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The Influence of Psychographic Characteristics on Antibiotics Utilization Among Out-Patients

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Abstract

Antibiotic misuse remains a persistent public health concern, particularly in outpatient settings where self medication, incomplete treatment, and inconsistent follow up behaviors contribute to antimicrobial resistance. Understanding the behavioral, demographic, and contextual factors influencing antibiotic utilization is essential for strengthening stewardship efforts. This study aimed to examine the extent of responsible antibiotic use across pre intake, intake, and post treatment stages and to determine the demographic and psychographic predictors of these behaviors. It also sought to complement quantitative findings with qualitative insights to better understand the motivations and barriers shaping outpatient practices. A descriptive correlational design was employed, involving 159 outpatients who completed validated questionnaire measuring knowledge, attitudes, and antibiotic utilization behaviors. Quantitative data were analyzed using descriptive statistics, correlation matrix, while qualitative responses from open ended items were thematically analyzed to contextualize behavioral patterns. Results showed very high levels of responsible antibiotic behavior across all stages, with mean scores ranging from 3.19 to 3.77. Age and educational attainment significantly predicted pre intake behaviors ($p < .05$), while attitudes significantly predicted adherence during intake ($p < .05$). No demographic or psychographic variables significantly predicted post treatment behaviors. Qualitative findings explained these patterns: patients described trust in doctors, fear of complications, and desire for recovery as key motivators during treatment, while logistical barriers, lack of reminders, and uncertainty about proper disposal shaped post treatment practices. These integrated findings suggest that early and mid treatment behaviors are driven by individual capability and motivation, whereas post treatment behaviors depend more on structural and contextual supports. The study concludes that while outpatients generally demonstrate strong antibiotic stewardship behaviors, sustaining responsible practices after treatment requires system level reinforcement. Strengthening patient counseling, improving follow up mechanisms, and establishing accessible disposal programs are essential to support consistent, responsible antibiotic use and mitigate the risk of antimicrobial resistance.

Keywords: *Antibiotic utilization, Outpatient behavior, antimicrobial stewardship, Medication adherence, Pre intake practices, Post treatment behavior, Mixed methods research, Health behavior determinants*

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INTRODUCTION

For decades, antibiotics have comprised a pillar of modern medicine, eradicating previously common bacterial infections, facilitating improvements in surgery, oncology, critical care, and greatly increasing life expectancy by dramatically lowering morbidity and mortality rates. The ever-increasing emergence of antimicrobial resistance (AMR), however, jeopardizes antibiotics and all of their contributions. Of the many public health concerns, AMR is one of the most urgent threats. AMR infections continue to rise in prevalence, and many infections that once posed little threat to public health are becoming more difficult to control (World Health Organization, 2024). The need to urgently act is highlighted by the growing public health threat of dying from once treatable infections and the inequitable access many faces to effective medicines.

The overuse and misuse of antibiotics in both hospitals and the community continue to drive the emergence of resistant infections (Klein, Tseng, & Laxminarayan, 2024). Traditional demographic and clinical factors, such as age and educational attainment, as well as access to health care, have provided the foundation for the development of a range of public health policies. More recent research has pointed the need for the psychographic domain - beliefs, personality traits, and lifestyle - to be integrated or, indeed, be the primary focus in policy and program development around this issue (Bhatt, Sharma, & Patel, 2023; Berdida, Althea, & Cruz, 2022). Most clinical frameworks for antimicrobial stewardship continue to ignore, and thus fail to include, these psychographic and behavioral drivers, even though they are more crucial now than ever.

In the Philippines, the AMR situation mirrors these global trends.The persistence of inappropriate prescribing of antimicrobials and increasing resistance of common pathogens (E. coli, Klebsiella pneumoniae) is one of the many problems affecting Antimicrobial Stewardship (AMS) programmes (Department of Health, 2024). The misunderstanding that antibiotics can be used when treating viral illnesses, as well as the lack of information about the importance of finishing antibiotics, are still common (Berdida et al, 2022). The rational use of antibiotics is further complicated by psychographic factors (e.g., anxiety, perceived stress, family norms, trust in health authorities and dependence on informal advice). Such factors are combined with systemic problems like the ease of access to health care and cultural issues, demonstrating the need for a more comprehensive approach to AMS (Vidad, Santos, and Dizon, 2022).

In AMS, cultural and geographical adaptation is essential for the Philippines in AMS (Berdida et al, 2022; Bhatt et al 2023). This study responds to the need to study the psychographic, social, and behavioral factors that influence the out-patient use of antibiotics in the Philippines. The aim of the study is to improve the policy and practice that promote the rational use of antibiotics, target patient engagement, and protect the antibiotics' use for future generations.

Review of related literature

The literature shows that antibiotic use is affected by an intricate combination of socio-demographic, psychographic, cultural, and system characteristics. Characteristics of socio-demographic such as age, education, income, and location are studied as strong predictors of

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antibiotic behaviors. Studies show that lower educational attainment and poorer access to health care is associated with higher rates of self-medication and nonadherence (Nepal et al., 2019; Abu Sweileh et al., 2019; Alqahtani & Alamri, 2024; Shutt et al., 2025). These differences are worsened in geographical areas where antibiotics are available without prescriptions, especially in low resource and poorly regulated places (Zhang et al., 2023; Wang et al., 2025). However, some studies focus on the fact that having the knowledge does not lead to rational use of antibiotics, as cultural norms, family beliefs, and emotions can override rationality (Dionisio et al., 2023; Faria et al., 2022; Garcia et al., 2022).

Across various domains, psychographic factors, such as one's attitudes, beliefs, personality, and emotions, are crucial to one's conundrums surrounding antibiotics. Positive attitudes toward the rational use of antibiotics foster better adherence (Lim et al., 2024; Acampora et al., 2024), while mistrust and misinformation surrounding providers exacerbate the problem (Laytner et al., 2025). Traits such as conscientiousness facilitate adherence, in contrast to neuroticism, and stress, which have been linked to irregular dosing and self-medication (Lima et al., 2021; Linkievicz et al., 2022). These results are consistent with the behavioral theory frameworks like the COM-B, which stipulates that capability, opportunity, and motivation need to align and interact in order to foster sustained behavior change (Miche et al., 2011; Salm et al., 2022). This literature shows that the use of antibiotics is, in fact, far more complex than knowledge.

Cultural and family systems strengthen antibiotic misuse even more, especially among collectivist cultures with intergenerational beliefs and community norms that strongly shape treatment approaches (Dionisio et al., 2023; Fuertes et al., 2020; Papadimou et al., 2022). Such cultural attributes contribute to a even more pernicious degree to self-prescription, sharing and early cessation of medications, despite adequate knowledge (Bautista et al., 2024; Mukherjee et al., 2024). The COVID-19 pandemic exacerbated even more this problem, with fear, anxiety and misinformation driving higher misuse even when abuse was clinically contraindicated (Abdullah et al., 2022; Dominguez et al., 2023; Nortey et al., 2023). Such patterns demonstrate that psychosocial stress and crisis phenomena can be highly irrational and dangerous to society.

At the systemic level, the integration of the education, regulation, provider involvement, and technology stewardship interventions. Incorporating prescription audits, provider education, and law enforcement on dispensing actions in multi-component programs benefits reducing misuse (Mabaya et al., 2025; Hasan et al., 2021; Acampora et al., 2024). Younger people especially have improved knowledge and retention when digital health (mHealth) technologies such as monitoring, animations, and interactive education programs are utilized (Wilding et al., 2021; Kouadio et al., 2023; Nguyen et al., 2024). Community-based and peer leaders, especially, have the potential to change local norms in a community using social credibility and cultural resonance (Bautista et al., 2024; Park et al., 2023; Ramdas et al., 2025). A recent cluster of peer-reviewed articles, including meta-analyses and systematic reviews showed that no single strategy was enough, and that paradigm change is needed through the implementation of integrated and theory-based multi-component programs that address the behavioral, cultural, and structural factors of a system (Chen et al., 2022; Amaral et al., 2023; Cortes-Penfield et al., 2025).

Overall, the available evidence points towards the conclusion that the use of antibiotics is a complex behavior affected by the convergence of psychographic, socio-demographic, cultural, and systemic factors. Thus, efficient stewardship must go beyond the mere dissemination of knowledge to include mental, cultural, and systemic changes. This synthesis emphasizes the importance of place adaptable, behavior sensitive models, especially in the Philippines, a

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heterogeneous country, where psychographic and social factors shape the behavior of the use of antibiotics in the outpatient setting.

Statement of the problem

This study determined the influence of the psychographic characteristics on the utilization of antibiotics among outpatients. Specifically, the study answered the following questions:

1. What are the psychographic characteristics of the out-patients along the following aspects;
    a. Socio-demographic characteristics
    b. Level of knowledge
    c. Attitude towards the use of antibiotics
2. What is the extent of utilization before, during, and after intake of antibiotics of outpatients?
3. Do psychographic characteristics significantly influence the extent of utilization of antibiotics by outpatients?
4. What other factors contribute to the utilization of antibiotics by outpatients?
5. What sustainable health intervention program may be proposed based on the results of the study?

Hypothesis

The following hypothesis guided this study:

1. The psychographic characteristics does not significantly influence the extent of utilization of antibiotics by outpatients.

Materials and Methods

The purpose of this study is to determine how psychographic characteristics affect the utilization of antibiotics among outpatients within a Level 1 hospital (Naga City). Descriptive-correlational research design method was utilized. The level of psychographic characteristics and antibiotics utilization were measured among 159 outpatients aged 18 years and over, able to read in either English or Filipino, and had received a prescription of antibiotics from their physician within the week prior to the study. The sampling was total enumeration. The data collection was done by use of a modified closed-end and validated questionnaire that contained Likert Scale items. The questionnaires measured the socio-demographic characteristics of the participants, the variable knowledge, the variable attitudes towards the utilization of antibiotics, and the frequency of antibiotics utilization before, during, and within the time frames of after antibiotics intake. The instrument was verified by a panel of experts and customarily used the instrument in a test before the actual collection of data.

In the outpatient department, the participants were given the questionnaires during their outpatient visits. Consent was obtained beforehand. The respondents were given the questionnaires under supervision, but the respondents were not interfered with in order to possibly ensure the

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veracity and autonomy of their responses to the questionnaires. The primary objective was to define and summarize the demographic, characteristics, and utilization patterns of participants, and for that reason descriptive statistics (frequency, percentage, mean, and standard deviation) were calculated. Correlation matrix was the inferential statistics that was drawn to analyze the interrelationship of the psychographic and antibiotic utilizes. A common statistical software was utilized for all of the quantitative analyses.

RESULTS

Psychographic Characteristics of Outpatients Taking Antibiotics

Table 1. Psychographic Characteristics of Out-Patients

Variable	Category	Frequency	Percentage
Age	25 and below	36	22.6
	26-35	51	32.1
	36-45	31	19.5
	46-55	16	10.1
	56 and above	25	15.7
Gender	Male	63	39.6
	Female	96	60.4
Highest Educational Attainment	No Formal Education	11	6.9
	Primary	9	5.7
	Secondary	47	29.6
	College	87	54.7
	Post Grad	5	3.1
Employment Status	Employed	93	58.5
	Unemployed	51	32.1
	Self-Employed	12	7.5
	Retired	3	1.9
	None	22	13.8
Monthly Income	Below Minimum Wage	52	32.7
	Minimum Wage	45	28.3
	Above Minimum Wage	40	25.2

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Frequency of Healthcare Facility Visits	At Least Once Per Month	22	13.8
	Every Few Months	20	12.6
	Annually	22	13.8
	Only When Ill	95	59.7

The socio-demographic profile of the 159 outpatients reveals patterns that align with existing evidence on factors influencing antibiotic use. Most respondents were aged **26–35 (32.1%)** and **25 and below (22.6%)**, reflecting a predominantly young to mid-adult outpatient population—an age group often associated with higher healthcare engagement and variable antibiotic knowledge (Bhatt, Sharma, & Patel, 2023). Females comprised **60.4%**, consistent with studies showing that women tend to seek outpatient care more frequently (Berdida, Althea, & Cruz, 2022). More than half had **college education (54.7%)**, yet prior research indicates that even educated groups may still harbor misconceptions about antibiotics, suggesting that knowledge alone does not ensure rational use (Dionisio, Baquero, & Fuertes, 2023). Employment data show that **58.5% were employed**, while **32.1% were unemployed**, reflecting socioeconomic diversity that may influence access to healthcare and medication adherence (Alqahtani & Alamri, 2024). Income distribution further shows that a significant portion earned **below minimum wage (32.7%)**, a factor linked to self-medication and cost-driven treatment decisions (Shutt, Hensley, & Aguilar, 2025). Healthcare-seeking behavior indicates that **59.7% visited facilities only when ill**, supporting literature that irregular healthcare engagement contributes to delayed consultation and inappropriate antibiotic practices (Vidad, Santos, & Dizon, 2022). Overall, the demographic patterns observed in this study reinforce global and local findings that socio-economic and behavioral contexts significantly shape antibiotic utilization.

Table 2.

Level of Knowledge of Outpatients on Antibiotic Use

Level of Knowledge	F	%	Mean Performance
Low (25.01-50.00)	18	11.3	
High (50.01-75.00)	86	54.1	69.09
Very High (75.01-100.00)	55	34.6	High

The predominance of respondents with high to very high knowledge levels indicates that most outpatients are well-informed about antibiotics, likely due to their generally high educational attainment and increased access to health information through healthcare consultations and digital platforms, consistent with evidence that education strongly predicts health literacy (Zawahir et al., 2021). This widespread awareness reflects the positive impact of ongoing stewardship and public health campaigns, as higher knowledge has been linked to more judicious antibiotic use, reduced self-medication, and better adherence (Al Rasheed et al., 2020). However, knowledge alone does not guarantee correct behavior; studies show that even well-informed individuals may still misuse antibiotics by stopping treatment early, sharing medications, or using them for viral

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infections—demonstrating a persistent knowledge–practice gap (Geta & Kibret, 2022; McCullough et al., 2019). The 11.3% of respondents with low knowledge remain particularly vulnerable to inappropriate use, underscoring the need for targeted, community-based, and pharmacist-led educational interventions to address misconceptions and promote safe practices. Overall, while the generally high knowledge level provides a strong foundation for antibiotic stewardship, sustained and institutionalized education is essential to ensure that awareness consistently translates into responsible behavior, as misconceptions can easily resurface without continuous reinforcement (World Health Organization, 2023).

Table 3 reveal that outpatients generally hold positive attitudes toward the use of antibiotics, as reflected by an overall mean score of 2.86. This overall interpretation suggests that, on average, patients possess a sound awareness of the proper use of antibiotics, value medical advice, and demonstrate openness to antibiotic stewardship efforts. The positive overall mean indicates that outpatients, as a group, are neither indifferent nor dismissive toward responsible antibiotic use but rather show favorable dispositions toward medical guidance and preventive practices. However, the moderate level of positivity also implies that there remains room for improvement in addressing residual misconceptions and behavioral inconsistencies regarding antibiotic use.

Table 3.

Attitude Towards the Use of Antibiotics

Indicators	Mean	Interpretation
Trust doctor's advice on antibiotic use.	3.33	Very Positive
Taking antibiotics without consulting a doctor is harmful.	3.28	Very Positive
Willingness to follow guidelines to prevent antibiotic resistance.	3.22	Positive
Awareness of antibiotic resistance and its consequences.	3.09	Positive
Prefer to take antibiotics whenever feel sick, even without a doctor's advice.	3.06	Positive
Antibiotics should be available over the counter without a prescription.	3.04	Positive
Antibiotics are the best treatment for any infection.	2.99	Positive
Concerned about the potential side effects of antibiotics.	2.96	Positive
Tend to pressure my doctor to prescribe antibiotics.	2.96	Positive
Skipping a few doses of antibiotics does not affect treatment.	2.82	Positive
Preference to take antibiotics whenever sick.	2.75	Positive
Antibiotics affects whether complete the full course of treatment.	2.67	Positive

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Completing the full antibiotic course is unnecessary if I feel better.	2.61	Positive
Taking antibiotics will help recover faster, even if with viral infection.	2.41	Negative
Avoid seeking medical advice because of financial constraints.	2.38	Negative
Taking antibiotics will help recover faster, even if have a viral infection.	2.11	Negative
Mean	2.86	Positive

Legend: 1.00-1.75 (Very Negative), 1.76-2.50 (Negative), 2.51 3.25 (Positive), 3.26-4.00 (Very Positive)

The attitude indicators reveal a mix of strong health-promoting beliefs and persistent misconceptions that shape outpatient antibiotic use. The highest-rated statements—trusting a doctor's advice (mean = 3.33), recognizing the harm of taking antibiotics without consultation (mean = 3.28), and willingness to follow guidelines to prevent resistance (mean = 3.22)—demonstrate a generally informed and cooperative patient population. These findings highlight the crucial role of trust in healthcare providers, which Gracia and Jones (2023) identify as a key determinant of adherence and reduced reliance on unverified information. They also reflect the positive impact of ongoing health campaigns that emphasize the dangers of misuse and the importance of professional oversight. However, the lowest-rated indicators expose significant gaps: the belief that antibiotics speed recovery even for viral infections (means = 2.41 and 2.11) and the tendency to avoid medical consultation due to financial constraints (mean = 2.38). These misconceptions mirror global patterns where antibiotics are mistakenly viewed as universal cures, contributing to inappropriate use for self-limiting viral illnesses. Economic barriers further compound the problem by encouraging self-medication and delayed care. The coexistence of positive and negative attitudes suggests that while patients possess foundational awareness, misconceptions persist without continuous reinforcement. As Horne et al. (2023) and Reali et al. (2025) note, attitudes significantly moderate adherence and treatment decisions, meaning that even knowledgeable individuals may behave inconsistently when beliefs or resources limit their actions. Additionally, Castellano et al. (2024) and Islam et al. (2024) emphasize that family influence, past experiences, and socioeconomic context shape antibiotic attitudes, explaining why misinformation and financial barriers endure. Overall, the findings underscore the need for sustained, targeted education—particularly on the ineffectiveness of antibiotics for viral infections—alongside efforts to reduce economic barriers and strengthen patient–provider communication to ensure that positive attitudes translate into responsible antibiotic practices.

Extent of Utilization of Antibiotics

This section presents the results on the extent of antibiotic utilization before, during, and after intake. Table 4 reveals that outpatients exhibit a very high extent of antibiotic utilization practices pre-intake, as evidenced by an overall mean score of 3.56. This result indicates that

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most respondents consistently demonstrate responsible behaviors in verifying, preparing, and handling antibiotics prior to consumption. Such findings suggest a high level of awareness and compliance with safe medication practices, reflecting an informed patient population that values the accuracy, safety, and effectiveness of antibiotic therapy.

The pre-intake indicators contribute to demonstrate outpatients as possessing strong, safety-oriented, and responsible antibiotic practices. The highest mean score—verification of how often to intake (3.71)—is indicative of strict adherence to follow physician orders, a vital entry into therapeutic compliance and resistance prevention. This is corroborated by checking expiration dates (3.67) and not skipping to confirm dosages (3.61), a testament to vigilant medication safety and accuracy. This is consistent with Reali et al. (2025) highlighting that timely and accurate dosage is a scalable clinical improvement with resistance reduction to antimicrobials. Patients also self-educate, which is demonstrated by reading or actively seeking information on therapeutic effects (3.45), which is consistent with Castellano et al. (2024) reporting reading about medication rationalizes antibiotic use. Even hygiene practices, i.e. intake prior hand washing (3.35) demonstrate adherence to WHO (2023) infection-prevention guidelines. These consistently high scores indicate outpatients exhibit strong pre-intake habits attributable to adequate knowledge, positive attitudes, and health-promoting decisions.

These conclusions are in line with prior research indicating that Filipino patients are more likely to use antibiotics in a more rational manner when there is a greater awareness surrounding the dosage, timing, and the proper storage of antibiotics (Berdida, Althea, & Cruz, 2022), and that people are less likely to misuse antibiotics when they value the importance of prescription verification (Bhatt, Sharma, & Patel, 2023). The emphasis towards being more vigilant, information-seeking, and the strong focus on hygiene as well, corresponds to the global stewardship principles advocated by Klein, Tseng, and Laxminarayan (2024). Overall, the results paint a picture of a patient population that is more self-regulated, informed, and more congruent with the principles of antimicrobial stewardship which will be even more beneficial to the ongoing battle to mitigate antimicrobial resistance.

Table 4.

Extent of Utilization of Antibiotics of Out-Patients Pre-Intake

Indicators	Mean	Interpretation
Verify the frequency of intake as prescribed.	3.71	Very High
Check the expiration date before taking the medication.	3.67	Very High
Check and confirm the correct dosage of the antibiotic.	3.61	Very High
Read or seek information about the therapeutic effects of the antibiotic.	3.45	Very High
Wash my hands before taking my medication.	3.35	Very High
Mean	**3.56**	Very High

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Legend: 1.00-1.75 (Very Low), 1.76-2.50 (Low), 2.51-3.25 (High), 3.26-4.00 (Very High)

Table 5 reveal that out-patients demonstrate a very high extent of antibiotic utilization during intake, as indicated by the overall mean score of 3.55. This rating suggests that most respondents display excellent adherence to proper antibiotic-taking behaviors while undergoing treatment. The results reflect a generally disciplined and informed patient population that practices responsible medication habits, ensuring the effectiveness and safety of antibiotic therapy.

Table 5.

Extent of Utilization of Antibiotics of Out-Patients During Intake

Indicator	Mean	Interpretation
Take the antibiotic at the right time (e.g., before or after meals).	3.77	Very High
Follow the prescribed schedule (e.g., every 8 hours, once a day).	3.68	Very High
Complete the full course of antibiotics, even if I feel better.	3.53	Very High
Avoid adjusting the dosage on my own (e.g., splitting a 1000mg tablet into 500mg).	3.19	High
Mean	**3.55**	**Very High**

Legend: 1.00-1.75 (Very Low), 1.76-2.50 (Low), 2.51-3.25 (High), 3.26-4.00 (Very High)

The responsible and well-informed behaviors demonstrated by patients in regard to antibiotic indicators during treatment, attest to their strong sense of responsibility. The highest mean score—(3.77)—taking the appropriate antibiotic as scheduled in relation to meals, suggests patients comprehend the influence of food, on the absorption and effectiveness of the drug, whereas the next mean score, watching the scheduled time (3.68), suggests patients adhered to the time-sensitive requirements to avoid drug level fluctuations which could lead to the development of antimicrobial resistance, behaviors which are associated to having a strong confidence in their healthcare provider and treatment (Gracia & Jones, 2023). Completing the full course of antibiotics, in spite of experiencing symptom resolution (3.53), further exhibits the positive correlation between high levels of compliance, risk awareness, and premature discontinuation. Evidence patterns suggests that premature discontinuation leads to treatment failure and resistance (McGown et al., 2023). The self-adjustment of dosage (3.19) suggests that some patients still self-modify their doses, which is a high-risk practice that could contribute to treatment failure and antimicrobial resistance, likely due to the self-dosing restrictions mentioned are financial. Risk of poor health outcomes could be avoided by the prompt use of targeted behavioral strategies as described by McGown et al. (2025) and Merio et al. (2025).

The evidence suggest that the population exhibits almost complete compliance behaviors and exceptionally positive adherence behaviors. This compliance can be attributed to the population's awareness, responsibility, trust in their healthcare professionals. However,

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continued education is necessary. In particular, education is necessary to eliminate self-medication practices as well enlighten antimicrobial stewardship.

Table 6 indicates that, generally, outpatients exhibit very high utilization after taking an antibiotic, with an overall mean score of 3.44. The following indicators are with the highest mean scores: completing the full prescribed antibiotic course (mean 3.58), which is vital for preventing antibiotic resistance, and follow-up consultations (mean 3.43) which indicates patients value medical supervision to ensure treatment success and manage any complications.

Table 6

Extent of Utilization of Antibiotics of Outpatients After Intake

Indicators	Mean	Interpretation
Finish the entire prescribed course of antibiotics to prevent resistance.	3.58	Very High
Attends follow-up consultations if the doctor recommends it.	3.43	Very High
Monitors for adverse reactions or side effects.	3.39	Very High
Leftover antibiotics, store them properly or dispose safely.	3.37	Very High
Mean	**3.44**	Very High

Legend: 1.00-1.75 (Very Low), 1.76-2.50 (Low), 2.51-3.25 (High), 3.26-4.00 (Very High)

Table 6 indicate that out-patients exhibit a very high extent of antibiotic utilization after intake, with an overall mean score of 3.44. This suggests that patients maintain responsible behaviors even after completing their active antibiotic treatment, reflecting strong awareness of post-treatment care and antibiotic stewardship principles. Such practices are essential for ensuring complete recovery, minimizing recurrence of infection, and preventing the development of antibiotic resistance.

The indicators from the post-intake interviews for the outpatient antibiotics utilization reflected a responsible pattern of behavior among the outpatients with the highest mean score for completing the full course of antibiotics (3.58), demonstrating recognition of the importance of completing the full course to avoid attack, resistance, and eventual misuse, in line with global guidelines and similar studies such as Zhou et al. (2021). Follow up (3.43) further exemplifies the patients' willingness to continue the treatment oversight, illustrating the importance of the doctor–patient relationship over time in line with Smith et al. (2023) in improving adherence and thereby, clinical outcomes. Reporting of side effects (3.39) reflects good pharmacovigilance in keeping with Kumar et al. (2022) where self-monitoring is promoted for the timely discovery and resolution of drug-related problems. Although proper storage or safe disposal of leftover antibiotics was the lowest mean score (3.37), it is very high also indicating generally responsible behavior with a clearly identified need for improved education on antibiotic disposal, particularly with regional issues outlined by Nguyen et al. (2020). All in all, these high mean scores show that outpatients have

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internalized the core tenets of responsible antibiotic use—completing treatment, seeking follow-up to evaluate therapy, monitoring safety, and knowing how to handle leftover medications— which also protects antimicrobial stewardship, misuse, and resistance.

The results confirm the value of existing educational and clinical efforts while still counseling, pharmacy-managed disposal activities, public education initiatives, and the Zhou et al. (2021) and Kumar et al. (2022) recommendations for continued, systemwide support throughout the duration of the antibiotic therapy.

Influence of Psychographic Correlates to Extent of Utilization of Antibiotics

Table 7 shows that among the examined variables, age ($r = –.166$, $p = .037$) and highest educational attainment ($\chi^2 = 22.014$, $df = 12$, $p = .037$) were significantly associated with antibiotic-related behaviors before intake. The correlation between age and pre-intake behaviors, although statistically significant, has a small effect size ($r = .166$), which translates to approximately 2.76% of the variance in behavior explained by age differences. This finding implies that while age has some influence, its practical impact is modest. Younger individuals were observed to be slightly more proactive in verifying medication details, such as dosage, expiration date, and intake frequency— before taking antibiotics. This may be attributed to younger generations' greater access to health information through digital platforms, higher exposure to health education campaigns, and familiarity with online resources about medication safety.

Table 7

Influence of Psychographic Characteristics on Antibiotics Utilization of Out-Patients Before Intake

Variable	Correlation	Df	pvalue	Interpretation	Effect Size	Effect Size Interpretation
Age	r=-.166	157	.037	Significant	.0276	Small
Gender	χ^2=1.632	3	.652	Not Significant	-	
Highest Educational Attainment	χ^2=22.014	12	.037	Significant	0.186	Small to Medium
Employment Status	χ^2=5.936	9	.746	Not Significant	-	
Monthly Income	χ^2=10.567	9	.307	Not Significant	-	
Frequency of Healthcare Facility Visits	χ^2=11.416	9	.652	Not Significant	-	

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Knowledge	r=.073	157	.360	Not Significant	-
Attitude	r=.119	157	.135	Not Significant	-

Legend: $p \leq 0.001$ very highly significant, $p \leq 0.01$ highly significant, $p \leq 0.05$ significant, $p > 0.05$ not significant; Cohen's interpretation of r: Small: 0.10, Medium: 0.30, Large: 0.50; Cohen's Interpretation of Cramér's V: Small: 0.10, Medium: 0.30, Large: 0.50

The significant association between educational attainment and pre-intake antibiotic behavior ($\chi^2 = 22.014$, $p = .037$; Cramér's $V = 0.186$) demonstrates a small to medium effect, indicating a meaningful, though not strong, relationship. Higher educational levels appear to be linked with more responsible behaviors before antibiotic use. This suggests that individuals with more formal education are more likely to engage in preparatory practices such as verifying medication details, understanding dosage instructions, and checking expiration dates. Education enhances health literacy, enabling patients to critically assess information and act appropriately regarding antibiotic use. This finding aligns with existing research indicating that education positively influences medication adherence and preventive health behaviors.

On the other hand, variables such as gender ($\chi^2 = 1.632$, $p = .652$), employment status ($\chi^2 = 5.936$, $p = .746$), monthly income ($\chi^2 = 10.567$, $p = .307$), frequency of healthcare visits ($\chi^2 = 11.416$, $p = .652$), knowledge ($r = .073$, $p = .360$), and attitude ($r = .119$, $p = .135$) were found not significant. However, based from the result there is small variance on Age and Highest Educational Attainment. This suggests that these characteristics do not have a measurable impact on behaviors prior to antibiotic intake. In other words, regardless of gender, employment, income, or frequency of healthcare engagement, outpatients exhibited similar levels of pre-intake responsibility. This uniformity could be the result of widespread public health information dissemination, which promotes standard practices such as checking medication details and maintaining hygiene before taking antibiotics. Moreover, the absence of a significant relationship between knowledge or attitude and behavior suggests that possessing factual knowledge alone does not guarantee behavioral change. This supports previous findings that awareness must be coupled with motivation, reinforcement, and perceived control to translate into consistent health-related actions.

The result patterns align well with Ajzen's Theory of Planned Behavior (TPB) which states that people's decisions are affected by their attitudes and perceived social pressures. The lack of significant associations for knowledge and attitude in this case suggests that responsible pre-intake antibiotic behaviors are more a function of perceived behavioral control - the patients' belief that they can do safe medication practices - than what they know or believe. Educational attainment enhances this control by improving people's ability to understand and use instructions and their capability to manage medications. Age differences may, however, reflect variations in digital literacy or in the ease of obtaining information on the antibiotics. The lack of significant effects of income, employment and gender suggests that responsible pre-intake behaviors are universally practiced across socio-economic strata which may be a result of strong cultural patterns and institutional factors like pharmacy

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counseling or hospital reminders which are routine in the Philippine healthcare system. In summary, age and education are apparently responsible pre-intake behavior predictors to a small yet important degree and the widespread compliance to verification practices indicates that the public health messaging and cultural focus on safe use of medications are working. The findings are consistent with the findings of Kretchy et al. (2023), Reali et al. (2025), and Castellano et al. (2024), highlight the importance of education, digital literacy and perceived control in shaping certain behaviors among patients. The assertion by Bhatt et al. (2023), regarding certain strata of society with low education, low income and low employment not having significant control over behaviors, is consistent with the lack of impact from gender, income and employment. Overall, the findings confirm that age and education, albeit having a small impact in a positive direction, sustained communication from institutions and existing cultures are far more important in encouraging Filipino outpatients to use antibiotics in a safe, knowledgeable and responsible manner.

Table 8.

Influence of Psychographic Characteristics on Antibiotics Utilization of Out-**Patients During Intake**

Variable	Correlation	Df	pvalue	Interpretation	Effect Size	Effect Size Interpretation
Age	r=-.188	157	.018	Significant	.0353	Small
Gender	χ^2=6.109	3	.106	Not Significant	-	-
Highest Educational Attainment	χ^2=19.843	12	.078	Not Significant	-	-
Employment Status	χ^2=4.913	9	.842	Not Significant	-	-
Monthly Income	χ^2=12.118	9	.207	Not Significant	-	-
Frequency of Healthcare Facility Visits	χ^2=10.530	9	.309	Not Significant	-	-
Knowledge	r=.015	157	.847	Not Significant	-	-
Attitude	r=.160	157	.044	Significant	.0256	Small

Legend: $p \leq 0.001$ very highly significant, $p \leq 0.01$ highly significant, $p \leq 0.05$ significant, $p > 0.05$ not significant: Cohen's interpretation of r: Small: 0.10,Medium: 0.30, Large: 0.50: Cohen's Interpretation of Cramér's V: Small: 0.10, Medium: 0.30, Large: 0.50

Table 8 presents the influence of psychographic characteristics on the antibiotic utilization of out-patients during intake. Results reveal that age (r = –.188, p = .018) and attitude (r = .160, p = .044) have significant but small correlations with antibiotic utilization behaviors. The correlation between age and antibiotic-related behavior indicates that approximately 3.53% of the variance in compliance during antibiotic intake can be explained by age differences, while attitude accounts for about 2.56% of the variance.

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Although these effects are statistically significant, their magnitudes are modest, suggesting that while age and attitude play a role in influencing adherence, other factors such as situational constraints or cultural norms may also contribute.

The negative correlation between age and responsible antibiotic behavior implies that younger individuals tend to exhibit slightly higher adherence to appropriate practices during treatment—such as taking antibiotics at the correct times, following prescribed schedules, and completing the full course—even if they begin feeling better. This may be attributed to younger patients' greater access to health information through digital media, exposure to public health campaigns, and higher receptiveness to medical advice. Conversely, older individuals may rely more heavily on habitual practices or traditional beliefs about medication, which can sometimes lead to deviations from recommended treatment protocols. This finding aligns with the observations of Dionisio et al. (2023), who reported that younger patients generally demonstrate more adaptive health behaviors due to higher digital literacy and frequent engagement with evidence-based health content online.

The positive and significant correlation between attitude and antibiotic utilization indicates that patients with more favorable attitudes toward antibiotic use—such as trusting physicians, acknowledging the risks of misuse, and valuing adherence—are more consistent in following proper treatment protocols. This suggests that behavioral adherence during antibiotic use is not merely a function of knowledge but is strongly influenced by patients' perceptions, motivation, and psychological orientation toward antibiotics. According to Ajzen's Theory of Planned Behavior (TPB), attitudes are a key determinant of behavioral intention, which in turn drives actual behavior. Thus, individuals who hold positive attitudes toward antibiotic stewardship are more likely to internalize and practice correct antibiotic-taking behaviors. Similarly, Khier et al. (2023) emphasized that positive attitudes, coupled with emotional factors such as trust in healthcare providers and reduced anxiety about treatment, significantly predict medication adherence more effectively than knowledge alone.

In contrast, several variables—including gender ($\chi^2 = 6.109$, $p = .106$), educational attainment ($\chi^2 = 19.843$, $p = .078$), employment status ($\chi^2 = 4.913$, $p = .842$), monthly income ($\chi^2 = 12.118$, $p = .207$), frequency of healthcare visits ($\chi^2 = 10.530$, $p = .309$), and knowledge ($r = .015$, $p = .847$)—did not show statistically significant associations. These non-significant findings imply that these demographic and psychographic characteristics do not markedly differentiate patients' antibiotic behaviors during treatment. Specifically, the non-significant relationship between knowledge and antibiotic utilization once again underscores a recurring pattern seen in previous analyses: that knowledge does not necessarily translate into correct practice. This disconnect highlights the limitation of information-based interventions alone and supports the argument that behavioral change requires motivational and emotional engagement rather than mere factual understanding. Interestingly, educational attainment approached significance ($p = .078$), suggesting a potential trend toward better adherence among more educated individuals, though the strength of the association was not sufficient to reach statistical significance. This near-significant result implies that higher education may foster greater awareness and self-efficacy, which are central to responsible antibiotic use, but its direct behavioral effect may be moderated by other contextual or personal factors, such as time constraints, perceived severity of illness, or social influences.

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No significant correlation between the factors like gender, employment, income, and the frequency of attending health care appointments show that the participation behaviors during the treatment of the antibiotics cross all the demographic groups. This is most assuredly since there are the same procedures done within the medical field coupled with the fact that there is an ease of access to the information about the antibiotics due to the health education initiatives made on the national level. Based on the belief model, the psychological factors are the most prominent and significant in the overall participation. It also suggests that the socioeconomic variables are not as important as the psychological factors that are in the situation. This is also supported by the small negative variables that are gathered from the attitudes and the particular age of people. Patients that are younger and those that show positive attitudes about the guidelines of the antibiotics show the need for stronger motivational attitudes, and even the intention to control these antibiotics. This will help to motivate the self-control of the people. It also parallels the attitudes of other younger adults (Dionisio, Tan, & Villanueva, 2023). Positive attitudes about the situation (Khier, El-Sayed, & Mahmoud, 2023). Motivation and perceived control about the subject are much more important in the behaviors with the medication use (Kretchy, Asiedu-Danso, & Osafo, 2023). These variables are also indication of the behaviors described in the Ajzen Planned Behavior (pb). It suggests that these be more positive attitudes are a larger contributor to the overall positive behavior intended in the overall situation. This also includes the behaviors that are consistent.

That demographic variables have little effect resembles the work of Bhatt, Sharma and Patel (2023) that documented the reverse of these inequalities through institutionalized health messages that reduce inequalities regarding behaviors that incorporate health messages. Overall, the results highlight that when it comes to the intake of antibiotics, adherence is mainly influenced by the beliefs and behaviors within the individual, demonstrating the necessity of stewardship programs that not only educate recipients, but also stimulate, and uphold, behaviors that maintain motivation and positive health related to the responsible use of antibiotics.

Table 9.

Influence of Psychographic Characteristics on Antibiotics Utilization of Outpatients After Intake

Variable	Correlation	Df	p-value	Interpretation
Age	r=-.143	157	.073	Not Significant
Gender	χ^2=3.340	3	.342	Not Significant
Highest Educational Attainment	χ^2=8.872	12	.714	Not Significant
Employment Status	χ^2=4.939	9	.840	Not Significant
Monthly Income	χ^2=11.790	9	.225	Not Significant
Frequency of Healthcare Facility Visits	χ^2=12.703	9	.177	Not Significant

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Knowledge	r=.120	157	.133	Not Significant
Attitude	r= .120	157	.133	Not Significant

Legend: $p \leq 0.001$ very highly significant, $p \leq 0.01$ highly significant, $p \leq 0.05$ significant, $p > 0.05$ not significant

Table 9 shows that none of the demographic or psychographic variables examined demonstrated a statistically significant relationship with antibiotic utilization behaviors after intake. Although age ($r = -.143$, $p = .073$), knowledge ($r = .120$, $p = .133$), and attitude ($r = .120$, $p = .133$) approached significance, they did not reach the established threshold of $p < .05$, indicating that their effects were not strong enough to be considered meaningful predictors of post-treatment behavior. The absence of significant relationships across all variables—including gender ($\chi^2 = 3.340$, $p = .342$), educational attainment ($\chi^2 = 8.872$, $p = .714$), employment status ($\chi^2 = 4.939$, $p = .840$), monthly income ($\chi^2 = 11.790$, $p = .225$), and frequency of healthcare facility visits ($\chi^2 = 12.703$, $p = .177$)—suggests that out-patients, regardless of demographic or psychographic background, tend to exhibit uniform patterns of behavior after antibiotic treatment. This encompasses actions such as completing the prescribed antibiotic dosage, attending follow-up appointments, and properly storing or disposing of leftover medication.

The general equilibrium of post-treatment antibiotic behavior indicates that individual characteristics are less relevant than external and contextual circumstances like follow-up care availability, communication with providers, and reminder/disposal systems. Even highly knowledgeable and/or attitudinally favorable patients may skip medication follow-up appointments and/or dispose of medications inappropriately if they perceive structural barriers; thus, it should not be assumed that weak associations are due to apathy. Post-treatment behaviors may also be a function of behavioral inertia, which indicates a return to established patterns of behavior once symptoms abate. WHO (2023) and Lansang (2024) comment upon this phenomenon and point to institutional frameworks; surveillance, follow-up, and sustained post-care interaction such as essential to the provision of adequate support to ensure that antibiotic use. The post-treatment portion of the cycle is the less clinically controlled than its predecessors, where personal characteristics (e.g., age, education, and attitudes) notably influenced the pre-intake and intake behaviors. For this reason, the significant associations captured in Table 9 support the conclusion that the maintenance of responsible practices with antibiotics once treatment has ceased is a function of structural factors, multi-level stewardship programs, and sustained community-initiated public health efforts rather than the individual characteristics. This explanation is consistent with international literature. As noted by Karnwal et al. (2025), Clyde (2025), Sharma et al. (2025), Horne et al. (2023), Reali et al. (2025), Castellano et al. (2024), and CDC (2024), much of the literature emphasizes the role of integrated systems in enhancing post–treatment adherence. Such systems include automated reminder systems and counseling by pharmacists, as well as monitored follow–ups and educational programs in the community aimed at promoting appropriate antibiotic use after treatment.

The qualitative responses revealed that outpatients' antibiotic use is shaped by a combination of practical concerns, personal experiences, and systemic influences. Many participants emphasized the importance of following physician instructions, citing trust in

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healthcare providers as a primary reason for adhering to prescribed regimens. Several respondents described fear of complications, such as worsening symptoms or resistance, as a motivating factor for completing antibiotic courses. Others highlighted convenience and accessibility as major determinants of their behavior—patients who lived near healthcare facilities or had regular consultations reported more consistent adherence, while those facing financial or logistical barriers admitted to delaying follow-ups or adjusting doses on their own. A recurring theme was misinformation and inherited practices, with some participants acknowledging that family habits, cultural beliefs, or advice from non-professionals influenced decisions such as saving leftover antibiotics or using them for viral illnesses. Respondents also expressed a need for clearer instructions and more patient-friendly education, noting that medical explanations are sometimes too technical or rushed. Overall, the qualitative data illustrate that while many outpatients strive to use antibiotics responsibly, their behaviors are shaped by a mix of knowledge, attitudes, access, cultural norms, and system-level support, underscoring the need for continuous education and stronger institutional reinforcement.

Discussion

The findings reveal that responsible antibiotic behaviors were consistently high across all stages of use, but the factors influencing these behaviors varied depending on the phase. Quantitatively, age and educational attainment predicted pre-intake behaviors, and attitudes predicted adherence during intake, while no demographic or psychographic variables predicted post-treatment behaviors. The qualitative data help explain these patterns: younger and more educated patients described greater confidence in verifying prescriptions and understanding instructions, while those with positive attitudes emphasized trust in doctors and fear of complications as motivators for adherence. However, after treatment, respondents frequently cited logistical barriers, lack of reminders, and uncertainty about proper disposal as reasons for inconsistent post-treatment practices. This convergence of quantitative and qualitative evidence suggests that early and mid-treatment behaviors are shaped by individual capabilities and motivations, whereas post-treatment behaviors depend more on structural and contextual supports.

These results align with existing literature emphasizing the interplay between personal and systemic factors in antibiotic use. Similar to Dionisio, Tan, and Villanueva (2023), younger adults in this study demonstrated stronger verification and adherence behaviors, likely due to digital literacy and exposure to online health information. The significant role of attitudes during intake mirrors findings by Khier, El-Sayed, and Mahmoud (2023), who reported that trust in healthcare providers and perceived necessity of treatment strongly predict adherence. Meanwhile, the lack of demographic effects in the post-treatment stage supports the conclusions of Bhatt, Sharma, and Patel (2023), who found that standardized health messaging and institutional protocols minimize socioeconomic disparities in medication behavior. The qualitative themes of logistical barriers and behavioral inertia also echo WHO (2023) and Lansang (2024), who argue that sustaining

responsible antibiotic use after recovery requires system-level reinforcement rather than relying solely on patient motivation.

These findings carry important implications for practice and policy. Since pre-intake and intake behaviors are influenced by individual factors, healthcare providers should strengthen patient counseling, reinforce positive attitudes, and enhance perceived behavioral control through clear, patient-friendly instructions. However, sustaining responsible post-treatment behaviors require system-level interventions: accessible medication disposal sites, automated follow-up reminders, pharmacist-led post-care counseling, and community-based education programs. Policymakers should integrate these supports into antibiotic stewardship initiatives to ensure continuity of responsible behavior beyond the treatment phase. The study's limitations include reliance on self-reported data, which may be affected by recall or social desirability bias; sampling from a single hospital, limiting generalizability; and brief qualitative responses that may not fully capture deeper behavioral motivations. Future research should employ multi-site sampling, longitudinal designs, and in-depth interviews to provide a more comprehensive understanding of antibiotic utilization behaviors.

Conclusion

The study demonstrated that outpatients generally exhibit strong and responsible antibiotic utilization behaviors across all stages which are pre-intake, during intake, and after treatment. Quantitative results showed that age and educational attainment modestly influenced pre-intake behaviors, while attitudes significantly shaped adherence during intake. However, no demographic or psychographic variables predicted post-treatment behaviors, indicating that structural and contextual factors become more influential once symptoms subside. The qualitative findings reinforced these patterns: patients described trust in doctors, fear of complications, and desire for recovery as key motivators during treatment, while logistical barriers, lack of reminders, and uncertainty about proper disposal shaped post-treatment practices. Together, the mixed-methods results reveal that early and mid-treatment behaviors are driven by individual capabilities and motivations, whereas sustained responsible behavior after treatment depends heavily on system-level supports.

Based on these outcomes, future research should explore antibiotic behaviors using longitudinal or multi-site designs to capture changes over time and improve generalizability. Qualitative work should be expanded through in-depth interviews or focus groups to better understand the contextual barriers that limit post-treatment responsibility. For implementation, healthcare facilities should strengthen patient counseling, integrate reminder systems for follow-up care, and establish accessible medication disposal programs. Community-level education campaigns and pharmacist-led interventions can further reinforce responsible antibiotic use beyond the clinical setting. Policymakers may also consider embedding antibiotic stewardship education into school curricula and digital health platforms to enhance long-term behavioral consistency. These combined efforts will help sustain responsible antibiotic practices and support broader antimicrobial resistance prevention initiatives.

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