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Original Research Article

## A descriptive study to assess the knowledge of staff nurses regarding antibiotic resistance at a selected hospital, Bangalore

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### ABSTRACT

**Background:** Antibiotic resistance is a major global health problem that compromises the effective treatment of infectious diseases. Nurses play a crucial role in administration of antibiotic and monitoring therapeutic outcome. Proper knowledge among nurses can help reduce the misuse of antibiotics and prevent the development of resistance organism. This study conducted with the objective to assess level of knowledge about antibiotic resistance among staff nurses and to find association between knowledge of staff nurses regarding antibiotic resistance with sociodemographic variables

**Methods:** We conducted a descriptive cross-sectional study in the month of November 2025 using non-probability convenience sampling among 402 staff nurses at a selected hospital in Bangalore, data was collected through Google form with structured questionnaire and analyzed using descriptive and inferential statistics.

**Results:** Among all the participants 17.7% had adequate knowledge, 46.3% had moderately adequate knowledge, 36% had inadequate knowledge of antibiotic resistance. The mean score was 5 with standard deviation of  $\pm 4.820$ . There is significant association between knowledge of staff nurses regarding antibiotic resistance with area of work only (chi square value=13.100,  $p=0.041$ ).

**Conclusions:** The findings revealed that most of the staff nurses had moderately adequate knowledge. To improve nurses' knowledge, periodic assessment should be conducted to identify their learning needs. It will assist in planning and developing formal educational and training programs to enhance nurses understanding of antibiotic resistance.

**Keywords:** Knowledge, Antibiotic resistance, Staff nurse

### INTRODUCTION

Since the discovery of penicillin by Alexander Fleming in 1928, antibiotic have revolutionized medical science, significantly reduced mortality and extending the average human lifespan by approximately 23 years.

Antimicrobial resistance (AMR) has emerged as one of the most serious global public health threats, compromising the effective prevention and treatment of infections caused

by bacteria, parasites, viruses, and fungi. According to the world health organization antibiotic-resistant bacterial infections were directly responsible for an estimated 1.27 million deaths worldwide in 2019.<sup>1</sup> India is among the countries most severely affected by AMR, reporting nearly 300,000 deaths annually, including approximately 60,000 neonatal deaths. If current trends continue, projections indicate that India may experience up to 2 million AMR-related deaths by 2050.<sup>2</sup> This alarming incidence

highlights the urgent need for systematic efforts to address antibiotic resistance within healthcare systems.

The consequences of AMR extend beyond mortality, significantly affecting patient outcomes and healthcare delivery. Resistant infections are associated with prolonged hospital stays, delayed recovery, increased complications, and higher healthcare costs. National-level evidence indicates that patients with drug-resistant infections, particularly those admitted to intensive care units, experience increased morbidity and mortality compared to patients with susceptible infections.<sup>3</sup> Prolonged hospitalization further increases the risk of hospital-acquired infections, thereby accelerating the spread of resistant organisms and placing additional strain on healthcare resources. Nurses play a pivotal role in preventing and controlling AMR through appropriate antibiotic administration, strict adherence to infection-control practices, early identification of adverse drug reactions, and patient and caregiver education. As frontline healthcare providers, nurses are directly involved in implementing key preventive measures such as hand hygiene, aseptic techniques, isolation precautions, and antimicrobial stewardship (AMS) activities. The world health organization has emphasized the need to strengthen AMS strategies by promoting rational antibiotic use and preventing the development of resistance.<sup>4</sup> Global health authorities have also recognized nurses as essential contributors to the success of AMS programs across hospital and community settings.<sup>5</sup>

Despite this crucial role, evidence suggests notable gaps in nurses' knowledge and practices related to antibiotic resistance. Several studies have reported poor understanding of basic antibiotic concepts, confusion between bacterial and viral infections, and inappropriate antibiotic practices among nurses.<sup>6</sup> Other studies have shown that nearly half of staff nurses possess only moderately adequate knowledge, with a significant proportion demonstrating moderate to poor practices related to antibiotic use and resistance. Furthermore, community-based studies conducted in Bangalore have focused primarily on the general public, leaving a clear gap in evidence regarding antibiotic-resistance knowledge among healthcare workers in hospital settings.<sup>7</sup>

Systematic reviews of the literature have highlighted substantial heterogeneity across existing studies, limited reporting of patient-centred outcomes, and a lack of robust evidence from primary care and clinical settings.<sup>8</sup> Additionally, a persistent gap between knowledge and actual practice has been identified among healthcare workers, with nurses often being underutilized in AMS programs.<sup>9</sup> Given the rising incidence of antibiotic resistance, its detrimental impact on hospital stays and patient recovery, and the central role of nurses in infection control and AMS, there is a compelling need for the present study. Assessing the knowledge of staff nurses regarding antibiotic resistance will help identify existing gaps and guide the development of targeted educational

interventions. Empowering nurses with adequate knowledge and involving them actively in AMS initiatives are essential steps in curbing antibiotic resistance and safeguarding public health.

## **METHODS**

A descriptive survey was conducted for the study. It was conducted at M. S. Ramaiah Medical College Hospital, Bangalore. The 402 staff nurses were selected using non probability sampling technique to participate in the study.

### ***Inclusion criteria***

Staff nurses providing direct care to patient working at various department such as emergency ward, ICUs, surgical and medical wards, OT, labour room, postnatal ward were included in the study.

### ***Exclusion criteria***

Nurses working in non-clinical settings or administrative areas were excluded from the study.

### ***Description tool***

The tool consists of two sections:

#### ***Section A: Sociodemographic data***

This section includes age, gender, education, clinical experience, area of work, previous training and workshop regarding antibiotic resistance.

#### ***Section B: Structured questionnaire to assess the knowledge on antibiotic resistance***

Its self-structured questionnaire that includes 28 questions. It consists of following components: Knowledge of antibiotic, antibiotic use and practices, knowledge about antibiotic resistance and Infection control measure.

### ***Content validity***

The content validity was obtained from 9 experts (7 nurse experts and 2 physician). The suggestion was taken into consideration and changes were made accordingly.

### ***Reliability***

Tool's reliability was checked using split-half method and the spearman-Brown coefficient was 0.77. The reliability test done with the help of SPSS version 20.

### ***Pilot study***

The pilot study was conducted at Ramaiah Memorial Hospital, Bangalore. On completion, the study was found to be feasible and practicable to proceed with main study.

### Data collection

Data collection started from 18<sup>th</sup> November 2025 to 24<sup>th</sup> November 2025. Ethical clearance is obtained from Ramaiah University of Applied Sciences, reference no-EC-25/127-UG-RINER. Formal permission to collect data was obtained from associate Dean, Ramaiah medical college hospital. Consent was taken from staff nurses and data was collected using Google form with a structured questionnaire.

### Statistical analysis

The data were analysed using SPSS version 20 and according to the objectives of the study using both descriptive and inferential statistics. Descriptive statistics including, Frequency, percentage, mean, standard deviation was used to describe the socio-demographic variable and to assess the level of knowledge among staff nurses. Inferential statistics the chi-square test were used to determine the association between the level of knowledge of staff nurses regarding antibiotic resistance with sociodemographic variables.

## RESULTS

### Section A: Frequency and percentage distribution of sociodemographic variables

Table 1 presents the socio demographic characteristics of the 402 participants. The majority of the respondents were female (82.8%) and 39.8% were aged between 20-30

years. With regard to educational qualification, 62.2% were GNM. Approximately one third of the participants (32.8%) had 0-5 years clinical experience. Nearly half of the respondents (49.8%) were employed in various wards including surgical, medical, labour room, postnatal, paediatric wards, at Ramaiah medical college hospital. Furthermore, 59.2% of the staff nurses reported that had not attended any training or workshop related to the antibiotic stewardship program (ASP).

### Section B: Frequency and percentage distribution of knowledge of staff nurses regarding antibiotic resistance

Figure 1 illustrates that among the 402 participants, 17.7% had adequate knowledge, 46.3% had moderately adequate knowledge and 36.0% had inadequate knowledge regarding antibiotic resistance.

Table 2 depicts that the mean score of knowledge of staff nurses regarding antibiotic resistance was 16.52±4.820.

### Section C: Association between knowledge of staff nurse regarding antibiotic resistance with sociodemographic variables by using the chi-square test

Table 3 depicts that a statistically significant association was found between the knowledge of staff nurses regarding antibiotic resistance and the area of work only (chi square value=13.100, p=0.041). However, no significant association was observed with gender, age, Education, clinical experience, previous training on ASP.

**Table 1: Frequency and percentage distribution of sociodemographic variables (n=402).**

Sociodemographic variables	N	Percentage (%)	
Gender	Male	69	17.2
	Female	333	82.8
Age (in years)	20-30	160	39.8
	31-40	155	38.6
	41-50	68	16.9
	51-60	19	4.7
Education	GNM	250	62.2
	B. Sc. nursing	81	20.1
	P. B. B. Sc nursing	67	16.7
Clinical experience (in years)	M. Sc. nursing	4	1.0
	0-5	132	32.8
	6-10	70	17.4
	11-15	86	21.4
	16-20	63	15.7
	21-25	38	9.5
Area of work	26-30	13	3.2
	ICU	138	34.3
	Emergency department	45	11.2
	OT	19	4.7
Have you ever gone through training or attended workshop on the ASP?	Others (Wards)	200	49.8
	Yes	164	40.8
	No	238	59.2

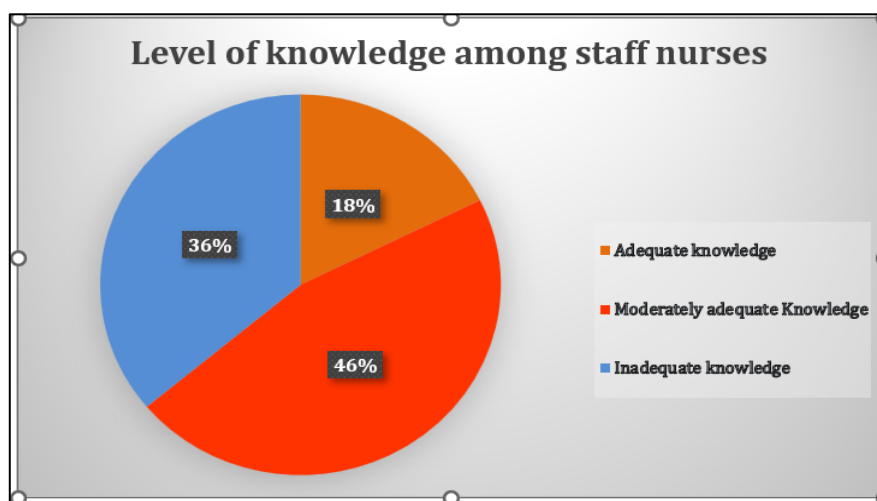
**Table 2: Mean and standard deviation of knowledge of staff nurses regarding antibiotic resistance.**

Knowledge	Minimum score	Maximum score	Mean	SD
	5	27	16.52	±4.820

**Table 3: Association between knowledge of staff nurse regarding antibiotic resistance with sociodemographic variables, n=402.**

Socio demographic variables	Knowledge			Chi square value	P value
	Inadequate knowledge	Moderately adequate knowledge	Adequate knowledge		
<b>Gender</b>					
Male	21	36	12	d (f)=2, 1.365	0.505 NS
Female	124	150	59		
<b>Age (in years)</b>					
20-30	67	62	31	d (f)=6, 9.478	0.148 NS
31-40	47	82	26		
41-50	27	30			
51-60	4	12	3		
<b>Education</b>					
GNM	89	116	45	d(f)=6, 4.461	0.615 NS
B. Sc. nursing	27	38	16		
P. B. B. Sc. nursing	29	29	9		
M. Sc. nursing	0	3	1		
<b>Years of clinical experience</b>					
0-5	52	54	26	d(f)=10, 16.509	0.086 NS
6-10	29	25	16		
11-15	22	53	11		
16-20	27	28	8		
21-25	12	18	8		
26-30	3	8	2		
<b>Area of work</b>					
ICU	52	58	28	d(f)=6, 13.100	0.041 S
Emergency department	24	17	4		
OT	9	9	1		
Others (Wards)	60	102	38		
<b>Have you ever gone through training or attended workshop on the ASP?</b>					
Yes	67	66	31	d(f)=2, 4.172	0.124 NS
No	78	120	40		

\*NS=Not significant, S=Significant, df=degree of freedom



**Figure 1: Frequency and percentage distribution of knowledge regarding antibiotic resistance, (n=402).**

## DISCUSSION

The statistical analysis showed that among the staff nurses, 17.7% had adequate knowledge, 46.3% had moderately adequate knowledge and 36% had inadequate knowledge regarding antibiotic resistance. We assumed that Staff nurses process basic level of knowledge antibiotic and antibiotic resistance through their formal nursing education and routine clinical experience. There will be variability in knowledge about antibiotic resistance among staff nurses.

These results are consistent with earlier research findings, similarly reported moderate or limited awareness of antibiotic resistance among nurses.<sup>10,11</sup> Further, one more study also observed a moderate knowledge level among nurses in Gujarat.<sup>6</sup> Collectively, these studies reinforce that insufficient knowledge regarding antibiotic resistance is a common challenge across nursing communities in various regions, not an isolated outcome of this study alone.

A notable finding in this study is that 59.2% of nurses had not attended any training or workshop related to ASPs. This limited exposure to formal training could be one of the reasons for lower knowledge levels. Without structured educational opportunities, nurses may not stay updated with evolving guidelines, AMR trends, or evidence-based stewardship practices. Since nurses are directly responsible for antibiotic administration, monitoring patient responses, and providing health teaching, gaps in knowledge can contribute to inappropriate antibiotic use and increased risk of resistance.

The study revealed a significant association between staff nurses' knowledge regarding antibiotic resistance and their area of work ( $p=0.041$ ). Other factors, including age, gender, educational qualification, years of clinical experience, and prior participation in ASP training, did not demonstrate a statistically significant association with knowledge of staff nurses regarding antibiotic resistance.

The observed association with clinical area indicates that nurses working in intensive care units, emergency departments, and other specialized units possessed higher levels of knowledge compared to those employed in general wards. This may be attributed to their frequent interaction with critically ill patients, adherence to stringent infection prevention protocols and regular exposure to broad-spectrum and advanced antibiotics, all of which may contribute to a deeper understanding of antibiotic resistance.

These findings are consistent with earlier studies. One study reported higher infection-prevention knowledge among nurses in neonatal intensive care units due to their routine involvement in high-risk clinical care.<sup>12</sup> Similarly, one study identified greater awareness of antibiotic resistance among ICU nurses, likely resulting from the increased prevalence of multidrug-resistant organisms in such settings. These findings suggest that continuous

hands-on clinical exposure plays a vital role in reinforcing knowledge related to antibiotic resistance.<sup>9</sup>

Present study found no statistically significant relationship between nurses' knowledge scores and age. This aligns with findings reported by 2 more studies also observed no meaningful differences in knowledge levels across various age groups. This suggests that age alone does not influence understanding of antibiotic resistance and that knowledge acquisition is more closely linked to professional exposure and ongoing educational opportunities.<sup>6,10</sup>

Similarly, in this study there was no significant association was found between knowledge of staff nurses regarding antibiotic resistance and gender. This finding supports previous studies which reported comparable levels of antibiotic-related knowledge among male, female nurses. These results indicate that gender does not determine knowledge levels and emphasize importance of equitable access to training and clinical learning experiences.<sup>10,13</sup>

The lack of association between knowledge levels and educational qualification or years of experience suggests that higher academic credentials or prolonged service alone may not guarantee adequate understanding of antibiotic resistance. Comparable observations were reported by other study where emphasized the necessity of translating theoretical knowledge into practical, clinically relevant understanding.<sup>9,14</sup>

Although 40.8% of participants had attended ASP training and had B. Sc. and post basic B. Sc. nursing qualifications. Despite this, there was still a lack of knowledge. This indicates the importance of continuous antibiotic stewardship training programme and regular skill-building sessions to update knowledge.

Overall, the study indicates that clinical exposure, particularly in high-acuity care settings, has a stronger influence on nurses' knowledge of antibiotic resistance than formal education or length of experience. These findings underscore the need for specialized unit-based training, regular continuing education, simulation-and case-based learning approaches, and mandatory ASP training for all nurses. Strengthening these educational strategies may help ensure that nurses across all clinical areas are adequately equipped to support AMS efforts and mitigate the growing challenge of antibiotic resistance.

The findings revealed that staff nurses had moderately adequate to adequate knowledge regarding antibiotic resistance and its prevention. We recommended that further research can assess the attitude and practices of staff nurses regarding antibiotic resistance.

### Limitations

The findings of the study were based on self-reported responses of staff nurses, which may be subject to response bias. The sample size was limited.

## CONCLUSION

The present study concluded that proportion of sample have perceived B. Sc. and post basic B. Sc. nursing qualification and 40% participants reported having attended ASP. Despite of this there is still of lack of knowledge of antibiotic resistance. Periodic assessment and regular in-service and continuing nursing education programs, including AMS training, should be strengthened to improve staff nurses' knowledge and practices related to rational use of antibiotics and prevention of antibiotic resistance.

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## REFERENCES

1. Who.int. Antimicrobial resistance. 2023. Available at: <https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance>. Accessed on 30 July 2025.
2. Institute for health metrics and evaluation. 2022. Available at: <https://www.healthdata.org/antimicrobial-resistance/policy-briefings>. Accessed on 30 July 2025.
3. Sharma A, Thakur N, Thakur A, Chauhan A, Babrah H. The Challenge of Antimicrobial Resistance in the Indian Healthcare System. *Cureus*. 2023;15(7):e42231.
4. Jahromi AS. Global knowledge, attitudes, and practices towards antimicrobial resistance among healthcare workers: a systematic review and meta-analysis. *Antimicrobial Resistance Infect Control*. 2025;14(1):47.
5. Carter EJ, William GG, Furuya EY, Srinivasan A, Shelley AN, Bothra A, et al. 'Exploring the nurses' role in antibiotic stewardship: A multisite qualitative study of nurses and infection preventionists. *Am J Infect Control*. 2018;46(5):492-7.
6. Maradia M, Gajjar S, Patel D, Christian A. *Int J Pharmaceut Clin Res*. 2024;16(1):80-5.
7. Rao A, Kamdar D, Fernandes G. Public's Perception, Knowledge, Attitude and Behaviour on Antibiotic Resistance-A Survey in Bangalore City, India. *IOSR J Pharmacy (IOSR-PHR)*. 2022;12(9):07-13.
8. van Hecke O, Wang K, Lee JJ, Roberts NW, Butler CC. *Clin Infect Dis*. Implications of Antibiotic Resistance for Patients' Recovery. *Common Infect Community*. 2017;65(3):371-82.
9. Singh KV, Puraswani M, Ningombam A, Ashita A, Thomas JM, Ambashta NK, et al. Infection control and antimicrobial stewardship awareness among healthcare workers. *Health Sci Dis*. 2026;27(1):85-91.
10. Sahu RK, Sahu Y. Knowledge regarding antibiotic resistance among healthcare professionals. *Int J Sci Healthc Res*. 2021;6(2):17-21.
11. Bai L, Rani M, Joseph J. Knowledge and awareness of antibiotic resistance among staff nurses. *Asian J Nursing Educat Res*. 2022;2:e0000661.
12. Iqbal F, Siva N, Shenoy PA, Lewis LES, Purkayastha J, Vandana KE. Knowledge of antimicrobial resistance among neonatal nurses. *J Neonatal Nurs*. 2025;31(4):101699.
13. Mishra R, Ruchika R, Maneesh S, Rajesh K. 'Nurses' awareness, perception and practices regarding antibiotic use: A call for setting up an antimicrobial stewardship programme. *J Med Evidence*. 2023;4(3):235-40.
14. Rana S, Gupta A, Meena R. Knowledge-practice gap regarding antimicrobial resistance among nursing staff. *Nursing J India*. 2024;12:1433430.

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