Evaluation of Knowledge, Attitude, and Practice on Antimicrobial Stewardship Between Medical Students and CRRIs

Shreyas Subash [1], Harsha Vardhini Nagavel Sekaran[2], Anto Clement Devadoss[3], Subash Sundar[4]

[1]Department of Paediatrics, Government Chengalpattu Medical College & Hospital, Chengalpattu, Tamil Nadu, India
[2,3,4]Department of Paediatrics, SRM Medical College Hospital & Research Centre, Faculty of Medicine and Health Sciences, SRMIST, Kattankulathur, Chengalpattu, Tamil Nadu, India

ABSTRACT

Purpose/Aim: Antimicrobial resistance (AMR) constitutes a significant worldwide health issue, particularly in underdeveloped nations where the abuse of antibiotics and inadequate management exacerbate resistance. This study evaluated the knowledge, attitudes, and behaviours (KAP) concerning antimicrobial stewardship (AMS) amongst undergraduate medical students at a tertiary care hospital in South India. **Materials and Methods:** A cross-sectional study including 518 students from various academic years was conducted from April to July 2024 via a standardised KAP questionnaire. **Results**: Medical students have robust knowledge of AMS principles but lag in attitude and adherence to practices of antimicrobial prescriptions. **Conclusion:** The disparities among AMS knowledge and practice underscore the necessity for practical training and curriculum integration to improve stewardship abilities and address AMR.

INTRODUCTION

Antimicrobial resistance (AMR) has arisen as a significant worldwide health issue, limiting the efficacy of conventional therapies. In regard to this, the notion of Antimicrobial Stewardship (AMS) has emerged as a strategic initiative designed to promote careful utilization of antimicrobials and mitigate the emergence of resistance.(1) In this regard, the World Health Organization (WHO) emphasizes the necessity of educating medical students and health care workers on responsible antimicrobial prescribing.(2)

Healthcare personnel can substantially mitigate antibiotic resistance through the implementation of AMS.(3) The prevalence of communicable diseases in underdeveloped nations such as India highlights the necessity to fill these gaps. Consequently, it is essential to deliver thorough education and training on AMS principles.

By educating the next generation of doctors with the necessary knowledge and tools, we can enhance their understanding and promote responsible antimicrobial utilization, compliance with AMS principles.(4) Consequently, this study seeks to evaluate the knowledge, attitudes, and behaviors (KAP) of medical students concerning antibiotic utilization and resistance. It examines their comprehension of the significance of responsible antibiotic prescribing.

MATERIAL & METHODS

Study design and setting: The study employed a cross-sectional survey design to assess the Knowledge, Attitude, and Practices (KAP) of undergraduate medical students regarding antimicrobial stewardship (AMS) at a tertiary care hospital in South India.

Sample size and study population: A total of 518 students from different academic years participated, with the sample size determined based on previous research. The sample was calculated based on the given formula

$$n = Z^2 * p * \frac{(1 - p)}{d^2} \quad (1)$$

Study Duration: Data was gathered over three months.

Data collection tool: A structured questionnaire was utilized to evaluate the knowledge, attitude, and practice of study participant

The questionaries' sections on knowledge of antibiotic resistance and AMS, attitudes towards AMS principles, and antibiotic prescribing and adherence practices.

Statistical analysis: Statistical analysis was conducted using SPSS (Version 23.0 and 26.0), where continuous variables were expressed as Mean ± Standard Deviation (SD) and categorical variables as frequency and percentage.

RESULTS

Knowledge, Attitudes, and Practices

This study emphasizes the KAP of medical students about AMS. Medical students exhibited robust theoretical understanding, especially with the WHO definition of AMS, global strategies, and the differentiation between bactericidal and bacteriostatic agents. Nevertheless, significant deficiencies maintained in comprehending the antibiotic phase and the appropriate timing for sample collection. Attitudes demonstrated an awareness of AMR as a global health issue and an acknowledgement of their professional obligations in AMS. Nonetheless, numerous students expressed diminished trust in regularly adhering to suggestions and a lack of empowerment to aggressively advocate for AMS norms. Documented practices were inadequate, with a lower number of students participating in prescription audits, tracking resistance trends, or adhering to policy compliance, but some engagement in patient education and discussions was observed.(Table 1) These findings underscore the necessity for organised, experiential AMS training to enhance practical application and facilitate a shift from knowledge to constant clinical practices.

KAP Scores Across Various Academic Years in Medical Education

The graph illustrates the variations in Knowledge, Attitude, and Practice (KAP) of Antibiotic Stewardship (AMS) across different academic years. (Figure 1) The highest knowledge was observed in first year students (94.42%). Whereas, third year students have knowledge of 77.89%, and the lowest was recorded in second year students (59.24%).

Attitude ratings were greatest among fourth-year students (40.92%), closely followed by CRRIs (39.54%) and third-year students (39.18%). Second-year students (29.48%) exhibited an average attitude level, and first-year students (15.38%) demonstrated the lowest level of attitude. Practice levels reached their highest point in the 4th year (28.98%), followed by 25.93%, 23.05%, and 19.79% of CRRIs, 3rd, and 2nd year students correspondingly. The first-year students had the lowest level of practice at 6.71%. In general, knowledge was higher in the initial years, although positive attitudes and practical application escalated with academic advancement.

DISCUSSION

Excessive and indiscriminate use of antibiotics has led to AMR. Thorough education and training of medical students can assist in alleviating AMR. Developing nations encounter significant challenges due to the high prevalence of infectious diseases and the broad availability of antibiotics without prescription.(5) The General Medical Council (GMC) underscores that medical schools must guarantee graduates attain skills in the safe utilisation of antimicrobials.(6)

Our study underscores the different levels of KAP among medical students. Although majority exhibited theoretical comprehension, deficiencies were evident in practical implementation. Only 47% consistently evaluated antibiotic prescriptions, and over one-fourth were unaware to institutional antimicrobial stewardship policy, underscoring the necessity for systematic training. These findings corroborate earlier research, emphasizing the necessity of early and continuous integration of AMS education, strengthened by practical experience and competency-based programs, such as WHO online courses.(7,8,9)

CONCLUSION

Medical students exhibit robust theoretical knowledge of AMS. Nonetheless, differences persist in the application of this knowledge, exhibiting variation among academic years. Many depend on senior physicians and exhibit constrained certainty in prescribing decisions underscoring the necessity for specific interventions to enhance practical AMS proficiency.

RECOMMENDATION

AMS education must be incorporated into curriculum through practical training, case-based learning, and ongoing assessment. Institutions must enhance understanding of AMS policies and foster active engagement. Prospective longitudinal

studies should evaluate the efficacy of educational programs on prescribing behaviors and the practical use of AMS.

AUTHORS CONTRIBUTION
Conceptualization: Shreyas Subash and Subash Sundar; Data curation: Shreyas Subash, Anto Clement Devadoss, Harsha Vardhini Nagavel Sekaran; Formal analysis: Shreyas Subash, Writing original draft: Anto Clement Devadoss, Harsha Vardhini Nagavel Sekaran; Writing review & editing: Shreyas Subash, Anto Clement Devadoss, Harsha Vardhini N and Sundar

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