



Original Article

An Insight into Knowledge, Attitudes, and Practices Regarding Fixed Dose Combinations among Undergraduate Medical Students in a Government Medical College

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ABSTRACT

Background: Fixed dose combinations (FDCs) are widely used in clinical practice because they can improve patient compliance and reduce pill burden. However, irrational combinations may lead to increased adverse effects, antimicrobial resistance, and unnecessary healthcare costs. Assessing the knowledge, attitude, and practices (KAP) of medical students regarding FDCs is important as they represent future prescribers.

Methods: A cross-sectional questionnaire-based study was conducted among 250 medical students at a tertiary care teaching hospital. A structured questionnaire assessed knowledge, attitude, and practices regarding FDCs. Data were analyzed using descriptive statistics and expressed as frequency and percentage.

Results: Most students correctly identified the definition of FDC (83.7%) and were aware that FDCs may not always be superior to individual drugs (81.5%). Knowledge regarding irrational FDCs was comparatively limited; only 41% recognized the irrationality of norfloxacin–tinidazole. Students demonstrated a positive attitude towards rational use of FDCs, with 80% willing to spread awareness among patients and 75.2% supporting strict regulation of irrational combinations. 77.2% reported observing FDC prescriptions during clinical postings and 66% reported checking FDC components during pharmacology learning. The common sources of information were

Conclusion: Although basic knowledge and attitude regarding FDCs were satisfactory, awareness regarding irrational combinations and their adverse effects was limited. Strengthening pharmacology education and promoting rational prescribing practices may improve awareness among future prescribers.

Keywords: Fixed dose combinations, rational drug use, pharmacology education, knowledge attitude practice, medical students.

INTRODUCTION

Fixed dose combinations (FDCs) are pharmaceutical formulations that contain two or more active ingredients combined in a fixed ratio within a single dosage form. Such combinations are commonly used in clinical practice because they simplify treatment regimens, reduce pill burden, and may improve patient adherence to therapy.¹²

Despite these advantages, concerns have been raised regarding the irrational use of several FDCs, particularly in developing countries. Inappropriate combinations may expose patients to unnecessary drug components, increase the risk of adverse drug reactions, contribute to antimicrobial resistance, and increase healthcare costs without providing additional therapeutic benefit.^{3–5} According to the World Health Organization, FDCs should be used only when the combination provides clear therapeutic advantages over individual components.¹²

India has a large pharmaceutical market with numerous FDCs available across different therapeutic categories. Regulatory authorities have taken several steps in recent years to review and restrict irrational drug combinations; however, inappropriate prescribing and use of such formulations continue to be reported.⁵⁻⁷

Medical students represent future prescribers, and their understanding of rational pharmacotherapy is essential for ensuring safe and effective medication use. Previous studies assessing knowledge, attitude, and practices regarding FDCs among medical trainees have demonstrated variable levels of awareness and have highlighted gaps in knowledge related to the rationality and safety of certain drug combinations.⁸⁻¹⁰

Therefore, the present study was undertaken to assess the knowledge, attitude, and practices regarding fixed dose combinations among medical students of a tertiary care teaching hospital.

METHODOLOGY

A cross-sectional questionnaire-based study was conducted in the Department of Pharmacology at Government Medical College, Ratlam, over a period of 1 month (January 2026) to assess the knowledge, attitudes, and practices (KAP) regarding fixed dose combinations (FDCs) among medical students. A total of 250 second and third professional MBBS students participated in the study.

A structured questionnaire consisting of 25 questions was distributed using Google Forms. Participants were informed about the objectives of the study, and informed consent was obtained prior to participation. Students were given approximately 10 minutes to complete the questionnaire. The collected data were compiled and analyzed using descriptive statistics, and the results were expressed as frequencies and percentages and presented in tabular form.

Inclusion Criteria

- Second and third professional MBBS students of GMC, Bhopal
- Students willing to participate in the study
- Students who provided informed consent

Exclusion Criteria

- Students who did not give consent
- Students who submitted incomplete responses

RESULTS

A total of 250 medical students participated in the study. The responses related to knowledge and attitude–practice regarding fixed dose combinations (FDCs) are summarized in Table-1, Table-2 and Table-3 respectively.

Overall, 83.7% of students correctly identified the definition of fixed dose combinations, while 81.5% were aware that FDCs may not always be superior to individual drugs. Knowledge regarding the irrationality of certain drug combinations varied among participants (Table 1).

TABLE-1 - Knowledge regarding FDCs-

KNOWLEDGE QUESTIONS / STATEMENTS	Correct responses n (%)
Correct definition of Fixed Dose Combination (FDC)	209 (83.7%)
Awareness that FDCs contain drugs from the same pharmacological class	169 (67.4%)
Knowledge of advantages of FDCs	170 (68%)
Identification of potential drawbacks associated with FDCs	162 (64.6%)
Awareness regarding whether FDCs are superior to individual drugs	204 (81.5%)
Knowledge that the FDC of atorvastatin and nicotinic acid increases the risk of myopathy	96 (38.2%)
Knowledge that the FDC of rabeprazole and domperidone increases the incidence of rhabdomyolysis	100 (40.1%)
Knowledge that in the FDC of dextromethorphan and guaiphenesin, guaiphenesin counteracts the antitussive action of dextromethorphan	127 (50.6%)
Identification of the irrationality of the FDC of norfloxacin and tinidazole	103 (41%)
Knowledge that the FDC of ramipril and telmisartan increases adverse events without additional efficacy	98 (39.2%)
Awareness of antimicrobial resistance associated with the FDC of amoxicillin and cloxacillin	174 (69.7%)

Identification of irrationality of the FDC of cetirizine and phenylpropranolamine (PPA) due to stroke risk and PPA ban	107 (42.7%)
Awareness that the FDC of ondansetron and pantoprazole is irrational due to lack of additional benefit	74 (29.5%)
Knowledge that dose alteration of one drug in an FDC is not possible without altering the other drug	160 (64%)
Awareness of hepatotoxicity associated with the FDC of nimesulide and paracetamol	157 (62.9%)

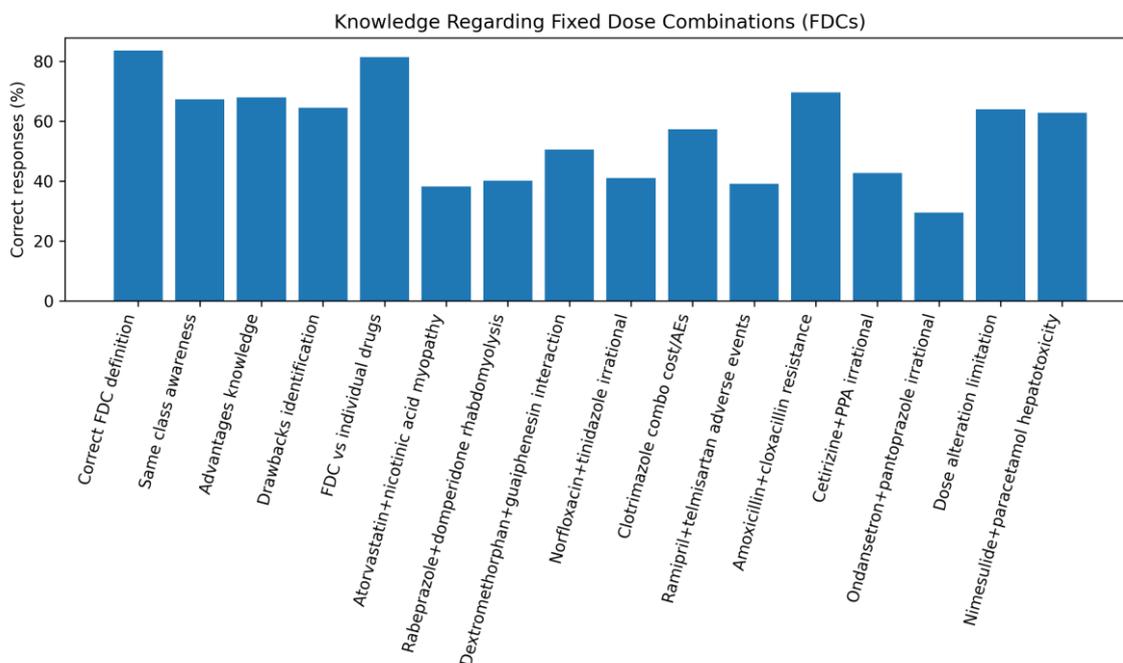


Figure 1: Knowledge regarding FDCs

With respect to attitude, 80% of students expressed willingness to spread awareness regarding FDCs, and 79.87% indicated willingness to prescribe rational FDCs in future clinical practice (Table 2). Practice-related responses indicated that many students had observed FDC prescriptions during clinical postings and reported reviewing their components during pharmacology learning (Table 3)

TABLE-2- Attitude towards FDCs-

ATTITUDE STATEMENTS	Students responding positively n (%)
Opinion that the use of FDCs should be increased in India	159 (63.58%)
Belief that government initiatives are necessary to promote rational use of FDCs in India	170 (67.86%)
Willingness to spread awareness about FDCs among patients	200 (80%)
Willingness to prescribe FDCs in clinical practice	200 (79.87%)
Belief that irrational FDCs should be strictly regulated or banned by authorities	188 (75.2%)

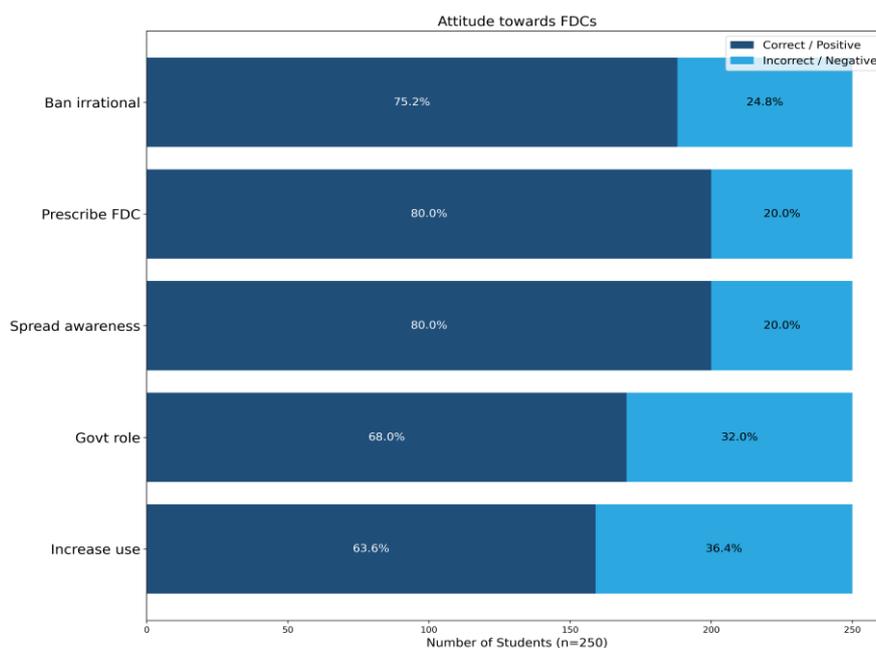


Figure 2: Attitude towards FDCs

TABLE-3- Practices related to FDCs among MBBS Students-

PRACTICE STATEMENTS	Students reporting the practice n (%)
Experience of drug interaction while taking an FDC	121 (48.45%)
Habit of checking the components of an FDC while studying pharmacology or during clinical postings	165 (66%)
Practice of referring to standard textbooks or drug information sources to understand the rationality of FDCs	152 (60.8%)
Observation of FDC prescriptions during clinical postings or internships	193 (77.2%)
Discussion of rational and irrational FDCs with teachers or peers during academic learning	148 (59.2%)

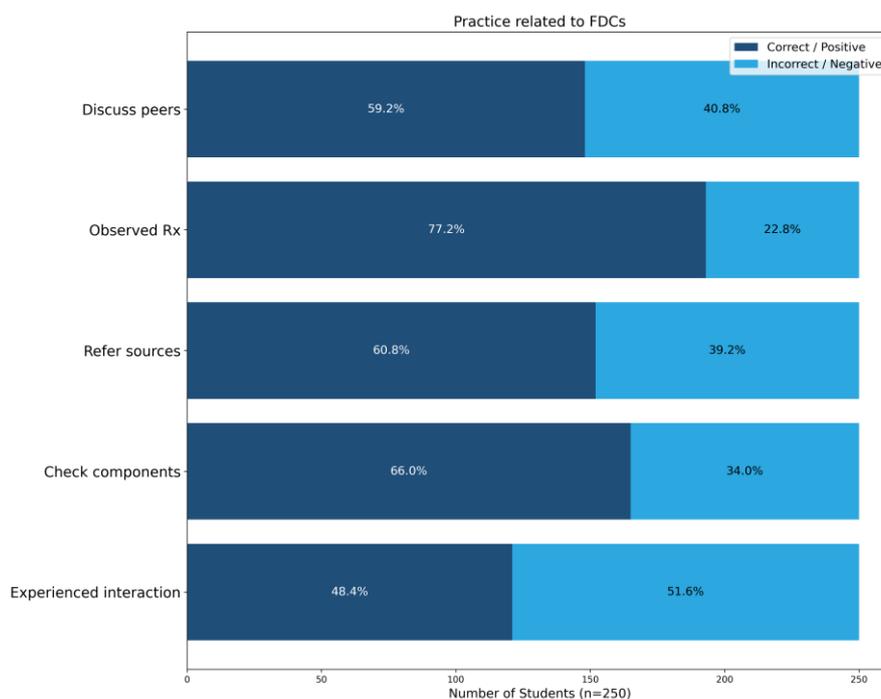


Figure 3: Practice related to FDC

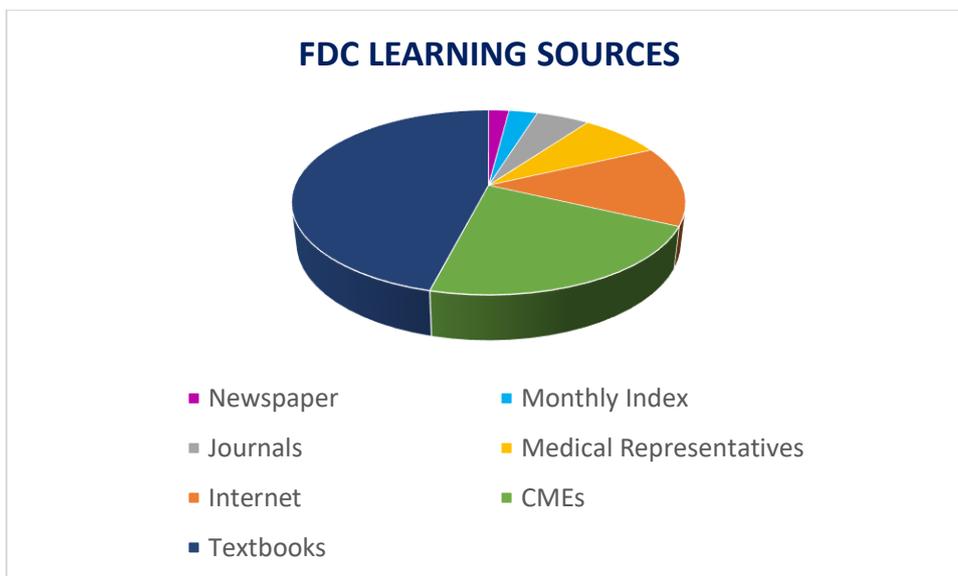


Figure 4: FDC Learning Sources

DISCUSSION

The present study evaluated the knowledge, attitude, and practices regarding fixed dose combinations among medical students.

Most participants demonstrated satisfactory awareness of the basic concept of FDCs, with 83.7% correctly identifying the definition of FDCs. Similar findings were reported by Mandal et al., who observed that most medical trainees were aware of the concept and advantages of FDCs.

However, awareness regarding irrational drug combinations was relatively limited in the present study. Only 29.5% of students identified the irrationality of the ondansetron–pantoprazole combination. Similar findings were reported by Korde et al., who observed inadequate awareness regarding irrational FDCs among medical trainees.

Similarly, Belhekar et al. reported variable knowledge regarding rationality of FDCs among clinicians and resident doctors, highlighting the need for improved educational interventions related to rational pharmacotherapy.

In addition, irrational use of fixed dose combinations remains a concern in clinical practice. Prescription pattern studies conducted by Pasha et al. have reported the continued presence of irrational FDCs in routine prescribing practices.

The attitude of students towards rational use of FDCs in the present study was encouraging. A majority expressed willingness to spread awareness regarding rational use of FDCs and supported stricter regulatory control of irrational combinations. Similar positive attitudes were reported in studies conducted by Gangadhar et al. and Desai et al.⁴⁻⁸

Regarding practices, most students reported observing FDC prescriptions during clinical postings and referring to academic resources to understand their rationality. These findings are consistent with those reported by Gupta et al., who observed that exposure to prescribing patterns during clinical training influences students' understanding of rational drug use.

Overall, the findings suggest that although medical students possess adequate theoretical knowledge regarding FDCs, awareness regarding the rationality and safety of specific combinations remains limited. Strengthening pharmacology education through case-based learning and prescription analysis may help improve rational prescribing practices.

LIMITATIONS

This study has certain limitations. The study was conducted in a single medical institution, which may limit the generalizability of the findings. Additionally, the study relied on self-reported responses, which may be subject to response bias. Since the participants were medical students, the practice component reflects academic behaviour rather than actual prescribing practices.

CONCLUSION

The present study demonstrated that medical students possess adequate basic knowledge and a positive attitude towards fixed dose combinations. However, gaps remain in understanding the rationality and adverse effects of certain drug combinations.

Strengthening undergraduate pharmacology training through interactive teaching methods, case-based discussions, and pharmacovigilance education may improve awareness regarding rational use of FDCs and promote safer prescribing practices among future physicians.

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CONFLICTS OF INTEREST

None declared

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