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HOSPITAL ALLIED HEALTHCARE PERSONNEL'S COMPLIANCE AND COMPETENCIES ON ANTIMICROBIAL STEWARDSHIP PROGRAM: BASIS FOR ENHANCED AND SUSTAINABLE GUIDELINES OF METRO BACOLOD HOSPITAL AND MEDICAL CENTER

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ABSTRACT

This study assessed, evaluated, and analyzed the compliance and competencies of hospital allied healthcare personnel related to the Antimicrobial Stewardship Program at Metro Bacolod Hospital and Medical Center to inform the development of enhanced, sustainable guidelines. The study was completed in September 2026. The study employed a descriptive-correlational quantitative research design. From a population of about 796 qualified personnel, 354 respondents participated: 240 doctors and 114 nurses and other healthcare personnel, including 73 nursing personnel, 11 pharmacy personnel, and 30 clinical laboratory personnel. Experts content-validated a researcher-made survey questionnaire, which was pilot-tested among 10 comparable respondents and yielded a Cronbach's alpha of 0.94. The study used frequency, percentage, mean, standard deviation, t-test, analysis of variance, simple linear regression, and Pearson correlation at the 0.05 significance level. Hospital allied healthcare personnel had a High Level of Compliance with the National Antibiotic Guidelines (M=4.01, SD=0.60) and a High Level of Competency in antimicrobial stewardship (M=4.15, SD=0.58). Compliance significantly predicted competency (B=.773, SE=.031, β=.797, t=24.723, p<.001) and was strongly positively correlated with competency (r=.797, p<.001). Roles across the stewardship process were Highly Performed (M=4.04, SD=0.59). The findings provided a basis for proposed Enhanced and Sustainable Antimicrobial Stewardship Guidelines.

Keywords: *antimicrobial stewardship, antibiotic guidelines, compliance, competency, allied healthcare personnel, antimicrobial resistance*

INTRODUCTION

Antimicrobial resistance (AMR) has become one of the most significant public health threats worldwide because it compromises the effectiveness of antimicrobial agents used to treat infectious diseases. (World Health Organization [WHO], 2026) The inappropriate use, overuse, and misuse of antibiotics have accelerated the emergence and spread of resistant microorganisms, resulting in prolonged hospitalizations, increased healthcare costs, treatment failures, and higher morbidity and mortality rates. Addressing AMR requires not only appropriate antimicrobial prescribing but also coordinated participation from healthcare professionals directly involved in patient assessment, diagnosis, treatment, medication management, laboratory testing, monitoring, and infection prevention. In the Philippines, the Department of Health (DOH), together with the Research Institute for Tropical Medicine (RITM) and partner agencies, institutionalized the Philippine Antimicrobial Stewardship (AMS) Program as a key strategy in the national response to AMR (Department of Health [DOH], 2019; Inter-Agency Committee on Antimicrobial Resistance [ICAMR], 2024). Likewise, the National Antibiotic Guidelines (NAG) 2017 serve as a primary Philippine clinical reference for selecting and using antimicrobial agents appropriately (Research Institute for Tropical Medicine [RITM], 2018).

Hospital compliance with the National Antibiotic Guidelines is a fundamental component of a successful Antimicrobial Stewardship Program. Hospitals are expected to adopt or adapt the guidelines according to their local context, antimicrobial susceptibility patterns, available resources, and institutional policies while maintaining adherence to national standards (RITM, 2018). Compliance is reflected not only in antimicrobial prescribing but also in the collective practices of allied healthcare personnel throughout the patient care continuum. This includes selecting appropriate antimicrobial agents, considering the indication and likely causative organism, administering the appropriate dose and route, observing the recommended treatment duration, reassessing therapy based on the patient's clinical response and available laboratory results, using combination therapy only when indicated, recognizing causes of therapeutic failure, and preventing antimicrobial misuse or inappropriate use. Consistent compliance with these principles supports patient safety, treatment effectiveness, and responsible antimicrobial use within healthcare facilities.

Implementing antimicrobial stewardship also depends on the distinct but interconnected roles of hospital allied healthcare personnel. Physicians and other prescribers determine whether antimicrobial therapy is clinically indicated, select appropriate agents, and modify or discontinue treatment based on the patient's condition, diagnostic findings, culture results, and response to therapy. Nurses contribute through timely medication administration, monitoring therapeutic response and adverse effects, documentation, communicating relevant clinical changes, and educating patients and families. Pharmacists support medication review, dose optimization, drug interaction assessment, monitoring, and other stewardship interventions. Medical technologists and laboratory personnel provide accurate, timely microbiological and antimicrobial susceptibility information to support evidence-based treatment decisions. Other personnel involved in infection prevention, quality improvement, and hospital administration contribute through monitoring, documentation, policy implementation, and

support for continuous improvement. These responsibilities reflect the multidisciplinary approach required by the Philippine AMS Program (DOH, 2019).

The competencies of hospital allied healthcare personnel in antimicrobial stewardship may be reflected through the domains of knowledge, attitude, and practice. Knowledge refers to understanding antimicrobial resistance, appropriate antimicrobial use, relevant clinical and laboratory information, institutional protocols, and the National Antibiotic Guidelines. Attitude encompasses professional commitment, responsibility, willingness to comply with stewardship principles, and readiness to collaborate with other members of the healthcare team. Practice refers to applying stewardship principles within each professional role, including prescribing and medication management, safe administration, patient monitoring, diagnostic and laboratory support, documentation, infection prevention and control, patient education, communication, and participation in quality-improvement activities. Compliance and competency are closely related: institutional standards and protocols provide the framework for appropriate antimicrobial use, while the knowledge, attitudes, and practices of healthcare personnel determine how consistently these standards translate into patient care (DOH, 2019; RITM, 2018).

In Metro Bacolod Hospital and Medical Center, antimicrobial stewardship involves multiple professional groups whose responsibilities extend from patient admission and initial assessment to specimen collection, initiation of empiric antibiotics, ongoing monitoring, 48–72-hour antibiotic review, duration control, patient education and discharge, and documentation and quality monitoring. Although national guidelines and institutional policies set standards for appropriate antimicrobial use, institution-specific assessment is necessary to determine how consistently personnel responsible for patient care understand and apply these standards. Examining compliance, competencies, and role performance together provides a more comprehensive view of stewardship practice than examining only one professional group or one stage of antimicrobial management. It can also identify areas requiring reinforcement in training, multidisciplinary collaboration, monitoring, documentation, and quality improvement.

Accordingly, the study assessed, evaluated, and analyzed the compliance and competencies of hospital allied healthcare personnel in relation to the Antimicrobial Stewardship Program at Metro Bacolod Hospital and Medical Center. It examined compliance with the General Principles of the National Antibiotic Guidelines (2017), competencies in knowledge, attitude, and practice, and the performance of professional roles throughout the antimicrobial stewardship process. The findings were intended to provide an empirical basis for developing Enhanced and Sustainable Antimicrobial Stewardship Guidelines that strengthen professional responsibilities, guideline compliance, competency development, multidisciplinary collaboration, monitoring, and quality-improvement activities within the hospital.

Research Questions

Specifically, the study sought to answer the following questions:

1. What is the profile of the respondents in terms of:
   1.1 For doctor respondents (prescribing physicians and infectious and all specialist doctors);
      1.1.1 Age;

1.1.2 Sex;
1.1.3 Specialization; and
1.1.4 Years of Practice?

1.2 For nurse, pharmacist, and lab-personnel respondents;
1.2.1 Age
1.2.1 Sex
1.2.3 Years of service working in the hospital; and
1.2.4 Department or Unit assignment;

2. What is the level of compliance of the Hospital allied healthcare personnel with regards to the following general principles stated in the National Antibiotic Guidelines of 2017:
2.1 Factors to consider in the choice of antimicrobials;
2.2 Antibiotic combination therapy;
2.3 General steps in appropriate antimicrobial theraphy;
2.4 Causes of failure in antimicrobial theraphy;
2.5 Misuse/abuse of antimicrobial;
2.6 Factors that lead to inappropriate use of antimicrobials; and
2.7 Unwanted consequences of misuse/inappropriate use of antimicrobials?

3. Is there a significant difference on the assessment of the respondents as to the level of Compliance on the general principles stated in the National Antibiotic Guidelines of 2017 when grouped according to their profile?

4. What is the level of competencies of the hospital allied healthcare personnel in handling the antimicrobial stewardship program:
4.1 Knowledge;
4.2 Attitude and;
4.3 Practice?

5. Is the level of compliance of the allied healthcare personnel on the general principles of National Antibiotic Guidelines a predictive factor of their level of competencies in handling the antimicrobial stewardship program?

6. Is the level of compliance of the allied healthcare personnel on the general principles of National Antibiotic Guidelines statistically significantly correlated to their level of competencies in handling the antimicrobial stewardship program?

7. How do respondents evaluate the roles of the allied healthcare personnel performing their duties with regards to the following process flow of the Antimicrobial Stewardship program:
7.1 Patient Admission and Initial Assessment;
7.2 Specimen Collection;
7.3 Start Empiric Antibiotics;
7.4 On-going Monitoring;
7.5 48-72 Hours Antibiotic Review;
7.6 7 Day Automatic Stop Policy;
7.8 Patient Education Discharge and;
7.8 Documentation and Quality Monitoring

8. Based on the findings of the study, what enhanced and sustainable guidelines may be developed to strengthen the hospital allied healthcare personnel's

competencies and level of compliance with the Antimicrobial Stewardship Program at Metro Bacolod Hospital and Medical Center?

METHODOLOGY

The present study employed a descriptive-correlational quantitative research design. This research design was appropriate because it systematically collected, analyzed, and interpreted numerical data to describe the characteristics of the variables under investigation and determine the relationships among them without manipulating any variable. The researcher gathered quantitative data through a researcher-made survey questionnaire administered to the identified respondents at Metro Bacolod Hospital and Medical Center. The collected data were analyzed using appropriate descriptive and inferential statistical techniques to determine the hospital allied healthcare personnel's level of compliance with the General Principles of the National Antibiotic Guidelines (2017), their competencies in implementing the Antimicrobial Stewardship Program, and their respective roles throughout the antimicrobial stewardship process. The design also allowed the study to determine significant differences, predictive associations, and correlational relationships among the variables.

The study population consisted of 796 qualified allied healthcare personnel from Metro Bacolod Hospital and Medical Center in Bacolod City. The respondents were composed of two groups. Group 1 consisted of 636 prescribing physicians, including infectious disease specialists and other specialist doctors, while Group 2 consisted of 160 nurses, pharmacists or pharmacy personnel, and laboratory personnel. Using the appropriate Raosoft sample size computation, the study selected 354 respondents: 240 prescribing physicians, infectious disease specialists, and other specialist doctors, and 114 nurses and other healthcare personnel. The latter group included 73 nursing personnel, 11 pharmacy personnel, and 30 clinical laboratory personnel. The study used purposive stratified sampling, with the two respondent groups as strata, and applied purposive sampling within each stratum to identify respondents who met the predetermined inclusion criteria. Only respondents who were directly involved in antimicrobial prescribing, antimicrobial administration and monitoring, medication management, laboratory diagnostics, or other activities supporting the implementation of the Antimicrobial Stewardship Program were included. The study excluded patients and patient companions because it focused exclusively on allied healthcare personnel involved in antimicrobial stewardship.

The study used a researcher-made survey questionnaire to gather the data needed to answer the research questions. The questionnaire was developed based on the objectives of the study, the National Antibiotic Guidelines (2017), the Department of Health Administrative Order No. 2019-0002 on the Philippine Antimicrobial Stewardship Program, the Antimicrobial Stewardship Program process flow, and relevant literature on antimicrobial stewardship, antimicrobial use, and the competencies and roles of allied healthcare personnel. The questionnaire consisted of four parts. Part I gathered respondents' profiles. For doctor respondents, the profile included age, sex, specialization, and years of practice, while for nurses, pharmacists or pharmacy personnel, and laboratory personnel, the profile included age, sex, years of service in the

hospital, and department or unit assignment. Part II measured the level of compliance of hospital allied healthcare personnel with the General Principles of the National Antibiotic Guidelines (2017) in terms of factors to consider in the choice of antimicrobials, antibiotic combination therapy, general steps in appropriate antimicrobial therapy, causes of failure in antimicrobial therapy, misuse or abuse of antimicrobials, factors that lead to inappropriate use of antimicrobials, and unwanted consequences of misuse or inappropriate use of antimicrobials. Part III assessed the level of competencies of hospital allied healthcare personnel in handling the Antimicrobial Stewardship Program in terms of knowledge, attitude, and practice. Part IV evaluated the roles of allied healthcare personnel in performing their respective duties throughout the Antimicrobial Stewardship Program process flow, including patient admission and initial assessment, specimen collection, start of empiric antibiotics, ongoing monitoring, 48–72-hour antibiotic review, seven-day automatic stop policy, patient education and discharge, and documentation and quality monitoring.

Before data collection, the researcher-made questionnaire underwent content validation by three qualified experts with relevant expertise in nursing or healthcare, antimicrobial stewardship or infectious diseases, and research methodology or statistics. The experts evaluated the questionnaire for clarity, relevance, appropriateness, organization, and adequacy of the items in relation to the study objectives, variables, and research questions. The researcher incorporated the experts' comments and recommendations into the instrument revision. After validation, the revised questionnaire underwent pilot testing among respondents with characteristics similar to the target allied healthcare personnel population but who were not included in the actual study. The pilot test involved 10 respondents, and the instrument obtained a Cronbach’s alpha reliability coefficient of 0.94. The pilot test assessed the clarity, comprehensibility, applicability, and consistency of the questionnaire items and identified items requiring further revision. The internal consistency and reliability of the instrument were determined using Cronbach’s alpha coefficient.

Prior to data collection, the researcher secured the necessary approval from the university and the management of Metro Bacolod Hospital and Medical Center and coordinated with the concerned department heads and unit supervisors. The researcher informed the respondents of the study’s objectives, significance, procedures, and ethical considerations and obtained written informed consent from all participants. The researcher personally administered the questionnaires through face-to-face distribution. After retrieving the completed questionnaires, the researcher examined each instrument for completeness and consistency of responses. The researcher then encoded, classified, tabulated, analyzed, and interpreted the data. The study observed the provisions of Republic Act No. 10173, or the Data Privacy Act of 2012 (Republic of the Philippines, 2012), and applicable ethical principles governing research involving human respondents.

The study analyzed the data using descriptive and inferential statistical tools. The study used frequency and percentage distributions to describe the respondents’ profiles. The weighted mean was used to determine respondents’ average assessment of the hospital allied healthcare personnel’s level of compliance with the General Principles of the National Antibiotic Guidelines (2017), their level of competency in implementing the

Antimicrobial Stewardship Program, and their role performance throughout the stewardship process. The study used ranking to determine the relative order of the indicators based on weighted mean scores, and standard deviation to assess the variability and consistency of respondents' assessments. The study used a five-point Likert scale to assess compliance, competencies, and role performance.

For inferential analysis, one-way analysis of variance was used to determine whether significant differences existed among respondents' assessments when grouped according to relevant profile variables involving more than two categories, while the independent-samples t-test was used to determine differences between two independent groups. Linear regression analysis was used to determine whether compliance with the General Principles of the National Antibiotic Guidelines (2017) significantly predicted allied healthcare personnel's competencies in handling the Antimicrobial Stewardship Program. Pearson product-moment correlation was used to determine whether a statistically significant relationship existed between compliance with the National Antibiotic Guidelines and antimicrobial stewardship competencies. The gathered data were processed using the Statistical Package for the Social Sciences (SPSS) Version 27 and Microsoft Excel, and all hypotheses were tested at the 0.05 level of significance.

The study was limited to qualified hospital allied healthcare personnel at Metro Bacolod Hospital and Medical Center who were directly involved in or had relevant responsibilities in implementing the Antimicrobial Stewardship Program. It focused on respondents' assessments of compliance with the General Principles of the National Antibiotic Guidelines (2017), competencies in knowledge, attitude, and practice, and role performance throughout the identified Antimicrobial Stewardship Program process flow. The study did not evaluate patients' knowledge, attitudes, or practices; patient satisfaction; clinical effectiveness of antimicrobial treatment; appropriateness of antimicrobial prescribing for individual patients; individual patient treatment outcomes; antimicrobial resistance rates; microbiological surveillance data; healthcare-associated infection rates; or the effectiveness of specific antimicrobial stewardship interventions. The enhanced, sustainable guidelines developed from the findings were intended as recommendations to strengthen competencies, compliance, and implementation of the Antimicrobial Stewardship Program among qualified hospital allied healthcare personnel at Metro Bacolod Hospital and Medical Center.

RESULTS

Respondent Profile

Table 1 Profile of the Combined Respondents

SEX	FREQUENCY	PERCENTAGE
Male	130	36.7
Female	224	63.3
Total	**354**	**100.0**
YEARS OF PRACTICE	**FREQUENCY**	**PERCENTAGE**

1-5 Years	**51**	14.4
6-10 Years	110	31.1
11-15 Years	61	17.2
16-20 Years	63	17.8
More than 20 Years	69	19.5
Total	**354**	**100.0**
CLASSIFICATION	**FREQUENCY**	**PERCENTAGE**
Doctor	240	67.8
Nurse and Other	114	32.2
Total	**354**	**100.0**

Table 1 presents the profile of the 354 combined respondents by sex, years of practice, and classification. In terms of sex, female respondents had the highest frequency, with 224 or 63.3 percent, while males accounted for 130 or 36.7 percent. This reflects a 26.6 percentage-point difference, showing that women were more represented in the combined sample.

Table 2
Level of Compliance of the Hospital Allied Healthcare Personnel with the General Principles of the National Antibiotic Guidelines

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
1. Factors to Consider in the Choice of Antimicrobials	Doctor	3.93	0.64	Agree/High Level of Compliance	2.5
	Nurse	4.33	0.45	Strongly Disagree/Very High Level of Compliance	
	Combined	4.06	0.61	Agree/High Level of Compliance	
2. Antibiotic Combination Therapy	Doctor	3.94	0.70	Agree/High Level of Compliance	4
	Nurse	4.44	0.50	Strongly Disagree/Very High Level of Compliance	
	Combined	4.10	0.68	Agree/High Level of Compliance	
	Doctor	3.92	0.66	Agree/High Level of Compliance	5

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
3. General Steps in Appropriate Antimicrobial Therapy	Nurse	4.22	0.40	Strongly Disagree/Very High Level of Compliance	
	Combined	4.02	0.60	Agree/High Level of Compliance	
4. Causes of Failure in Antimicrobial Therapy	Doctor	3.75	0.45	Agree/High Level of Compliance	8
	Nurse	4.10	0.34	Agree/High Level of Compliance	
	Combined	3.86	0.45	Agree/High Level of Compliance	
5. Misuse or Abuse of Antimicrobials	Doctor	3.94	0.70	Agree/High Level of Compliance	2.5
	Nurse	4.32	0.48	Strongly Disagree/Very High Level of Compliance	
	Combined	4.06	0.66	Agree/High Level of Compliance	
6. Factors that Lead to Inappropriate Use of Antimicrobials	Doctor	3.96	0.70	Agree/High Level of Compliance	1
	Nurse	4.31	0.46	Strongly Disagree/Very High Level of Compliance	
	Combined	4.07	0.65	Agree/High Level of Compliance	
7. Factors that Lead to Inappropriate Use of Antimicrobials	Doctor	3.82	0.55	Agree/High Level of Compliance	7
	Nurse	4.17	0.36	Agree/High Level of Compliance	
	Combined	3.93	0.52	Agree/High Level of Compliance	
8. Unwanted Consequences of Misuse or Inappropriate Use of Antimicrobials	Doctor	3.86	0.64	Agree/High Level of Compliance	6
	Nurse	4.21	0.39	Strongly Disagree/Very High Level of Compliance	

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
	Combined	3.97	0.60	Agree/High Level of Compliance	
Overall Mean	Doctor	3.89	0.63	Agree/High Level of Compliance	
	Nurse	4.26	0.42	Strongly Disagree/Very High Level of Compliance	
	Combined	4.01	0.60	Agree/High Level of Compliance	

Table 2 exhibits the Level of Compliance of the Hospital Allied Healthcare Personnel with the General Principles of the National Antibiotic Guidelines. The data show a combined overall mean of 4.01 (SD = 0.60), corresponding to a High Level of Compliance. By classification, doctors obtained an overall mean of 3.89 (SD = 0.63), also within the high-compliance range, while nurses and other healthcare personnel obtained 4.26 (SD = 0.42), which falls within the Very High Level of Compliance category. Based on the combined scores, Antibiotic Combination Therapy received the highest mean at 4.10 (SD = 0.68). In contrast, Causes of Failure in Antimicrobial Therapy had the lowest mean, at 3.86 (SD = 0.45).

Even at the lowest end, however, the rating remained high. The narrow spread of the combined means, from 3.86 to 4.10, indicates that compliance was not concentrated in only one component of the guidelines but was maintained across the different areas assessed.

Table 3

Significant Difference on the Assessment of the Respondents as to the Level of Compliance on the General principles Stated in the National Antibiotic Guidelines of 2017 as to Profile

Grouping Variable	Test Statistic	p-value	Decision	Hypothesis Result
Sex	t = 0.02	p = .90	Not significant	Null hypothesis accepted
Years in Practice	F = 5.57	p < .001	Significant	Null hypothesis rejected
Professional Classification	t = 70.33	p < .001	Significant	Null hypothesis rejected

Table 3 shows significant differences in respondents' assessments of compliance with the General Principles of the National Antibiotic Guidelines of 2017 when grouped according to profile variables. In terms of sex, the computed t-value was 0.02 with a p-value of .90, which is greater than the 0.05 level of significance. This indicates no significant difference in respondents' assessment of compliance when grouped by sex; therefore, the null hypothesis was accepted.

For years in practice, the computed F-value was 5.57 with a p-value of less than .001, which is below the 0.05 level of significance. This indicates a significant difference in respondents' assessment of compliance when grouped by years in practice. Thus, the study rejected the null hypothesis.

Likewise, professional classification yielded a computed t-value of 70.33 with a p-value of less than .001, indicating a statistically significant difference in respondents' assessment of compliance by professional classification. Therefore, the null hypothesis was rejected. Overall, the findings show that compliance with the General Principles of the National Antibiotic Guidelines of 2017 did not differ significantly by sex but did differ significantly by years in practice and professional classification.

Table 4
Level of Competencies of the Hospital Allied Health Care Personnel in Handling the Antimicrobial Stewardship Program

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
1. Knowledge	Doctor	4.06	0.62	Agree/High Level of Competency	2
	Nurse	4.28	0.41	Strongly Agree/Very High Level of Competency	
	Combined	4.13	0.57	Agree/High Level of Competency	
2. Attitude	Doctor	4.12	0.60	Agree/High Level of Competency	**1**
	Nurse	4.42	0.46	Strongly Agree/Very High Level of Competency	
	Combined	4.22	0.58	Strongly Agree/Very High Level of Competency	
3. Practice	Doctor	3.98	0.62	Agree/High Level of Competency	**3**

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
	Nurse	4.37	0.45	Strongly Agree/Very High Level of Competency	
	Combined	4.11	0.60	Agree/High Level of Competency	
Overall Mean	Doctor	4.06	0.61	Agree/High Level of Competency	
	Nurse	4.35	0.44	Strongly Agree/Very High Level of Competency	
	Combined	4.15	0.58	Agree/High Level of Competency	

Table 4 summarizes the level of competencies of the Hospital Allied Health Care Personnel in handling the Antimicrobial Stewardship Program across Knowledge, Attitude, and Practice. The data show an overall combined mean of 4.15 (SD = 0.58), indicating a High Level of Competency. By respondent group, doctors obtained an overall mean of 4.06 (SD = 0.61), interpreted as High, whereas the nurse group obtained 4.35 (SD = 0.44), interpreted as Very High. Among the three competency domains, Attitude received the highest combined mean of 4.22 (SD = 0.58), classified as a Very High Level of Competency. This was followed by Knowledge, with a mean of 4.13 (SD = 0.57). In contrast, Practice received the lowest combined mean of 4.11 (SD = 0.60), although it remained within the High Level of Competency. The result shows that attitudes were stronger than the application of stewardship principles in actual professional activities.

Table 5

Regression Analysis on the Level of Compliance of the Allied Healthcare Personnel on the General Principles of National Antibiotic Guidelines a Predictive Factor.

Predictor Variable	B	SE	B	T	p-value	Decision on H_0	Interpretation
Level of Compliance with the General Principles of the National Antibiotic Guidelines	.773	.031	.797	24.723	< .001	Reject H_0	Significant Predictor

Table 5 presented the Regression Analysis on the Level of Compliance of the Allied Healthcare Personnel on the General Principles of National Antibiotic Guidelines a Predictive Factor. The regression coefficient for compliance was B = .773 (SE = .031), and the standardized beta coefficient was β = .797. The computed t-value of 24.723 was associated with p < .001, which is below the .05 level of significance. Therefore, the null hypothesis is rejected, indicating that compliance with the National Antibiotic Guidelines significantly predicts competency in antimicrobial stewardship. The positive regression coefficient further means that as compliance increases, competency scores are also expected to increase. Specifically, for every one-unit increase in the compliance score, the predicted competency score increases by approximately 0.773 units.

Table 6 examines the Significant Correlation between the level of Compliance of the Allied Healthcare Personnel on the General Principles of National Antibiotic Guidelines and the level of Competencies in handling the Antimicrobial Stewardship Program. The data show an r-value of .797, indicating a strong positive correlation: higher compliance scores tended to occur with higher competency scores. The significance value was reported as .000, which is lower than the .05 level of significance. Thus, the null hypothesis is rejected, and the relationship is interpreted as statistically significant. This means sufficient statistical evidence exists to conclude that respondents' level of compliance with the National Antibiotic Guidelines is significantly associated with their level of competency in antimicrobial stewardship. In practical terms, personnel who adhere more strongly to recommended antimicrobial principles also tend to show higher competency in knowledge, attitude, and practice in antimicrobial stewardship.

Table 6
Significant Correlation between Level of Compliance of the Allied Healthcare Personnel on the General Principles of National Antibiotic Guidelines and Level of Competencies

Variable Tested		*R*-Value	Degree of Correlation	Sig Value (2 tailed)	Decision on HO	Interpretation
Level of Compliance of Allied Healthcare Personnel	Level of Competencies of Allied Healthcare Personnel in handling Antimicrobial Stewardship program	.797	Strong Positive Correlation	.000	Reject Ho	Significant

Table 7
Roles of Allied Healthcare Personnel in the Antimicrobial Stewardship Program Process Flow

INDICATORS	CLASSIFICATION	MEAN	SD	INTERPRETATION	RANK
1. Patient Admission and Initial Assessment	Doctor	3.93	0.55	Highly Performed	3
	Nurse	4.30	0.42	Very Highly Performed	
	Combined	4.05	0.54	Highly Performed	
2. Specimen Collection	Doctor	3.97	0.85	Highly Performed	5.5
	Nurse	4.19	0.39	Highly Performed	
	Combined	4.04	0.74	Highly Performed	
3. Start of Empiric Antibiotics	Doctor	3.97	0.63	Highly Performed	1.5
	Nurse	4.27	0.41	Very Highly Performed	
	Combined	4.07	0.58	Highly Performed	
4. Ongoing Monitoring	Doctor	3.94	0.56	Highly Performed	1.5
	Nurse	4.36	0.47	Very Highly Performed	
	Combined	4.07	0.57	Highly Performed	
5. 48-72 Hours Antibiotic Review	Doctor	3.95	0.66	Highly Performed	5.5
	Nurse	4.23	0.41	Very Highly Performed	
	Combined	4.04	0.60	Highly Performed	
6. Seven-Day Automatic Policy	Doctor	3.88	0.53	Highly Performed	8
	Nurse	4.26	0.42	Very Highly Performed	
	Combined	4.00	0.53	Highly Performed	
7. Patient Education and Discharge	Doctor	3.94	0.60	Highly Performed	5.5
	Nurse	4.26	0.40	Very Highly Performed	
	Combined	4.04	0.56	Highly Performed	
8. Documentation and Quality Monitoring	Doctor	3.97	0.64	Highly Performed	5.5
	Nurse	4.18	0.43	Highly Performed	
	Combined	4.04	0.59	Highly Performed	
Overall Mean	Doctor	3.94	0.63	Highly Performed	
	Nurse	4.26	0.42	Very Highly Performed	
	Combined	4.04	0.59	Highly Performed	

As shown in table 7, Start of Empiric Antibiotics and Ongoing Monitoring shared the highest combined mean of 4.07, while the Seven-Day Automatic Policy obtained the lowest combined mean of 4.00 (SD=0.53). Nevertheless, all eight stages remained within the Highly Performed category. The combined overall mean was 4.04 (SD=0.59).

Basis for Enhanced and Sustainable Antimicrobial Stewardship Guidelines

The findings identified several priorities for the proposed guidelines: explicit professional responsibilities; continuing and role-specific competency development; timely initiation of clinically indicated antimicrobial therapy; stronger recognition and management of treatment failure; structured reassessment and de-escalation; consistent 48–72-hour review; review before continuation beyond an established treatment duration; therapeutic-response monitoring; multidisciplinary communication; documentation; and use of monitoring findings for quality improvement. The proposed guidelines remain a research output for institutional review and have not yet been approved, validated, piloted, or evaluated for effectiveness.

DISCUSSION

The respondent profile shows a multidisciplinary sample in which doctors constituted the larger group, while nursing, pharmacy, and laboratory personnel formed the second group. The predominance of doctors is relevant because prescribing decisions are central to antimicrobial use, but stewardship also depends on administration, monitoring, medication review, diagnostic testing, communication, and patient education. Including multiple professional groups reflects the collaborative nature of stewardship, although unequal group sizes mean pooled estimates should not be interpreted as equally weighted, profession-specific evidence.

The data show a combined overall mean of 4.01 (SD=0.60), corresponding to a High Level of Compliance. By classification, doctors obtained an overall mean of 3.89 (SD=0.63), while nurses and other healthcare personnel obtained 4.26 (SD=0.42), interpreted as a Very High Level of Compliance. Based on the combined scores, Antibiotic Combination Therapy received the highest mean at 4.10 (SD=0.68). In contrast, Causes of Failure in Antimicrobial Therapy had the lowest mean at 3.86 (SD=0.45). Even at the lowest end, however, the rating remained high. The narrow spread of the combined means indicates that compliance remained consistent across the areas assessed.

The comparatively lower rating for treatment-failure management should not be interpreted as proof of poor patient outcomes because the study did not directly examine clinical records or treatment results. Rather, it identifies a perceived area for reinforcement. Hospital studies have shown that stewardship initiatives can improve policy adherence and antimicrobial use when review and feedback are embedded in clinical practice (Chowdhury et al., 2020). Likewise, Gutiérrez-Urbón et al. (2022) demonstrated the importance of systematically evaluating the appropriateness of ongoing antimicrobial treatment, while Ladines-Lim et al. (2024) showed that a plausible indication does not ensure antibiotic prescribing is appropriate in all respects.

Compliance did not differ significantly by sex but did differ by years in practice and professional classification. The absence of a sex difference suggests that compliance

standards were broadly similar across male and female respondents in this sample. Differences associated with experience and professional classification may reflect variation in role responsibilities, exposure to antimicrobial decisions, workflow, access to information, and professional training. These findings support role-sensitive and experience-sensitive educational approaches rather than assuming that a single intervention will address all professional groups equally.

Table 4 shows an overall combined mean of 4.15 (SD=0.58), indicating a High Level of Competency. Doctors obtained an overall mean of 4.06 (SD=0.61), interpreted as High, whereas the nurse group obtained 4.35 (SD=0.44), interpreted as Very High. Among the three competency domains, Attitude received the highest combined mean of 4.22 (SD=0.58), classified as a Very High Level of Competency. Knowledge followed, with a mean of 4.13 (SD=0.57). Practice received the lowest combined mean of 4.11 (SD=0.60), although it remained within the High Level of Competency. The result shows that attitudes were stronger than the application of stewardship principles in actual professional activities.

The regression and correlation findings showed that higher compliance scores were associated with higher competency scores. Compliance significantly predicted competency in the fitted regression model, and the two constructs were strongly positively correlated. These findings support the practical value of addressing guideline adherence and competency development together. However, the cross-sectional descriptive-correlational design does not establish temporal or causal direction, and overlap between self-reported compliance and competency measures may contribute to the strength of the association. The results should therefore be interpreted as evidence of association and prediction within the measured sample rather than proof that improved compliance causes improved competency.

The combined overall mean for the roles of Allied Healthcare Personnel across the Antimicrobial Stewardship Program process flow was 4.04 (SD=0.59), interpreted as Highly Performed. The nurse group obtained an overall mean of 4.26 (SD=0.42), interpreted as Very Highly Performed, whereas doctors registered 3.94 (SD=0.63), interpreted as Highly Performed. Start of Empiric Antibiotics and Ongoing Monitoring shared the highest combined mean of 4.07, while the Seven-Day Automatic Policy obtained the lowest combined mean of 4.00 (SD=0.53). Nevertheless, every stage remained within the Highly Performed category, indicating generally consistent role performance throughout the stewardship process.

The proposed Enhanced and Sustainable Antimicrobial Stewardship Guidelines respond directly to these findings. Their emphasis on defined responsibility, competency development, treatment reassessment, communication, monitoring, reporting, and education is broadly consistent with recognized stewardship implementation components (Centers for Disease Control and Prevention [CDC], 2019; WHO, 2019). Nevertheless, the guidelines should be treated as a proposed institutional output rather than a validated intervention. Pilot implementation, objective monitoring, and subsequent evaluation are necessary before claiming improvements in prescribing quality, patient outcomes, resistance patterns, or sustainability.

Conclusions

1. The doctor respondents were predominantly middle-aged, female, from Pulmonology, and had several years of professional practice, while the nurses, pharmacists, and laboratory personnel were generally younger, female, had several years of hospital service, and were mostly from the Nursing Department. This indicates that the study included healthcare personnel from varied professional backgrounds and levels of clinical experience, with doctors comprising the larger respondent group.

2. Hospital allied healthcare personnel had a High Level of Compliance with the General Principles of the National Antibiotic Guidelines of 2017 across the areas assessed. Antibiotic Combination Therapy received the highest overall assessment, while Causes of Failure in Antimicrobial Therapy received the lowest. This indicates that the personnel generally adhere to recommended antimicrobial practices, although practices related to recognizing and addressing treatment failure may still require greater attention.

3. Compliance with the National Antibiotic Guidelines did not significantly differ according to sex but differed significantly according to years in practice and professional classification. Therefore, compliance is generally consistent between male and female respondents but varies according to professional experience and the roles performed by different healthcare personnel.

4. Hospital allied healthcare personnel had a High Level of Competency in handling the Antimicrobial Stewardship Program. Attitude received the highest assessment and was rated Very High, followed by Knowledge and Practice, which were both rated High. This indicates that healthcare personnel have favorable views toward antimicrobial stewardship and adequate knowledge and practice, although the practical application of stewardship principles may still be further strengthened.

5. Compliance with the General Principles of the National Antibiotic Guidelines was a significant positive predictor of competency in handling the Antimicrobial Stewardship Program. Therefore, higher compliance with antimicrobial guidelines is associated with higher predicted competency among hospital allied healthcare personnel, showing the importance of strengthening guideline adherence together with competency development.

6. Compliance with the National Antibiotic Guidelines had a strong positive and statistically significant relationship with competency in antimicrobial stewardship. This indicates that personnel with higher levels of compliance also tend to have higher levels of knowledge, attitude, and practice, confirming that guideline adherence and professional competency are closely associated in antimicrobial stewardship.

7. The roles of allied healthcare personnel across the Antimicrobial Stewardship Program process flow were generally Highly Performed. Start of Empiric Antibiotics and Ongoing Monitoring received the highest assessments, while the Seven-Day Automatic Policy received the lowest. This indicates that stewardship responsibilities are generally

carried out well throughout the care process, although review of prolonged antimicrobial therapy and related follow-through may require further strengthening.

8. The findings provide a clear basis for the development of Enhanced and Sustainable Antimicrobial Stewardship Guidelines for Metro Bacolod Hospital and Medical Center. These guidelines should integrate professional responsibilities, competency development, guideline compliance, treatment assessment and reassessment, multidisciplinary communication, monitoring, and quality-improvement activities to strengthen the hospital's antimicrobial stewardship practices.

Recommendations

1. Design antimicrobial stewardship activities that consider the different professional roles and levels of clinical experience of doctors, nurses, pharmacists, and laboratory personnel to ensure that training and program activities are relevant to their respective responsibilities.

2. Strengthen practices related to the early recognition, assessment, and management of antimicrobial treatment failure while sustaining the favorable practices already observed in antibiotic combination therapy and other areas of guideline compliance.

3. Tailor antimicrobial stewardship education and training according to years of professional experience and professional classification while maintaining consistent standards of compliance for all personnel regardless of sex.

4. Enhance the practical application of antimicrobial stewardship principles through continuing education, case-based activities, clinical updates, and opportunities for healthcare personnel to apply their knowledge and positive attitudes in their respective professional roles.

5. Integrate efforts to reinforce compliance with the National Antibiotic Guidelines with competency-development activities so that improved adherence to antimicrobial guidelines is supported by appropriate knowledge, attitudes, and professional practices.

6. Monitor compliance with the National Antibiotic Guidelines and antimicrobial stewardship competency concurrently to identify areas requiring improvement and to guide appropriate educational, clinical, and organizational interventions.

7. Reinforce implementation of the Seven-Day Automatic Policy through timely reassessment of prolonged antimicrobial therapy, proper documentation of decisions, and consistent follow-through on monitoring findings throughout the antimicrobial stewardship process.

8. Develop Enhanced and Sustainable Antimicrobial Stewardship Guidelines that define the responsibilities of doctors, nurses, pharmacists, and laboratory personnel; strengthen competency through continuing education, case-based learning, and practical

application; reinforce the timely initiation of clinically indicated antimicrobial therapy and the recognition and management of treatment failure; standardize regular treatment reassessment, de-escalation, the 48–72-hour antibiotic review, and review before continuation beyond the established treatment duration; strengthen monitoring of therapeutic response and antimicrobial prescribing practices; and ensure that monitoring findings are translated into documented quality-improvement actions. The guidelines should then undergo multidisciplinary review and pilot implementation to assess feasibility and applicability within the hospital.

Proposed Enhanced and Sustainable Antimicrobial Stewardship Guidelines

The proposed output is the Enhanced and Sustainable Antimicrobial Stewardship Guidelines for Metro Bacolod Hospital and Medical Center. It is intended for the hospital administration, stewardship committee, doctors, nurses, pharmacy personnel, laboratory personnel, and quality-improvement staff. It translates the reported priorities into a coordinated process for reviewing antimicrobial-related decisions and following up on identified gaps within each professional scope of practice.

The guidelines contain five linked components: governance and accountability; role-specific competency development; documented treatment assessment and review; coordinated communication and discharge information; and monitoring linked to improvement. The priority areas reflect lower relative ratings for minimizing treatment delay, considering patient-specific factors, reassessing therapy, monitoring therapeutic response, and using findings for improvement. Because these are survey-based priorities, the first implementation phase includes a baseline chart review to confirm their relevance.

Table 8 Core Components of the Proposed Guidelines

Component	Proposed Direction
Professional accountability	Clarify role-specific responsibilities of prescribers, nurses, pharmacy personnel, laboratory personnel, stewardship staff, and quality-improvement personnel.
Competency development	Use continuing education, role-specific case discussions, clinical updates, supervised application, feedback, and periodic assessment.
Treatment initiation and failure recognition	Reinforce timely initiation when clinically indicated, clinical justification for empiric therapy, patient-specific considerations, and early recognition of treatment failure.
Structured reassessment	Standardize ongoing review, de-escalation, 48–72-hour antibiotic review, and review before continuation beyond an established treatment duration.
Monitoring and communication	Strengthen therapeutic-response monitoring, prescribing review, timely interprofessional communication, and documentation.

Quality improvement and sustainability	Use monitoring findings to identify improvement priorities; establish accountability, periodic review, pilot evaluation, and integration with existing hospital systems.

Compliance with Ethical Standards

The researcher secured the required institutional permissions before data collection and obtained written informed consent from participating respondents. Participation was voluntary, and respondents were informed of their right to decline or withdraw at any time without penalty or adverse consequence. Confidentiality and anonymity were maintained, personally identifiable information was not disclosed in reports or presentations, and research data were used solely for academic and research purposes and handled in accordance with the Data Privacy Act of 2012 and applicable institutional requirements. The source thesis reports that respondent well-being and minimal-risk procedures were observed. No conflict of interest was reported in the conduct of the study, and the researcher was expected to avoid plagiarism and bias in interpretation. Generative artificial intelligence was used as a writing and formatting aid in preparing this journal-format manuscript; the study data, statistical results, interpretations, and final submission remain subject to the researcher's review and responsibility.

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