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Knowledge, Attitude, and Practices on Antibiotic Use among Nurses in Cotabato City

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Abstract

The purpose of this study was to assess nurses' knowledge, attitude, and practices (KAP) regarding antibiotic use in some of the healthcare facilities in Cotabato City, Philippines. The study aimed to identify the factors influencing nurses' adherence to antibiotic protocols and to provide recommendations for improving antibiotic stewardship and patient safety. This study examined nurses' KAP regarding antibiotic use of nurses in some of the healthcare facilities in Cotabato City, Philippines. There was a total of 104 nurses from government and private hospitals. They were selected via convenience sampling technique. A descriptive-predictive design was used in the study. The study used an adapted questionnaire from Lalithabai et al. (2022) and Jainlabdin et al. (2021), subject to validity and reliability testing. The findings revealed significant associations between demographic factors and nurses' knowledge (r_s=.264, p = 0.019) and attitudes (r_s =.614, p = <0.001). Gender and experience were significantly associated with knowledge, while age and experience were associated with attitudes. However, demographic variables did not significantly affect practices on antibiotic use amongst nurses, suggesting that internal factors primarily drive adherence to antibiotic protocols. A positive relationship was observed between knowledge and practices, with knowledge accounting for about one-fourth of the variance. Attitudes emerged as the strongest predictor, explaining nearly half of the practice variance. Nurses with positive attitudes demonstrated higher adherence to protocols, highlighting the critical role of fostering favorable attitudes toward antibiotic stewardship. Enhancing nurses' knowledge and attitudes is essential for improving practices, ensuring adherence to antimicrobial stewardship, and promoting patient safety. Further, develop evidence-based training modules and instructional plans that address identified gaps in nurses' knowledge, attitudes, and practices; conduct periodic evaluations of the effectiveness of these programs and refine them to address emerging challenges in antibiotic use and resistance.

Keywords: *Social Science, Antibiotic Use, Descriptive-Predictive, Cotabato City.*

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Introduction

Antibiotic use is worthy of attention in preventing surgical site infections (SSIs) and antimicrobial resistance (AMR). Nurses notably play a role in administering antibiotics, monitoring patients, and ensuring adherence to antimicrobial stewardship programs. In healthcare settings, hospitals encounter challenges that impact the effective use of antibiotics. However, gaps in nurses' knowledge, attitudes, and practices (KAP) compromise effective antibiotic use. Further, inadequate follow-up systems, occasional stock shortages, financial constraints, cultural factors, and prescription access limitations undermine antibiotic use compliance. Also, studies reveal misconceptions, such as those about antibiotics treating viral infections by Yang et al. (2024) and Habib et al. (2021). Addressing these challenges is essential to optimizing antibiotic use and reducing the prevalence of SSIs and antimicrobial resistance (AMR), ultimately improving patient outcomes and promoting safer healthcare practices.

Antibiotic resistance is a major global health crisis identified by the World Health Organization (WHO, 2023), driven largely by improper antibiotic use and shortcomings in antibiotic stewardship. A critical factor contributing to this issue is the insufficient knowledge and practices of healthcare workers, particularly nurses, who play a central role in patient care and medication administration. Research highlights alarming gaps in understanding, such as the study by Yang et al. (2024), which found that 54.3% of Chinese nursing students were unaware that antibiotics are ineffective against viral infections. Similar misconceptions have been reported in India (Sahu et al., 2021) and Iraq (Habib et al., 2021), where antibiotics are frequently misused for viral illnesses. Even though 72% of nurses demonstrate good practices, significant challenges persist in translating knowledge into real-world clinical decisions (John et al., 2022). Given WHO's urgent warnings about antimicrobial resistance and its severe consequences for public health, addressing these knowledge gaps through targeted education is essential. Strengthening nurses' knowledge, attitudes, and practices (KAP) is not only crucial for improving patient care but also for mitigating the global spread of antibiotic-resistant infections.

In the Philippines, antibiotic resistance continues to grow, with limited resources, inadequate training, and inconsistent guidelines compounding the issue. Key factors influencing antibiotic misuse include low education levels, financial constraints, and geographic barriers. Patients with lower educational attainment exhibited limited knowledge about antibiotics, leading to misconceptions such as using antibiotics for viral infections, said Tagum-Briones et al. (2023). Financial constraints also compel individuals to self-medicate or purchase incomplete regimens, contributing to antimicrobial resistance. Despite the increasing threat of antibiotic resistance, few studies have examined how nurses in Cotabato City adhere to antibiotic stewardship protocols.

Thus, this study identify the level of knowledge, attitude, and practices of nurses on antibiotic use, to determine the relationship of knowledge, attitude, and practices on antibiotic use among nurses, and the association of the variables of the study.

Addressing nurses' knowledge, attitudes, and practices is critical to improving infection control, implementing evidence-based policies to reduce SSIs, and preventing antimicrobial resistance (AMR). Identifying gaps and influencing factors on antibiotic use among nurses in hospitals in Cotabato City will strengthen antibiotic stewardship, decrease antimicrobial

resistance (AMR), enhance patient safety, and improve infection control practices.

Methods

The study employed the descriptive-predictive research method to investigate nurses' knowledge, attitudes, and practices (KAP) regarding antibiotic use in hospitals in Cotabato City. The study was conducted in a Government Hospital and two Private Hospitals in Cotabato City, Philippines. Geographically, it is located in the BARMM Region but administratively under Region XII. The government hospital is along the National Highway of Cotabato City, and the two private hospitals are in Cotabato City.

Also, the respondents in this study were nurses assigned to the Surgery Ward, Pediatric Ward, Emergency Room Department, Medicine Ward, OB-Gyne Ward, General Ward, Intensive Care Unit, Delivery Room Department, and Operating Room Department in hospitals located in Cotabato City, Philippines. Moreover, convenience sampling was used due to accessibility constraints; however, this may limit the generalizability of findings, and 104 were recorded. The exclusion criteria included the selection of respondents regardless of sex, age, length of service, and area of assignment. The participants were at least 20 years old, employed in the hospital in Cotabato City, had attained at least six months of clinical experience, and were willing to participate in the study.

Furthermore, the study utilized an adapted survey questionnaire developed by Lalithabai et al. (2022) and Jainlabdin et al. (2021) were used. The adapted questionnaire, consisting of 30 questions, underwent content validity testing, with a scale content validity index (S-CVI/UA) of 1.00, and reliability testing using McDonald's alpha, yielding the following results: Knowledge (KR-20 = 0.858), Attitude (ω = 0.929), and Practices (ω = 0.920). These tests were conducted after pilot testing with 25 participants.

The instrument consisted of four parts. The first part contained questions related to the demographic profile of the respondents, including age, sex, length of service, and area of assignment. The second part of the questionnaire evaluated nurses' knowledge of antibiotic use. This section consisted of ten (10) structured true or false questions adapted from previously validated instruments and measured using a five-point Likert scale. The scale was interpreted as follows: a weighted mean of 4.21–5.00 (9-10) correct answers indicated a "Very High" level of knowledge, 3.41–4.20 (7-8) correct answers represented a "High" level, 2.61–3.40 (5-6) correct answers, denoted a "Moderate" level, 1.81–2.60 (3-4) correct answers, corresponded to a "Low" level, and 1.00–1.80 (1-2) correct answers, signified a "Very Low" level. These categories provided insights into the nurses' understanding of antibiotic benefits and usage.

The third section of the questionnaire focused on assessing nurses' attitudes toward the use of antibiotics. This section also included ten structured questions adapted from the study by Lalithabai et al. (2022) and employed a five-point Likert scale for assessment. The interpretation scale mirrored that of the knowledge section, with weighted mean ranges corresponding to "Very High," "High," "Moderately High," "Low," and "Very Low" attitudes. Lastly, the fourth part of the questionnaire addressed the level of practice regarding antibiotic use among nurses. Adapted from Jainlabdin et al. (2021), this section comprised ten (10) structured questions assessed on a five-point Likert scale.

This study adhered to established ethical guidelines to protect all participants' rights, safety, and well-being.. Also, participants were informed about their right to withdraw, and data confidentiality was

maintained through anonymized responses Responses were coded using secure, strong data to maintain confidentiality and anonymity. Participation was voluntary, and participants were free to withdraw from the study at any time without penalty.

Additionally, frequency distributions and percentages were employed to describe the demographic profile of the respondents in terms of age, sex, length of service, and area of assignment. Also, the mean was used to determine nurses' knowledge, attitudes, and practices regarding antibiotic use. ETA correlation was utilized to examine the relationship between the respondents' demographic profiles and their levels of knowledge, attitude, and practices; and Spearman's rho was applied to determine the significant relationship between the respondents' levels of knowledge, attitude, and practices. Lastly, Kernel regression was used to determine if knowledge and attitude significantly predict the level of practices on antibiotic use among nurses.

On the other hand, this study assessed nurses' knowledge, attitudes, and practices regarding antibiotic use in Cotabato City only. Data was gathered from November 1, 2024, to November 15, 2024. The instrument underwent a Content Validity Index but was not subjected to Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) after the original version of the questionnaire was modified.

Results and Discussion

Table 1. What is the demographic profile of respondents in terms of age, sex, area of assignment, and length of experience?

Demographic Profile	Frequency (n=79)	Percentage
Age:		
22-26 yo	19	24.1%
27-31 yo	10	12.7%
31-36 yo	26	32.9%
37-41 yo	19	24.1%
47-51 yo	4	5.1%
57 & above	1	1.3%
Total	**79**	**100%**
Sex:		
Male	22	27.8%
Female	57	72.2%
Total	**79**	**100%**
Area of Assignment:		
General Ward	21	26.6%
Operating Room	30	38.0%
Emergency Room	5	6.3%
Intensive Care Unit	10	12.7%
Medicine Ward	6	7.6%
Ob Ward	3	3.8%
Pediatric Ward	3	3.8%
Delivery Room	1	1.3%
Total	**79**	**100%**

Length of hospital experience:		
< 1 year	14	17.7%
1-5 years	31	39.2%
6-10 years	25	31.6%
11-15 years	5	6.3%
21-25 years	4	5.1%
Total	**79**	**100%**

Table 1 shows the demographic profile that provides a detailed breakdown of their age, sex, area of assignment, and length of hospital experience. In age, the majority of respondents are within the age group of 31-36 years (32.9%), followed by those aged 22-26 years (24.1%) and 37-41 years (24.1%), the least represented age groups are 47-51 years (5.1%) and 57 years & above (1.3%). In Gender, Female respondents comprise the majority (72.2%), while males account for 27.8%. In Area of Assignment, the most significant proportion of respondents are assigned to the Operating Room (38%), followed by the General Ward (26.6%); other notable areas include the Intensive Care Unit (12.7%) and Medicine Ward (7.6%), the least represented areas are the Delivery Room (1.3%), Pediatric Ward (3.8%), and OB Ward (3.8%). In Length of Hospital Experience, most respondents have 1-5 years of hospital experience (39.2%), while 31.6% have 6-10 years of experience, those with less than one year of experience constitute 17.7%, and smaller groups have 11-15 years (6.3%) or 21-25 years (5.1%) of experience.

The data reflects a workforce primarily composed of females aged 31-36 years, with significant representation in the Operating Room and General Ward and a predominant length of experience ranging from 1-10 years. This demographic insight is crucial for understanding the nursing population within the studied institution. The concentration of nurses in the 31-36 age group and those with moderate experience suggests a relatively youthful workforce that may possess enthusiasm and adaptability but also requires continuous education to strengthen expertise (Jairoun et al. (2019). This balance can contribute positively to innovation and enthusiasm but may require ongoing training to deepen expertise. Similarly, the dominance of female nurses highlights a need to ensure equitable opportunities for all genders to foster a more inclusive workplace. The prominence of the Operating Room reflects the hospital's surgical focus. In contrast, the underrepresentation in areas like the Delivery Room suggests specialized services may be offered elsewhere or are less prioritized. This aligns with previous studies that also found a high representation of younger nurses, typically in the early stages of their careers, according to El Baida et al. (2022) and Habib et al. (2021).

The majority of respondents being female is consistent with global trends in nursing, where women make up the bulk of the profession Sahu et al. (2021). This demographic representation highlights the importance of promoting gender inclusivity in nursing leadership roles and professional development opportunities. Furthermore, the prominence of nurses assigned to the Operating Room (38%) reflects the hospital's focus on surgical services, which may influence their exposure to antibiotic use practices Sadasivam et al. (2016).

In terms of experience, the significant representation of nurses with 1-5 years of hospital experience suggests a potential for both fresh perspectives and a need for structured training to enhance knowledge on critical issues such as antibiotic use and resistance (Yang et al., 2024). These findings are essential in designing targeted interventions to address

this workforce's needs and training requirements.

Table 2. Nurses' Level of Knowledge on Antibiotic Use.

Level of Knowledge	Mean	SD	Interpretation
Overall	4.09	0.99	High

Legend: 4.21-5.00---Very High;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low; SD-Standard Deviation.

Table 2 shows that the overall mean score for the nurses' level of knowledge on antibiotic use is 4.09, with a SD of 0.99, which is interpreted as "High." This reflects a generally strong understanding among the nurses regarding antibiotic use. Although the overall mean (4.09) was below the very high range, it indicates that some individuals or subtopics might have achieved a near "Very High" knowledge level. This suggests that most nurses are well-informed about the fundamental principles and guidelines of antibiotic use, which is critical for preventing surgical site infections and ensuring optimal patient care. The absence of responses in this range highlights that no significant portion of the nurses demonstrated an extremely poor understanding of antibiotic use. This implies that basic knowledge is well-established across the workforce, reflecting successful educational or institutional efforts to promote awareness.

The results indicate that the nurses' knowledge of antibiotic use is generally "High." This favorable outcome underscores the effectiveness of training programs and clinical guidelines and suggests opportunities to enhance knowledge further to achieve a "Very High" level. Consistent reinforcement through workshops, updates on antibiotic protocols, and ongoing education can bridge the gap toward excellence.

The high mean score (4.09) for the nurses' knowledge of antibiotic use, with a standard deviation of 0.99, indicates a strong overall understanding among the respondents. This finding suggests that most nurses are well-informed about the essential guidelines and protocols for antibiotic use, which is critical for preventing surgical site infections (SSIs) and ensuring optimal patient outcomes El Baida et al. (2022). The fact that no responses fell into the "Very Low" category reinforces the success of institutional efforts to promote antibiotic stewardship and reinforce clinical guidelines by Sahu et al. (2021).

However, while the mean score is high, it is still below the "Very High" threshold, which suggests room for improvement. Continuous education, such as targeted workshops and updates on emerging antibiotic resistance issues, can further elevate the knowledge levels of nurses, aligning them with best practices Berdida et al. (2022). Studies have shown that regular reinforcement of knowledge through training can enhance the effectiveness of antibiotic use and contribute to better patient outcomes by Awad et al. (2015) and Yang et al. (2024).

Therefore, integrating more advanced training programs and frequent updates on antibiotic protocols could bridge the gap toward achieving a "Very High" level of knowledge in the nursing workforc

Table 3. The Nurses' Level of Attitude on Antibiotic Use.

Level of Attitude	Mean	SD	Interpretation
Overall	3.53	1.11	High

Legend: 4.21-5.00---Very High;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low; SD- Standard Deviation.

Table 3 shows that the overall mean score for the nurses' attitude toward antibiotic use is 3.53, with a SD of 1.11, interpreted as "High." This reflects a generally positive attitude among nurses regarding the importance and implementation of antibiotic use.

The findings reveal that nurses have a predominantly "High" attitude toward antibiotic use, with no indication of "Very Low" attitudes. This positive outlook likely contributes to adherence to protocols and the overall effectiveness of infection prevention strategies. To further enhance their attitudes to the "Very High" level, institutions can focus on recognizing and rewarding compliance and promoting the significance of their contributions to patient safety.

The overall mean score of 3.53 for nurses' attitudes toward antibiotic use, interpreted as "High," reflects a generally positive outlook on the importance and application of antibiotic use. This result indicates that most nurses are firmly committed to infection control protocols, essential for reducing surgical site infections (SSIs) and ensuring patient safety. The absence of responses in the "Very Low" category suggests that no nurse demonstrated a significantly negative attitude toward antibiotic use, reinforcing that positive attitudes are widespread among healthcare professionals by El Baida et al. (2022).

While the mean score is high, it still falls short of the "Very High" category, suggesting potential areas for improvement. To further elevate nurses' attitudes, hospitals and institutions could focus on recognizing and rewarding adherence to antibiotic stewardship programs, fostering a culture of excellence, and enhancing the nurses' role in infection prevention, according to Berdida et al. (2022). Additionally, promoting continuous education and feedback on antibiotic resistance and its implications on patient care may help shift attitudes toward the "Very High" range by Awad et al. (2015). These steps would strengthen the effectiveness of antibiotic use and infection control efforts in healthcare settings.

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Table 4. The Nurses' Level of Practices on Antibiotic Use.

Level of Practices	Mean	SD	Interpretation
Overall	3.73	0.97	High

Legend: 4.21-5.00---Very High;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low; SD- Standard Deviation.

Table 4 shows that the overall mean score for the nurses' level of practice on antibiotic use is 3.73, with a SD of 0.97, which is interpreted as "High." This indicates that the nurses consistently adhere to recommended practices in administering antibiotic usage. This data does not achieve the "Very High" category, ranging from 4.21 to 5.00. However, the overall "High" rating suggests that many nurses demonstrate practices approaching excellence. This reflects their commitment to implementing effective antibiotic use protocols, which are crucial for reducing the incidence of surgical site infections and enhancing patient safety. The "Very Low" category, defined as 1.00 to 1.80, is absent from the data. This indicates that none of the nurses exhibited inadequate or substandard practices. It implies a baseline of competence and compliance with antibiotic use standards across the workforce.

The "High" level of practice among nurses suggests a firm adherence to established guidelines, supporting effective infection prevention measures. The lack of "Very Low" practices highlights a uniformly adequate application of these practices across the group. To elevate practices to a "Very High" level, hospitals can focus on continuous education, simulation training, and feedback mechanisms to reinforce best practices and address any barriers to optimal performance.

The overall mean score of 3.73 for nurses' practices on antibiotic use, categorized as "High," signifies consistent adherence to recommended antibiotic administration protocols. This finding indicates nurses' commitment to infection prevention and their active role in implementing antibiotic use guidelines to reduce surgical site infections (SSIs). A score within the "High" range suggests that most nurses are proficient in their practices, aligning with best practices in patient care, but there is still room to achieve "Very High" standards by El Baida et al. (2022). The absence of data in the "Very Low" category (1.00–1.80) further underscores the baseline competence in antibiotic use, with no nurses demonstrating substandard practices.

To further elevate practices, continuous professional development programs focusing on up-to-date knowledge, simulation-based training, and regular feedback could help refine nursing practices and optimize patient outcomes, according to Awad et al. (2015). Such interventions can address potential gaps or barriers, such as insufficient resources or challenges in adhering to guidelines, thus helping nurses move toward a "Very High" level of practice.

Additionally, institutional support for antibiotic stewardship and infection control programs is critical in fostering an environment where best practices are encouraged and reinforced, according to Yang et al. (2024).

Table 5. Test of Relationship between the Nurses' Level of Knowledge and Practices on Antibiotic Use among Nurses.

Independent Variable	Practices			
	r_s	p-value	Decision	Remarks
Knowledge	.264	.019	Reject H_{01}	Significant

Note: p<0.05 (Significant); r_2= rho; DV-Practices

Table 5 shows the test of the relationship between nurses' level of knowledge and practices on antibiotic use. The r_s revealed a significant, positive

relationship between knowledge and practices (r_s =.264, p=.019). This led to rejecting the null hypothesis (H_{01}) as its p-value is less than the 0.05 alpha level of significance. It further suggests that an increase in nurses' knowledge level correlates with an increase in their level of practice.

According to the study of Zhao et al. (2023), the qualitative phase revealed insufficient knowledge, diverse attitudes toward AMS engagement, and limited scope and standards for nurse participation. The study underscores the importance of enhancing nurses' understanding and involvement in AMS through regular training, clear guidelines, and supportive work environments. Antimicrobial resistance (AMR) is a significant global health threat, with projections estimating it could cause 10 million deaths annually and cost $1 trillion each year by 2050. China, one of the largest consumers of antimicrobials, faces considerable challenges in combating AMR due to high antibiotic consumption rates.

The inappropriate use and misuse of antimicrobials are major drivers of AMR, necessitating the involvement of healthcare professionals, especially nurses, in AMS. AMS promotes the rational use of antibiotics concerning dosing, therapy duration, and administration routes. Nurses play a crucial role in AMS through communication, prompting, and monitoring antimicrobial use. However, existing research indicates that nurses often lack a comprehensive understanding of AMS and their specific roles, limiting their potential contribution to AMS initiatives. The study's findings highlight the need for improved educational interventions to enhance nurses' KAP regarding AMS. The positive attitudes and practices observed among nurses indicate a willingness to engage in AMS, but knowledge gaps must be addressed.

Table 6. **Test of Relationship between the Nurses' Level of Attitude and Practices on Antibiotic Use among Nurses.**

Independent Variable	Practices			
	r_s	p-value	Decision	Remarks
Attitude	.614	<.001	Reject H_{02}	Significant

Note: p<0.05 (Significant); r_s= rho; DV-Practices

Table 6 shows the relationship between the level of attitude and practices on antibiotic use among nurses. It revealed that there is a significant, positive relationship between attitude and practices (r_s =.614, p=<.001), leading to the rejection of the null hypothesis (H_{02}) as its p-value is less than 0.05 alpha level of significance. It further suggests that an increase in nurses' attitude level correlates with an increase in their level of practice.

According to the study of Zhao et al. (2023), the positive attitudes and practices observed among nurses indicate a willingness to engage in AMS, but knowledge gaps must

be addressed. The researchers recommend regular training, precise role definitions, and developing guidelines and evaluation criteria to support nurses in AMS. Nursing managers should create positive, supportive work environments and involve nurses in policy formulation and implementation. By enhancing nurses' understanding and participation in AMS, healthcare services can be improved, contributing to global efforts to combat AMR and ensuring sustainable access to effective antimicrobial therapy.

Table 7. Test of Influence of Knowledge on Practices on Antibiotic Use among Nurses.

PRAC	Observed Estimate	Bootstrap SE	Z	P-value	Decision	Remarks
Mean PRAC	3.730	.0576	64.80	0.000		
Effect						
KNOW	.067	.0457	1.47	0.142	Accept H_{03}	Not Significant
ATTI	.627	.084	7.47	0.000	Reject H_{03}	Significant

Note: Significant if p-value <.05; R^2= 0.4341; IV- Attitude, Knowledge; DV-Practices

Table 7 revealed that the level of knowledge (OE=.067, p=.142) significantly influenced the attitude level on antibiotic use among nurses. This led to the rejection of the null hypothesis (H_{03}) as its p-value is less than 0.05 alpha level of significance. On the other hand, the knowledge level did not significantly influence the level of practice. Furthermore, the findings were apparent in the results of nonparametric regression analysis, in which 43.41% of the variance of practices can be explained by the level of attitude as indicated by an r-square of 0.4341. This would mean that 56.59% of the variation can be attributed to factors other than knowledge and attitude.

The study of Zhao et al. (2023) was conducted using an explanatory sequential mixed-methods design; the research began with a quantitative survey administered to 463 nurses between March and August 2021, followed by qualitative semi-structured interviews with 17 nurses between March and July 2022. The study found that nurses scored 75% in knowledge, 82.8% in attitudes, and 84.1% in practices related to AMS. Factors such as knowledge of local AMS programs, frequency of AMS training, and willingness to participate in such training significantly impacted nurses' scores. The qualitative phase revealed insufficient knowledge, diverse attitudes toward AMS engagement, and limited scope and standards for nurse participation. The study underscores the importance of enhancing nurses' understanding and involvement in AMS through regular training, clear guidelines, and supportive work environments.

Table 8.1 Test of Association between the Nurses' Demographic Profile and Knowledge of Antibiotic Use.

Demographic Profile	Knowledge			
	η	p-value	Decision	Remarks
Age	.410	.159	Accept H_{04}	Not Significant
Sex	.228	.043	Reject H_{04}	Significant
Area of Assignment	.543	.396	Accept H_{04}	Not Significant
Length of Experience	.450	.002	Reject H_{04}	Significant

Note: p<0.05 (Significant); NS-Not Significant; η = eta.

Table 8.1 shows the test of association between demographic profile and level of knowledge on antibiotic use among nurses. The results revealed that sex (η =.228, p=.043) and length of experience (η =.450, p=.002) had a significant, positive association with nurse's level of knowledge. On the other hand, age (η =.410, p=.159) and area of assignment (η =.543, p=.396) did not show any significant association with the level of knowledge on antibiotic use, leading to the acceptance of null hypothesis (H_{04}) as their p-values are more than 0.05 alpha level of significance.

The study of Lalithabai et al. (2022) involved a cross-sectional study with 341 nurses from a multicultural tertiary healthcare setting, utilizing a structured self-administered questionnaire. The results showed that nurses generally had moderate awareness of AR and a fair attitude toward its prevention. Notably, no significant correlation existed between their demographic characteristics and overall knowledge and attitudes, indicating a widespread need for enhanced education regardless of background. Antibiotics are fundamental to modern medicine, enabling the treatment of infections and the execution of life-saving procedures such as surgeries, organ transplants, and chemotherapy. However, the rising threat of AR is severely undermining these medical practices, potentially leading to dire health outcomes like high morbidity, amputations, or even death. The study highlights the urgent need to address AR to avoid a scenario where the effectiveness of antibiotics is so diminished that we enter a post-antibiotic era, severely compromising healthcare. The variability in antibiotic use and the awareness of bacterial resistance across different countries further complicate this issue, underscoring the need for a unified global response.

Table 8.2. Test of Association between the Nurses' Demographic Profile and Attitude on Antibiotic Use.

Demographic Profile	Attitude			
	η	p-value	Decision	Remarks
Age	.357	.011	Reject H_{05}	Significant
Sex	.065	.065	Accept H_{05}	Not Significant
Area of Assignment	.356	.796	Accept H_{05}	Not Significant
Length of Experience	.333	.012	Reject H_{05}	Significant

Note: p<0.05 (Significant); NS-Not Significant; η = eta.

Table 8.2 shows the test of association between demographic profile and level of attitude on antibiotic use among nurses. The results revealed that age (η =.357, p=.011) and length of experience (η =.333, p=.012) had a significant, positive association with nurse's level of attitude. On the other hand, sex (η =.065, p=.065) and area of assignment (η =.356, p=.796) did not show any significant association with the level of attitude on antibiotic use, leading to the acceptance of null hypothesis (H_{05}) as their p-values are more than 0.05 alpha level of significance.

The study of Lalithabai et al. (2022) showed that nurses generally had moderate awareness of AR and a fair attitude towards its prevention. Notably, no significant correlation existed between their demographic characteristics and overall knowledge and attitudes, indicating a widespread need for enhanced education regardless of background. Antibiotics are fundamental to modern medicine, enabling the treatment of infections and the execution of life-saving procedures such as surgeries, organ transplants, and chemotherapy.

Table 8.3. Test of Association between the Nurses' Demographic Profile and Practices on Antibiotic Use.

Demographic Profile	Practices			
	η	p-value	Decision	Remarks
Age	.294	.760	Reject H_{06}	Significant
Sex	.034	.764	Accept H_{06}	Not Significant
Area of Assignment	.415	.195	Accept H_{06}	Not Significant
Length of Experience	.271	.282	Reject H_{06}	Significant

Note: p<0.05 (Significant); NS-Not Significant; η = eta.

As presented in Table 8.3, the results revealed that age (η =.294, p=.760), sex (η =.034, p=.764), area of assignment (η =.415, p=.195), and length of experience (η =.271, p=.282) had no significant association with nurse's level of practices on antibiotic use which led to the acceptance of null hypothesis (H_{06}) as their p-values are more than 0.05 alpha level of significance.

Yang et al.'s study (2024) highlighted that inadequate discussion of AMR in school courses was a significant risk factor affecting students' KAP. Since the discovery of penicillin in 1928, antibiotics have been essential in saving lives and advancing modern medicine. However, their misuse and overuse have led to a severe threat in the form of AMR, which compromises the effectiveness of antibiotics and poses a significant challenge to global health security.

Conclusions and Recommendations

The study concludes that the study's respondents were relatively young, predominantly female workforce, with moderate hospital experience, suggesting the need for targeted professional development initiatives tailored to the demographic characteristics of the nursing staff.

Also, murses demonstrated a high level of knowledge about antibiotic use, reflecting a solid foundation in this area. However, variability highlights opportunities for focused training to address specific gaps and enhance expertise. Nurses displayed a positive attitude toward proper antibiotic use, which is essential for fostering adherence to infection control measures. Continuous reinforcement of these attitudes is critical for sustaining high compliance levels.

Moreover, nurses' practices regarding antibiotic use were commendable, with adherence to recommended protocols observed. However, further refinement is needed to achieve consistent excellence in practice. Sex and length of experience were significantly associated with knowledge, indicating that these factors may influence nurses' understanding of antibiotic use. On the other hand, age and length of experience are significantly associated with the nurses' attitudes and practices in antibiotic use.A significant positive relationship between knowledge and practices underscores the importance of equipping nurses with comprehensive knowledge to improve adherence to antibiotic protocols.

Further, the strong relationship between attitudes and practices highlights the critical role of fostering positive attitudes to ensure adherence to proper antibiotic use and infection control measures. Attitudes significantly predicted practices, emphasizing the need for strategies to enhance knowledge and positively shape attitudes to improve compliance and patient outcomes.

These findings highlight that while demographic factors such as sex, age, and length of experience influence knowledge and attitudes, practices are predominantly driven by attitudes, emphasizing the importance of fostering positive attitudes to improve adherence to antibiotic protocols. At the same time, knowledge did not exhibit a direct predictive influence. This emphasizes the importance of fostering positive attitudes alongside knowledge enhancement.

Overall, the study concludes that while knowledge and attitudes are high among nurses, positive attitudes are more influential in driving practice adherence. Interventions should focus on sustaining high levels of knowledge, strengthening positive attitudes, and addressing external factors that may hinder translating knowledge and attitudes into consistent practice.

References

Awad, A. I., & Aboud, E. A. (2015). Knowledge, attitudes, and practices regarding antibiotic use among the Kuwaiti public. Kuwait Medical Journal, 47(1), 1–7.

Berdida, D. J. E., Grande, R. A. N., Lopez, V., Ramirez, S. H., Manting, M. M. E., Berdida, M. M. E., & Bañas, C. B. (2022). A national online survey of Filipinos' knowledge, attitude, and awareness of antibiotic use and resistance: A cross-sectional study. Nursing Forum

Habib, S. M., Habib, S., & Sulaiman, S. (2021). Nurses' knowledge, attitudes, and practices regarding antibiotic resistance in Services Hospital Lahore. Pakistan Journal of Nursing, 22(3), 64–72.

Jairoun, A. A., et al. (2019). Knowledge, attitude, and practice regarding antibiotic use among medical and non-medical students at Ajman University, UAE. Journal of Infection and Public Health, 12(5), 752–757.

Jainlabdin, M. H., Zainuddin, N. D. M., & Ghazali, S. A. M. (2021). Knowledge, attitude, and practice of antibiotic use and antibiotic resistance during the COVID-19 pandemic among nursing school students – A cross-sectional study. International Journal of Care Scholars, 4(2), 30–39. https://doi.org/10.31436/ijcs.v4i2.196

John, S., Kumar, R., & Nair, A. (2022). Assessment of antibiotic knowledge and practices among nurses in Kerala, India. International Journal of Nursing Studies, 60(4), 256–262. https://doi.org/10.1016/j.ijns.2022.04.005

Lalithabai, L., et al., (2022). Knowledge, attitudes, and practices on antibiotic resistance prevention among nurses in a tertiary care hospital in South India. Journal of Infection Control, 27(2), 119–126.

Sadasivam, S. et al. (2016). Knowledge, attitude, and practices regarding antibiotic resistance among paramedical staff in a tertiary care hospital in Tamil Nadu, India. Journal of Hospital Infection, 92(2), 129–135.

Sahu, P., & Sahu, S. (2021). A study of knowledge, attitudes, and practices of nursing professionals regarding antibiotic resistance and stewardship in Chhattisgarh, India. International Journal of Nursing Education, 13(3), 42–50.

Tagum-Briones, J. M., Romero, C. B., De Villa, L. V., & Hisan, U. K. (2023). Knowledge, attitudes, and practices on antibiotic use. Journal of Public Health Sciences.

Yang, C., Zhao, Y., & Li, H. (2024). Nursing students' knowledge, attitudes, and practices concerning antibiotic resistance in China. Nursing Education Today, 94, 104639. https://doi.org/10.1016/j.nedt.2024.104639

Zhao, W., Liu, X., & Wang, Y. (2023). Bedside nurses' engagement in antimicrobial stewardship: A mixed-methods study. Journal of Antimicrobial Resistance, 12(3), 188–196.