Knowledge and Attitude on Antimicrobial Resistance among Nurses working at a Teaching Hospital in Pokhara

Aarati Acharya [1], Ceto Gurung[2], Pramila Baral[3], Dipti Koirala[4], Pushpa Timilsina[1], Manoj Koirala[5]

[1] Department of Nursing, Manipal College of Medical Sciences, Pokhara – 16, Kaski, Nepal

[2] Department of Nursing, Green Pasture Hospital, Nayagaun, Pokhara, Nepal

[3] Program Manager, Smart Brains Academy, Kathmandu, Nepal

[4] Department of Nursing, Gandaki Medical College, Kulratna Marg, Kathmandu, Nepal

[5] Department of Medicine, Pokhara Academy of Health Sciences, Pokhara, Nepal

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Corresponding Author:

Aarati Acharya

Lecturer, Manipal College of Medical Sciences, Fulbari-12, Kaski, Nepal
Email: aaratiacharya7@gmail.com

Abstract

Introduction: Antimicrobial resistance (AMR) is a global health concernand it is estimated that by 2050,AMR could cause 1.91 million deaths each year. It threatens the progress of modern medicine by making infections harder to treat and complicating other medical procedures.Thus, this study aimed to assess the knowledge and attitude regarding antimicrobial resistance among nurses working at Manipal teaching hospital in Pokhara.

Methods: A crosssectional research design was carried among 158 nurses who were working on different departments of Manipal teaching hospital.Non-probability convenient sampling was used to select the sample.Data was collected after informed consent through structured self- administer questionnaires from 18thJuly to 8thAugust 2024.Descriptive statistics and inferential statisticstests were performed to analyze the data.

Results: The results showed that, 73.40% had adequate knowledgewhile more than half(52.50%)of the participants had positive attitude on antimicrobial resistance. There was significant association between level ofknowledgeand working area(p<0.001).However, there was no significant association of nurse's knowledge with regards to their age, working experience, professional qualification, source of information, training related to antimicrobial resistance.

Conclusion: The study concluded that nearly three-fourths of nurses had adequate knowledge and more than half had a positive attitude regarding AMR. The significant relationship between nurses' level of knowledge and their working area highlights the need to empower nurses through structured interventions in mitigating the growing threat of AMR and improving patient care outcomes.

Keywords: Antimicrobial resistance, attitude, knowledge,nurses.

Introduction

Antimicrobial resistance (AMR) is a global concern, affecting both countries with limited resources and developed countries.[1] AMR threatens the effective prevention and treatment of infections, increasing the risk of disease spread, severe illness, and death. It threatens the progress of modern medicine by making infections harder to treat and complicating other medical procedures.[2] In 2019, AMR was proposed for the first time as a specific indicator of Good Health and Wellbeing, which is Goal 3 of the United Nations' 2030 Sustainable Development Goals.[3]

The World Health Organization (WHO) lists AMR among the top 10 threats for global healthandestimates that by 2050,AMR could cause 1.91 million deaths each year and an additional 8.22 million deaths due to illnesses associated with resistance.[2] Factors such as the use of antibiotics as growth promoter in animal agriculture, overuse, use for long periods, self-medication practices and lack of well-equipped hospitals and clinics have been drivers of the development of AMR in humans.[4,5]

AMR affects countries in all regions and at all income levels, however, low-middle-income countries (LMICs) with poor

infection control and prevention systems are more vulnerable to the increasing threat posed by AMR.[2,6] The World Bank Report predicted that increasing AMR is estimated to drive an additional 28 million people to extreme poverty by 2050, mainly in LMICs.[7]

Nepal is one of the major contributors to the growing burden of AMR due to widespread irrational use of antibiotics along with poor health care systems poor infection control and prevention measures.[8] Various studies on antibiotic prescribing pattern in Nepal showed most patients were unnecessarily prescribed more than one antibiotic concurrently without bacterial confirmation or susceptibility testing.[9]Nepal has made tremendous advances in reducing mortality and morbidity and increasing health coverage, but still lacks to take steps to address antibiotic resistance.[4]

AMR is a major public health issue and health problem, it requires great attention.[10] Several studies carried out in HCWs reveals the lack of up to- date knowledge on AMR.[11,12] Health care workers should have good knowledge about antibiotics and antimicrobial resistance otherwise it will lead to ineffective treatment and million death associated with antimicrobial resistance and also have additional burden of medical cost to the patient.[10,13]

Nurses constitute the professional group with the largest workforce in the hospital that spends 24 hours with the patient, closely monitors the patients, coordinates care, and constantly communicates with other disciplines.[14] One of the major components in antimicrobial stewardship is that the right antimicrobial medicine at the right dose should be administered at the right time for the right duration, nurses, having a persistent presence within in-patient care settings, are in the ideal position to ensure correct use of antimicrobial agents.[15] Thus in this context, the study aim to assess the knowledge and attitude regarding antimicrobial resistance among nurses.

Methods

A quantitativecross-sectional study was carried out on a sampleof 158 nurses who were working on different departments of Manipal Teaching Hospital for more than one year.Data was collected from 18thJuly to 8thAugust 2024.

Sample size was calculated using Yamane formula:

$n = N / (1 + Ne2)$

where, n = sample size (?)

N = Population size (225)

e = level of precision (0.05)

now, $n = N / (1 + Ne2)$

= 225/ 1 +225 x 0.0025

= 225/ 1.5625

=144

Adding 10% non-response rate= 10% of 144

= 10/ 100 x 144

= 14.4

= 14

Therefore, final sample size was 144+ 14 = 158.

Non- probability convenient sampling was used to select the sample. Nurses who were present during the time of data collection and who were willing to participate were included in the study. Data was collected after informed consent through structured self- administer questionnaires which was developed by researcher based on related literature review, and peer review. Regarding variables knowledge and attitude on antimicrobial resistance is a dependent variable whereas age, educational qualification,working department, working experience, source of information on AMR and training on antimicrobial resistance, are independent variables.The instruments were divided into 3 parts.PartIconsisted of questions related to socio-demographic characteristics. Similarly, Part II consists of 17 questions related toantimicrobial resistance:itsdefinition,factors associated with AMR, consequences of overuse, actions for its preventions and role of nurse in control ofAMR.

Level of knowledge was identified by correct response of the respondents towards the questionnaire regarding antimicrobial resistance that is expressed in terms of percentages of total score.Itwas categorized asadequate knowledge (>60%)and inadequate knowledge (<60%).[16]Part IIIconsisted of five point Likert Scale to assess attitude regarding antimicrobial resistance.

The items were rated on a five pointLikert scale ranging from 1(strongly disagree) to 5 (strongly agree).Attitudewas classified as positive attitude (≥ mean value) and negative attitude (< mean value)[17].

Data were collected after informed consent through structured self- administereredquestionnaires. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS 23 Version). Descriptive statistics like frequency, percentage, mean and standard deviation andinferential statistics chi-square test was used to find out the association between knowledge regarding antimicrobial resistance and selected variables. The level of significance was considered at 5% with p<0.05. The study adhered to ethical protocols, obtaining clearances from the Institutional Review Committee, Manipal College of Medical Sciences and securing verbal informed consent from participants while ensuring anonymity.

Results

Among 158 nurses, 58.30%were under 25 years old, 53.10% of them had more than three years of clinical experience and 14.5% worked in ICU. Regarding educational qualification more nurses were PCL nursing accounting for 89.20%followed by bachelor in nursing 10.80%. (Table 1)

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Table 1: DemographicCharacteristics of Nurses n=158

Characteristics	Number (n)	Percentage (%)
Age in year		
<25	92	58.30
≥25	66	41.70
Work experience		
1 years to <3 years	74	46.80
≥3 years	84	53.10
Working area		
Emergency	10	6.30
Medical ward	17	10.70
Surgical ward	16	10.10
Pediatric ward	17	10.70
Orthopedic ward	14	8.80
Maternity ward	11	6.90
Private ward	12	7.50
Postoperative ward	15	9.40
Operation theatre	9	5.60
ICU	19	12.00
NICU	18	11.30
Professional qualification	17	10.80
Bachelor in nursing	141	89.20
PCL nursing		

Source of Information and Training on AMR

Regarding information and training, 60.00% nurses had gained information from internet and only 7.60%attended training courses on antimicrobial resistance(Table 2)

Table 2: Source of Information and Training on AMR   n=158

Characteristics	Number (n)	Percentage (%)
Source of information		
Internet	91	60.00
Academic	55	34.80
Journal	12	7.50
Training on antimicrobial resistance		
Attended	12	7.60
Not attended	146	92.40

Knowledge on AMR

Regarding knowledge,73.40%had adequate knowledge whereas 26.60%had inadequate knowledge regarding antimicrobial resistance. (Table 3)

Table 3: Level of Knowledge on Antimicrobial Resistance among Nurses n=158

Level of knowledge	Number (n)	Percentage (%)
Inadequate	42	26.60
Adequate	116	73.40

Attitude on AMR

Regarding attitude,52.5% of nurses had a positive attitude and 47.5%of the nurses had a negative attitude regarding antimicrobial resistance.(Table 4)

Table 4: Level of Attitude on Antimicrobial Resistance among Nurses n=158

Level of attitude	Number (n)	Percentage (%)
Positive attitude	83	52.50
Negative attitude	75	47.50

Mean ± SD = 62.65 ± 8.48

Association between Knowledge Level on AMR and Predicting Variables

There is a statistically significant relation between nurse's knowledge and their working area(p<0.001). Nurses working at specialized ward has more adequate knowledge on AMR compared to general ward.Similarly, there is no statistically significant relation between nurse's knowledge and their age, working experience, professional qualification,source of information and training related to antimicrobial resistance. (Table 5)

Table 5: Association between Knowledge regarding Antimicrobial Resistance and Selected Variables n=158

Characteristics	Level of knowledge		Chi-square	p-value
	Inadequate n (%)	Adequate n (%)		
Age in year				
< 25	21(23)	71 (77)	1.59	0.207
≥25	21 (32)	45(68)		
Work experience				
1 years to < 3 years	05 (19)	21 (81)	2.87	0.587
≥ 3 years	37(28)	95 (72)		
Working area				
General ward	35 (36)	62 (64)	35.61	**<0.001**
Specialized ward	07 (11)	54 (89)		
Professional qualification				
Bachelor in nursing	04 (24)	13 (76)	1.62	0.444
PCL nursing	38 (27)	103 (73)		
Source of information			5.28	
Internet	26(29)	65 (71)		0.260
Academic	14(25)	41 (75)		
Journal	02 (17)	10 (83)		
Training on antimicrobial resistance			1.04	0.594
Attended	02 (17)	10 (83)		
Not attended	40(27)	106 (73)		

General ward= Emergency, Medical, Surgical, Pediatric, Orthopedic,

Maternity,Private

Specialized ward= ICU, Post-operative, NICU, Operation theatre

Discussion

This study assessed the knowledge and attitudes of nurses on antimicrobial resistance working at Manipal teaching hospital in Pokhara. The findings revealed that while 73.40% of nurses had adequate knowledge of AMR, only 52.50% exhibited positive attitudes. These findings indicate that while knowledge levels are relatively high, the translation of knowledge into positive attitudes remains a challenge.

The results of this study revealed that 73.40% of nurses had adequate knowledge. These findings align closely with a study conducted in Amhara Region Ethiopia, where 72.2% of healthcare professionals had sufficient knowledge about AMR.[12] Similarly,a study in Ndola, Zambia; Northwest Ethiopia and Jordan reported that 70%, 84.7% and 76% of nurses demonstrated good knowledge of AMR respectively.[13,18,19] These consistent findings suggest that awareness of AMR among nurses in some regions is relatively high, likely due to targeted education efforts and the increasing global emphasis on AMR as a critical public health issue. In contrast, a study in Saudi Arabia reported that only 14.7% of the nurses that good knowledge regarding antibiotics and antibiotic resistance.[17] The differences in educational exposure, healthcare infrastructure, cultural practices,could contribute to the observed discrepancy in AMR knowledge between these countries.For instance, higher education levels are often linked to better understanding of AMR. However, even in areas with good healthcare, cultural beliefs about antibiotics and the availability of reliable information can hinder knowledge acquisition. Conversely, limited training opportunities and inconsistent institutional policies on antibiotics could contribute to lower knowledge levels. The discrepancy might also stem from methodological differences, including sample size, participant selection criteria, or the metrics used to assess knowledge.

Regarding attitude, 52.40% of nurses in this study exhibited a positive attitude toward AMR. This is consistent with findings in Ndola Zambia, where 60% of healthcare workers showed favorable attitudes.[18] However, this is lower than findings from Saudi Arabia, where 76.7% of the nurses reported to have good attitude.[17] Surprisingly, a strikingly higher percentage (96.9%) of participants expressed positive attitude towards AMR as per the findings of the study done among undergraduate students in Lusaka, Zambia.[20] The disparity in attitudes could stem from several factors, including differences in professional responsibilities, levels of education, and access to AMR-related resources and training. For example, undergraduate students may have recently received targeted education on AMR, leading to heightened awareness and favorable attitudes, whereas practicing nurses may face workplace constraints, such as heavy workloads and limited professional development opportunities, which could negatively influence their perspectives. The nearly equal split in attitude highlights the need for targeted programs to enhance awareness and foster behavioral change among nurse. Training on AMR enables nurses to correctly identify adverse events, monitor patient adherence to antibiotic regimens, and educate patients on proper antibiotic use.

The significant association between nurses' knowledge levels and their working areas (p < 0.001) in this study aligns with findings from Saudi Arabia.[17] Nurses working in specialized units such as critical care or surgical wards may have greater exposure to antimicrobial resistance (AMR)-related issues, antibiotic protocols, and stewardship practices, thereby enhancing their knowledge in these areas. However, other demographic variables such as age, work experience, and professional qualifications did not show significant associations with knowledge levels in this study. These findings are different with a study from Northwest Ethiopia, which reported that AMR knowledge was significantly associated with healthcare professionals' demographics like work experience, working hours and antibiotics intake.[13] One possible explanation for this discrepancy may lie in the differences in healthcare systems and organizational structures between the two countries. For example, healthcare professionals in Northwest Ethiopia may acquire AMR knowledge more informally through personal experience and extended working hours, as formal AMR training programs are less established compared to settings like those in this study.

A concerning finding in this study was the low participation in AMR-related training programs, with only 7.6% of nurses attending such programs. The finding is much more concerning of Amhara Region, Ethiopia, where only 4.3% of nurses reported participation in AMR training.[12]

This study provides valuable insights into the knowledge and attitudes of nurses regarding AMR in Nepal, a low-resource setting significantly burdened by antimicrobial misuse. The use of structured questionnaires ensured standardized data collection. However, the cross-sectional design limits the ability to infer causation, and self-reported data may introduce bias, with participants potentially overestimating their knowledge or attitudes. Additionally, the study was conducted in a single institution, limiting the generalizability of its findings.

Conclusion

The overall finding of the study concludes that nearly third quarter of nurses have adequate knowledge regarding antimicrobial resistance and slightly more than half of the nurses have positive attitude regarding antimicrobial resistance. There is a statistically significant relation between nurse's knowledge and their working area. Whilenosignificantassociation was found between level of knowledge and their age, working experience, professional qualification, source of information, training related to antimicrobial resistance.Thusempowering nurses through structured interventions will be key in mitigating the growing threat of AMR and improving patient care outcomes.

Acknowledgement

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