An evaluation of knowledge, attitude and practice of rational antibiotic usage and antibiotic resistance among interns in a teaching tertiary care hospital: A cross-sectional questionnaire/ based study

Pallavi Kulkarni[1,*], Alice Kuruvilla[2], Regina Roy[3], Indla Ravi [4]

[1]Assistant Professor, [2]Professor, [3]Professor & HOD, [4]Tutor, Dept. of Pharmacology, Karuna Medical College, Vilayodi. Palakkad, Kerala

***Corresponding Author:**
Email: Pallavid30th@gmail.com

Abstract

Introduction: To assess the knowledge, attitude and practice of the interns about rational antibiotic use and antibiotic resistance in a teaching tertiary care hospital.

Materials and Methods: A cross-sectional questionnaire based study was conducted involving a total of 100 interns. The data was collected in excel sheet and analyzed with descriptive statistics and results expressed as mean and standard deviation, frequencies and percentages.

Results: Mean age of the participants was 24±0.71 years, with mean duration of internship 6.9±2.3 months. Sixty percent (n=60) had moderate and 39% (n=39) had good knowledge about rational antibiotic use. Fifty-six percent (n=56) knew the components of rationality, 41% (n=41) had confusion between definitive and empirical therapy. The attitude of the interns was good and positive, 96% (n=96) of them agreed that antibiotic resistance is a serious global health issue, 92% (n=92) were aware of the factors contributing to antibiotics resistance and 82% (n=82) strongly felt the need of a hospital antibiotic policy. Seventy-two percent (n=72) of the interns chose antibiotic based on senior clinicians' opinion. Seventy-four percent (n-=74) interns opined that Internal medicine postings followed by surgery postings would have a significant role and impact on their prescribing practices.

Conclusion: Interns had moderate knowledge and favorable positive attitude, improvisation in the internship curriculum involving multi-modal approach with inclusion of tailored educational interventions like case-based scenarios, group discussions, workshops, continued medical education programmes, sensitization programmes particularly during their major clinical postings, in addition active involvement of the clinicians would ensure more effective training of the future prescribers.

Keywords: Interns, Antimicrobial resistance, Rational use, Antibiotics.

Introduction

Antibiotics are one of the most commonly used as well as misused drugs. Indiscriminate and irrational use of antibiotics has significantly contributed to antibiotic resistance. Antibiotic resistance is global problem, developing countries in particular, where burden of health care associated infections is high and cost constricts the replacement of older antibiotics with newer and more expensive ones.[1,2]

Various strategies have been proposed for rational use of antibiotics such as formulary restriction or replacement, antibiotic stewardship, feedback activities, prescription audit etc. Assessment of knowledge, attitude and practice in various groups of population related to health care is one of the basic strategies employed in teaching hospitals to promote rational use of antibiotics.[1,3,4]

Although there are few studies evaluating the awareness about rational antibiotic use among interns, the results largely vary depending on the prescription patterns, hospital location and patient turnover, training programmes and duration of clinical postings. Internship forms a crucial period of learning and application of theoretical medical knowledge into clinical practice. It is the period of maximum receptivity for training and creating awareness among young future doctors regarding rational antibiotic use. Assessment of knowledge, attitude and practice (KAP) among interns would aid to evaluate and improve the existing educational and training programmes to create awareness about antibiotic resistance and ensure rational use of antibiotics from the initial stage of clinical practice.[5,6] Hence the present study was taken up.

Materials and Methods

This was a cross-sectional questionnaire based study conducted in a teaching tertiary care hospital, Palakkad. A total of 100 interns posted in various clinical departments were included in the study. A well-structured questionnaire was developed referring from previously published studies.[1,7,8,9] and modified to suite the respondant population. The questionnaire had 4 sections, first section consisting of ten questions, assessed the knowledge of interns about rational antibiotic use and antibiotic resistance A scoring out of 10 was used to grade their knowledge. (0-3: poor, 4-7: moderate, 8-10: Good). Each right answer was given a score of one and wrong answer was given a score of zero. Second section evaluated their attitude regarding rational antibiotic use and antibiotic resistance. A five point Likert scale with responses ranging from strongly

agree to strongly disagree was used in this section. Third section analyzed the practices of antibiotic use in interns in their current period of internship. Fourth section included questions for self-assessment of the interns about their knowledge and attitude of antibiotic use. The questionare had multiple choice answers, respondant was allowed to choose one answer which according them was most appropriate. Informed consent was taken from all the participants after explaining the study protocol. Questionnaire was given to interns after their working hours in hospital, a total time of 20 minutes was given to answer the questions without using any references, notes or assistance.

Statistical analysis

The completed questionnaires were collected from participants, the data was tabulated on an excel sheet and results were analyzed using descriptive statistics and expressed as mean and standard deviation, frequency and percentages.

Results

Total of 100 interns participated and completed the questionnaire study. The mean age of participants was 24 ± 0.71 years and included 47 % (n=47) males and 53% (n=53) females. Average duration of internship training received was 6.9 ± 2.3 months and 52 % (n=52) of them had finished 6 months of internship and were in their second half of the training period. 42% (n=42) had completed at least one of the major clinical postings in the departments of medicine, surgery or obstetrics and gynecology.

Table-1 shows the questionnaire to assess the knowledge of the interns. The grading of knowledge of interns is depicted in Table-2. Mean score was 6.9± 1.55. 60% (n-=60) of the participants had moderate knowledge (score: 4-7), 39% (n=39) had a good knowledge (score: 8-10) and only 1% (n=1) had poor knowledge about rational antibiotic use and resistance. Seventy-two percent (n=72) of the participants chose antibiotics based on their senior consultant's or physician's advice, only 10% (n=10) were aware of the importance of infective organism and antibiotic sensitivity for choosing an antibiotic. Fifty-six percent (n=56) of the interns knew all the components of rationality, 90% (n=90) of them were familiar with the term nosocomial infection. However, only 33% (n=33) chose the correct meaning of empirical therapy, 41% (n=41) assumed empirical therapy as organism-specific therapy.

Table 1: Questionnaire to assess the knowledge of interns about rational antibiotic use and antibiotic resistance.

Questionnaire with multiple choice answers	
1.	Antibiotics are used to treat : **A**. bacterial infection **B**. viral infection **C**. injury **D**. all of the above
2	Which of the following conditions does not require antibiotics: **A.** Pneumonia **B**. sinusitis **C**. UTI* **D.** common cold
3	How do you choose antibiotic for an infection: **A.** Random **B.** infective organism and sensitivity **C**. clinician decision **D**. none
4.	Duration of antibiotic therapy depends upon: **A.** Clinical improvement **B.** infective organism and severity of infection **C**. clinician decision **D.** None
5	Rational antibiotic use includes all except: **A.** Correct choice **B.** right dosage and duration **C**. cost effectiveness **D**. always use newer antibiotics
6	Nosocomial infection means: **A.** acquired in the community **B.** Occur in AIDS** patients only **C.** hospital acquired **D.** spread through nasal route only
7	Emperical antibiotic therapy means: **A**. giving high dose **B.** antibiotic for severe infection **C.** organism –specific **D**. based on prevailing sensitivity patterns
8	All factors contribute to antibiotic resistance except: **A**. Over use **B**. Self-medication **C**. incorrect choice and duration **D.** combination of antibiotics
9	Definitive antibiotic therapy means: **A.** Choosing from a guideline **B.** Giving first line antibiotics **C.** antibiotic based on prevailing sensitivity patterns **D.** Organism-specific therapy
10	For which infection culture and sensitivity is a must? **A.** Sinusitis **B**. Pneumonia **C.** UTI **D.** diarrhea
	***** UTI **:** Urinary Tract Infection ** AIDS : Acquired immune-deficiency syndrome

Table 2: Grading of knowledge of the participants based on number of correct answers*

Grading	**Number of participants (n=100)**	**%**
Good	39	39
Moderate	60	60
Poor	1	1

*****Each question had only one correct answer. A score of 1 was given for each correct answer and zero for wrong answer
Grading: Good: 8-10; moderate: 4-7; poor: 0-3
Mean score : 6.91±1.55

Responses to the attitude based questions are shown in table-3**.** 61% (n=61) of the participants strongly disagreed and 22% (n=21) disagreed regarding self-medication of antibiotics.40% (n=40) strongly disagreed and 20% (n=20) disagreed that skipping antibiotic doses does not cause resistance. 10% (n=10) were not sure about the importance of dosage in antibiotic resistance. 57% (n=57) of the interns agreed and 21% (n=21) strongly agreed that cost of antibiotic plays an important role in rational prescribing. 50% (n=50) agreed and 46% (n=46) strongly agreed that antibiotic resistance is a serious global health issue. 62% (n=62) strongly agreed for the need of hospital antibiotic policy to ensure rationality. The responses indicate that the interns had a fairly positive attitude towards the rational antibiotic prescribing and were aware of the factors which could contribute to the resistance.

Table 3: Attitude of interns regarding rational use of antibiotics and resistance.

Statements	Strongly agree n (%)	Agree n(%)	Not sure n (%)	Disagree n (%)	Strongly disagree n (%)
Self-medication of antibiotics is advisable	04 (4%)	13 (13%)	0	22 (22%)	61 (61%)
Skipping one /two doses of antibiotics does not cause antibiotic resistance	15 (15%)	15 (15%)	10 (10%)	40 (40%)	20 (20%)
Combination of antibiotics can prevent development of resistance	12 (12%)	9 (9%)	0	35 (35%)	44 (44%)
Cost of antibiotic should be considered in rational prescribing	21 (21%)	57 (57%)	11 (11%)	9 (9%)	2 (2%)
Antibiotic resistance is a serious global health issue	46 (46%)	50 (50%)	2 (2%)	1 (1%)	1 (1%)
Hospital antibiotic policy is needed to ensure rational use of antibiotics	62 (62%)	20 (20%)	6 (6%)	8 (8%)	4 (4%)

Table-4 shows the pattern of antibiotic use practiced by the interns during their training period. Penicillins (n=42, 42%) followed by fluoroquinolones were the most common antimicrobial agents prescribed. For more than half of the interns (n=57,57%) the optimum duration of antibiotic therapy was 3-5 days, followed by 6-10 days (n=39,39%). 89% (n=89) of the interns advised the patients about frequency and duration of treatment (n=46,46%) and to complete the regimen (n=43,43%). Suggestion from senior doctors or consultants was the main source of reference for interns for antibiotic prescribing (n=52,52%), 34% (n=34) of them referred to the textbooks and only 12% (n=12) referred to the internet.

Table-5 consists of self-assessment statements regarding knowledge attitude and practices of antibiotic use among interns. About 44% (n=44) were confident of prescribing antibiotics without a senior doctor's assistance and 30% (n=30) were not sure about prescribing antibiotics on their own. Seventy-four percent (n=74) felt that medicine postings helped them the most to learn the rational use of antibiotics followed by surgery postings (12%, n=12). Interns were asked for self-grading of their knowledge out of a total score of ten. 77% (n=77) graded their knowledge as to be moderate (score :4-7), 12 % (n=12) as good (score:8-10) and 11 % (n=11) as poor (score: 0-3). Self-assessment was done to know the interns own perception about their ability to practice rational antibiotic use. The self-assessment knowledge score was similar to that assessed objectively using the questionnaire.

Table 4: Practice of antibiotic use by interns during their training period.

Questions	n (%) N=100
Commonly prescribed antibiotics on OPD basis in your hospital 1. Fluoroquinolones 2. Penicillins 3. Cephalosporins 4. Others	 26 (26%) 42 (42%) 21 (21%) 11 (11%)
Optimal duration of antibiotic therapy prescribed 1. 1-3 days 2. 3-5 days 3. 6-10 days 4. > 10 days	 1 (1%) 57 (57%) 39 (39%) 3 (3%)

Aspects of antibiotic use you advice the patient about 1. Side effects 2. Duration and frequency of use 3. To complete the regimen 4. Unsure	8 (8%) 46 (46%) 43 (43%) 3 (3%)
Your reference for antibiotic prescribing 1. Random 2. Textbooks 3. Suggestion by a senior doctor 4. Internet	2 (2%) 34 (34%) 52 (52%) 12 (12%)

Table 5: Responses to self-assessment questionnaire

Statements	**Responses (N ,%)**
1.You are confident of prescribing antibiotics for a disease without your senior doctor's assistance Yes No Unsure	44 (44%) 26 (26%) 30 (30%)
2. The clinical posting which would be most helpful regarding correct antibiotic use Internal-Medicine Surgery Obstetrics-gynecology Pediatrics Others	74 (74%) 12 (12%) 05 (5%) 04 (4%) 05 (5%)
3.Self-Grading of knowledge regarding antibiotic use (out of 10) Good Moderate Poor	12 (12%) 77 (77%) 11 (11%)

Discussion

Antimicrobial resistance is a serious public health problem. Assessment of knowledge , attitude and practices of antibiotic use in interns who are the new generation health care providers and the future prescribers , can greatly impact the antibiotic related issues.[9,10] In the present study, responses to the

knowledge based questions were encouraging , interns had a fairly moderate knowledge regarding the antibiotic usage and resistance, ninety-five percent (n=95) of them were aware that antibiotics are used to treat bacterial infections and 90% of them knew that common cold does not require antibiotics. These findings are similar to the studies done previously.[6,7,11] Seventy-two percent (n=72) of the participants opined that selection of antibiotics is based on their senior consultant's advice, only 10% (n=10) were aware of the importance of infective organism and antibiotic sensitivity for choosing an antibiotic. These findings are similar to the study done previously.[11] Our study findings emphasize the influence of a senior consultant or a clinician on interns in choosing an antibiotic, thus its essential for a clinician to adhere to rational prescriptive practices including appropriate selection of drug, dosage and duration, writing the prescription and also conveying enough information to the patients.[12,13,14]

In this study we also assessed the knowledge of interns about rationality, nosocomial infection, empirical and definitive therapy as these are the basic terms in the understanding of antibiotic resistance and rational use of antibiotics. Fifty-six percent (n=56) of the interns knew all the components of rationality, 90% (n=90) of them were familiar with the term nosocomial infection. However, there was a significant confusion regarding the terms empirical and definitive therapy, only 33% (n=33) chose the correct meaning of empirical therapy, 41% (n=41) assumed empirical therapy as organism-specific therapy. This clearly indicates lack of update of professional knowledge. Although the concept of rationality and antimicrobial resistance are included in the MBBS second year pharmacology curriculum, it is not given much importance thereafter. Hence continued emphasis should be laid on these concepts along with periodic updates through various adoptive strategies.[15] Ninety two percent (n=92) of the interns were aware of the factors contributing to antibiotic resistance , which was a positive finding and was similar to the studies done previously.[16,17] It was also noted that interns who had finished one of their major clinical postings (n=42) either in the departments of internal medicine, surgery or obstetrics and gynecology had better knowledge scores than the others. This finding was similar to a study,[18] and hints that major clinical postings play a crucial role in training these young minds and thus awareness programmes and educative measures could be focused in their curriculum during that period.

The interns had a favorable and good attitude about rational use of antibiotics. Significant number of them agreed that antibiotic resistance is a serious public health issue and self-medication and skipping the dose of antibiotics can contribute to drug resistance. These findings were similar to the previous studies.[9,11] Eighty-two percent (n=82) felt the need of hospital antibiotic policy to ensure rationality. However, only 21% (n=21) felt that combination of antibiotics could prevent development of resistance. This would necessitate for an in depth knowledge of rational antibiotic combinations and their indications in interns who are the future prescribers. Seventy-eight percent (n=78) felt that cost effectiveness forms an important part of rational prescribing, which indicates a positive and favorable attitude since the hospital where the present study was conducted is setup across a rural area and most of the patient input is of the lower socio-economic background.

Responses to the practice based questions gave an insight into the prescription practices in the hospital. Penicillins and fluoroquinolones were the common antibiotics prescribed. Interns advised the patients regarding duration and frequency of usage and also to complete the regimen. These findings indicate that

interns were well aware of the importance of communication and advice to the patients in preventing irrational use and development of resistance. This finding was similar to studies done previously.[8,19] The prescription pattern of antibiotics including their class, dosage, duration of prescription practiced in the hospital indicate an effort to prevent irrational use. However, the criteria for selection of antibiotics i.e. empirical or definitive could not be assessed based on the interns' responses to the questionnaire.

The knowledge score of interns in self-assessment questionnaire was surprisingly similar to that assessed objectively using a questionnaire. Majority of them felt internal medicine postings would help them the most to learn the correct pattern of antibiotic use and only 44% (n=44) were confident of prescribing antibiotics on their own without senior clinician's assistance.

The responses of the interns in the present study cannot be generalized to other teaching hospital in Kerala, since there could be different methods of teaching and training, the approach of the clinicians, prescribing patterns, patient input, location of the hospital and also interns exposed to similar educational institution and programmes may have different calibers, opinions, skills and experience.[16,20]

Conclusion

The responses of the interns to the questionnaire indicate a moderate knowledge, positive and good behavioral attitude towards rational antibiotic use. Most of them were well aware that antibiotic resistance is a serious health issue. Improvement in the internship curriculum requires multi-modal approach with inclusion of tailored educational and training interventions like case-based scenarios, group discussions, workshops, continued medical education programmes, sensitization programmes and seminars, in addition active involvement of the clinicians with regular upgradation of their knowledge would aid in ensuring rational use of antibiotics and thus control the growing problem of antibiotic resistance along with more effective training of the future prescribers.

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