

Knowledge, Attitude and Practice of Paramedical Staff Working in a Medical College and Hospital towards Antibiotic Use and its Resistance: A Cross-Sectional Study

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Abstract

Introduction: Antibiotic misuse is common and contributes to antibiotic resistance, particularly in less-regulated healthcare systems like India. Antibiotic knowledge is well known to be relatively low among patients and the general public in many countries. Antibiotic misuse is especially noticeable in India, which is one of the largest global consumers of antibiotics for human health.

Objective: To assess the knowledge, attitude, and perceived practices of paramedical staff working in a medical college and tertiary care hospital regarding antibiotic usage and resistance.

Methodology: This is a cross-sectional quantitative questionnaire-based study in a tertiary healthcare medical college and Hospital in eastern India. Total of 341 paramedical staff were provided with a pretested self-administered questionnaire. The survey questions focused on key topics such as antibiotic knowledge, attitude, and perceived antibiotic usage practices.

Result: The majority of participants were under 40 years old and graduates. They understood antibiotic resistance well (81.81 percent) and side effects (91.2 percent). However, there was a widespread misunderstanding about the indications for antibiotic treatment, with only 17.00 percent agreeing that antibiotics play no role against viruses.

The overall attitude was poor, with 65.98 percent expecting antibiotic prescriptions for short-term fever and the common cold. An alarming 92.96 percent of children expected antibiotic treatment for an ear infection. Compared to other paramedical staff, nurses and pharmacists had four times the knowledge about antibiotics. There was no significant relationship between antibiotic prescription patterns and doctor trust.

Conclusion: Most participants knew a lot about antibiotic resistance and its side effects. Still, their attitude and usage practices are poor, and outcome-based education, such as frequent Continuing Medical Educations and awareness campaigns, could effectively bridge the gap between knowledge and practice.

Keywords: Antibiotics, Antibiotics resistance, Knowledge, Attitude, Practice, Paramedical.

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Introduction

In clinical practice, antimicrobials are the most commonly prescribed drugs. At the same time, antimicrobial use is frequently unnecessary or inappropriate. Antibiotic indiscriminate use is one of the major factor which has significantly contributed towards the problem of antibiotic resistance.[1] Antibiotic resistance is increasing at an alarming rate, posing a serious threat to healthcare delivery. Concurrently, treating lethal bacterial infections has become difficult due to the rapid spread of antibiotic-resistant bacteria.[2] Self-medication without a prescription, over-the-counter antibiotic sales, inadequate antibiotic regulation, high medical consultation costs, and dissatisfaction with medical practitioners exacerbate the situation in developing countries.[3,4] More than half of all antibiotics purchased worldwide are purchased without a prescription.[5] Though antibiotic resistance is a serious issue, it has been relegated to a low priority in developing countries. As a result, the scope of the problem is largely unknown, and few studies addressing these issues have been published.[6] We must first assess health care providers' knowledge, perceptions, and prescribing patterns to reduce antibiotic resistance. Various studies have focused on the community knowledge, attitudes, and practices regarding antibiotic use and resistance, whereas similar studies among health workers or paramedical staff are limited. Even the few published sought to assess physicians' antibiotic prescribing patterns.[7,8]

It is critical to recognize that nurses and other paramedical staff in hospitals play an essential role in preventing the spread of resistant bacterial infections and raising antibiotic resistance awareness among patients and communities. As a result, the purpose of this study was to determine the

knowledge, attitude, and practice of antibiotic use among nurses and other paramedical personnel such as technicians, optometrists, audiologists, lab assistants, pharmacists, and physiotherapists.

Material and Methods

Study design

This is a survey-based cross-sectional study. This study was carried out for three months in SLN Medical College and Hospital, Koraput in Odisha. We have enrolled 341 study participants who volunteered for the study. They were from the paramedical field, mainly nurses, technicians, optometrists, audiologists, lab assistants, pharmacists, physiotherapists, and clerks. All the study participants who provided written informed consent were enrolled in the study. A self-administered pretested questionnaire was used to collect data from participants. The questionnaire had four sections and a total of 25 questions. The response regarding socio-demographic profile of study participants were documented in the first section. The second section assessed their knowledge, the third section evaluated the participants' attitudes, and the final section considered the respondents' practises regarding antibiotic usage and resistance. Except for the first part, the remaining questions required participants to select one of three responses: "yes," "no," or "don't know." A thorough literature search of published studies relevant to our survey was used to develop the survey questions. The questionnaire was written in English before being translated into Odiya. The questionnaire used in our survey was previously being used for different surveys.⁹⁻¹² Institutional ethical clearance was taken from the Ethical committee prior to the start of the study.

The entire dataset was entered into Microsoft Excel and analyzed with SPSS

22.0. Descriptive statistics of collected data such as frequency and percentages were used to describe the data, while inferential statistics such as odds ratio and Chi-square were used to analyze the obtained data. Four questions were primarily collected for participants to derive the association between knowledge about the effectiveness of antibiotics and factors influencing it, which were antibiotics effectiveness against bacteria, whether antibiotics are not effective against viruses, antibiotics does not play any role in speeding up recovery from a cold and Inflammation of the ear in a child. The correct responses against each question were calculated as 1 and for incorrect responses as 0. An average score of more

than or equal to 2 for the study participants was marked as knowledgeable.

Results

The questionnaire was completed by all 341 participants with a 100% response rate. Males constituted 29.61% (101) of the total study participants, while females made up the remaining 70.38% (240). Among them, 14.02 percent (48) of them denied having received any prior medical training. In addition, 72.72 percent (248) of respondents had at least one child less than the age of 6 years. Almost all our participants (95.88%) were between 20-40 years of age and had education (93.27%) of graduate level and above. The socio-demographic profile of the study participants is summarized in Table 1.

Table 1: Socio-demographic characteristics of the study participants

| Characteristic | Number (n= 341) | Percentage (%) |
|--|-----------------|----------------|
| Sex | | |
| Male | 101 | 29.61 |
| Female | 240 | 70.38 |
| Age group | | |
| 21-30 years | 172 | 50.43 |
| 31-40 years | 155 | 45.45 |
| 41-50 years | 14 | 4.1 |
| | 341 | |
| Education | | |
| Illiterate | 0 | 0 |
| School and college | 23 | 6.74 |
| Graduation and above | 318 | 93.25 |
| One child in family at least below 6 years | 248 | 72.72 |
| No prior medical training | 48 | 14.07 |

Table 2 describes the complete list of survey questions used for assessing the knowledge, attitude and practices of the study respondents and the percentage of respondents agreeing with the statements used in the survey questionnaire.

Table 2: Study participants giving correct response to statements.

| Statement | Number (n=341) | Percentage (%) |
|--|----------------|----------------|
| Antibiotic- Knowledge, use, side effects and resistance | | |
| Name an antibiotic correctly | 301 | 88.26 |
| Used an antibiotic at least once | 329 | 96.48 |

| | | |
|---|-----|-------|
| Antibiotics work well against bacteria. | 159 | 46.62 |
| Antibiotics have no effect on viruses. | 58 | 17 |
| Colds caused by viruses | 301 | 88.26 |
| Colds caused by bacteria | 322 | 94.42 |
| Frequent antibiotic use can increase bacterial resistance and reduce future effectiveness. | 279 | 81.81 |
| Antibiotic use disrupts the gut flora and leads to diarrhoea. | 311 | 91.2 |
| Attitude towards antibiotic usage | | |
| Respondents whose children require antibiotics more than six times per year | 149 | 43.69 |
| Even a one-day fever necessitates the use of antibiotics. | 225 | 65.98 |
| Children's ear infections always necessitate antibiotic treatment. | 317 | 92.96 |
| Antibiotics speed up recovery from cold | 300 | 87.97 |
| Doctors should always prescribe antibiotics. | 293 | 85.92 |
| I respect the doctor's decision not to prescribe antibiotics. | 240 | 70.38 |
| Doctors always explain how antibiotics should be used in detail. | 227 | 66.56 |
| Practice towards antibiotic usage | | |
| Even if you feel better after half of the treatment, you should finish the course of antibiotics. | 310 | 90.9 |
| Antibiotics that have been used should not be reused at a later date. | 284 | 83.28 |
| Antibiotics should not be purchased directly from pharmacy/chemists | 224 | 65.68 |

In terms of general knowledge, usage, side effects, and antibiotic resistance, 88.26 percent (301) could name a few antibiotics. Almost all of them (96.48 percent (329) stated that they had used antibiotics at least once in their lives. Only 46.62 percent (159) agreed that antibiotics are used to combat bacterial infections, while only 17 percent (58) agreed that antibiotics are ineffective against viral infections. Colds are caused by viruses, according to two-thirds of them (88.26 percent (301), and bacteria, according to a whopping 94.42 percent (322). In terms of antibiotic resistance and side effects, 81.81 percent (279) were aware that frequent use of antibiotics leads to resistance and reduces future effectiveness, and 91.2 percent (311) were aware of common antibiotic side effects. Regarding attitudes and practices

regarding antibiotic use, 65.98 percent (225) believed antibiotics should be prescribed even for short-term fevers, and 92.96 percent (317) believed ear infections in children should always be treated with antibiotics. Half of the respondents (43.69 percent (149) said their children had received antibiotics six times in the previous year.

Although 87.97 percent (300) thought antibiotics sped up recovery from a cold, 85.92 percent agreed that a doctor should only prescribe antibiotics, and 70.38 percent (240) trusted the doctor's decision not to prescribe antibiotics. However, only 66.56 percent (227) opposed obtaining antibiotics as over-the-counter drugs. In comparison, 90.9 percent (310) believed that a course of antibiotics should never be stopped halfway,

and 83.28 percent (284) stated that the antibiotics that has been used and left should not be used at a later date. Similarly, 65.68 percent (224) were satisfied because doctors always take the time to explain how

antibiotics should be used in detail.

Factors associated with knowledge about the effectiveness of antibiotics are tabulated in table 3.

Table 3: Factors associated with knowledge of study participants regarding effectiveness of antibiotics

| Parameters | Knowledge | | OR (95% CI) | Chi square, |
|--|--------------|--------------|-------------------|-------------|
| | Present (61) | Absent (280) | | P value |
| Medical training | | | | |
| Yes (Nursing staff) | 56 | 210 | 4.02 (1.61-10.64) | 11.34 |
| No (Technicians, clerks etc.) | 5 | 70 | | 0.0007 |
| At least one child < 6 years age | | | | |
| Yes | 49 | 91 | 8.89 (4.69-17.15) | 63.49 |
| No | 12 | 189 | | 0.0002 |
| Gender | | | | |
| Male | 22 | 78 | 1.41 (0.81-2.44) | 1.76 |
| Female | 39 | 202 | | 0.173 |
| Education | | | | |
| 2 | 10 | 13 | 3.99 (1.72-9.16) | 14.13 |
| 3 | 51 | 267 | | 0.0003 |
| Age group | | | | |
| ≤30 years | 43 | 129 | 2.79 (1.62-4.88) | 15.8 |
| >30 years | 18 | 151 | | 0.0002 |
| Doctor prescribing antibiotic | | | | |
| Trust | 61 | 201 | — | 28.95 |
| No trust | 0 | 79 | | 0.0002 |
| Doctor not prescribing antibiotic | | | | |
| Trust | 48 | 166 | 2.49 (1.36-4.63) | 10.11 |
| No trust | 13 | 114 | | 0.002 |

Those with medical training had 11.34 (CI 1.61-10.64) times more knowledge. The same findings were found among those who are young and have at least one child under 6 years, as they have three (CI 1.62-4.88) and nine (CI 4.69-17.15) times more knowledge than those who do not. There were no significant gender differences in knowledge, and those with more knowledge trusted the physician more whether they prescribed an antibiotic or not.

Discussion

Our research yielded useful information about paramedics' knowledge, attitudes, and practices regarding antibiotic use and resistance. Our study's findings clearly show that paramedics' knowledge of antibiotic resistance and side effects is above average.

The findings were similar to other recent studies which have found a sound knowledge among students of paramedical courses. [9-11] These findings corresponds with the fact that better knowledge is often correlated well with better health practices. However,

misunderstanding about antibiotic indication and effectiveness is clearly evident as only 17.00% knew that antibiotics are ineffective against viruses and 46.62% knew that antibiotics are used to treat bacterial infections. When compared to other paramedics, nursing staff and pharmacists had four times the knowledge about antibiotic effectiveness. Age appears to be an important factor associated with improved knowledge, as our participants under 30 years old demonstrated 2.8 times better understanding of antibiotic usage when compared to older study participants. The findings may be because of the reason that younger people have more infants and toddlers, which would have resulted in increased knowledge from physician visits. Furthermore, the younger generation has greater access to electronic media, and their curriculum has already incorporated changes regarding antibiotic awareness.

The general understanding of viral and bacterial infection is similar, as our previously published data show that only 14% of participants knew that antibiotics are ineffective against viruses. Numerous studies have found that more than 60% of participants believe antibiotics should be prescribed for viral illnesses.[12] Such perplexity may result in inappropriately high rates of antibiotic intake, exacerbating the already-increasing bacterial resistance. This highlights the urgent need to install a clear understanding of antibiotic effectiveness in paramedical staffs at an earlier stage of medical education. The current study's findings revealed that paramedics have a negative attitude toward antibiotic use.

Around 50% of study participants who responded to the survey said they had given antibiotics to their children more than six times in the previous year. Furthermore, 92.96 percent believe that ear infection in children always needs antibiotic prescription, and 66.56 percent responded

that they want the treatment with antibiotics even if it is for a one-day fever. Despite their relaxed attitude, our respondents' antibiotic use practices were found to be satisfactory. The vast majority, 85.92 percent, always consulted a doctor before beginning an antibiotic regimen, and the vast majority, 90.9 percent, always completed the entire course of treatment. Nonetheless, it is disheartening to note that only 65.68% agreed that antibiotics should never be purchased as over-the-counter drugs, and doctors take the time to explain the do's and don'ts of antibiotics in detail. There was no significant relationship between antibiotic prescription patterns and doctor trust. These findings are consistent with other published studies that have reported similar findings.[12,13] This emphasizes the importance of educating both paramedics and students.[14] In such cases, outcome-based education, such as frequent CMEs and awareness campaigns, could effectively bridge the knowledge-to-practice gap. Undergraduate and postgraduate paramedical education strategies should also aim to change behaviour and improve student outcomes and increase knowledge.[15] They must be tailored to the development, capabilities, and experience of the younger generations.[12]

The study's strength is that it addresses the major issue of antibiotic use and resistance among paramedics, an area in which little research has previously been conducted. This population has remained unaffected because paramedics are closely associated with physicians, and there is a general perception that they would better understand antibiotics. Our study has some limitations. For starters, we have used convenience sampling method to including participants from only one medical college which limits the ability to extrapolate results. Second, as with most surveys, it is possible that respondents provided answers that were

socially desirable rather than their actual opinions or practices.

Conclusion

Our study found that while paramedics have a good understanding of antibiotic resistance and side effects, their attitudes and practises toward antibiotic use are frequently contradictory and poor. These opposing viewpoints pose challenges that must be overcome if we are to address the escalating problem of antibiotic resistance effectively.

This study suggests that, in order to prevent the development of antibiotic resistance, we should promote antibiotic treatment education and develop novel policies to draw attention to antimicrobial resistance deterrence campaigns.

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