Original Research Article

A Study of Knowledge, Attitude and Practice of New Competencies in Pharmacology in Second MBBS Students of Tertiary Care Hospital, Vadodara, Gujarat

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Abstract:

Introduction: One of the significant transformations in recent years has been the adoption of Competency-Based Medical Education (CBME) curricula, designed to produce physicians equipped with the skills and knowledge necessary for contemporary healthcare delivery. Understanding current perceptions in both research and clinical practice may be helpful for improving teaching.

AIM: The prospective study aimed to gather feedback and suggestions for improving teaching methods, exploring learning approaches, and assessing student attitudes toward clinical applications of pharmacology.

Material & Method: The study included the current batch of 2nd professional MBBS students, totaling 166 subjects, who had been exposed to the new competencies in clinical pharmacology. A 20-question questionnaire, developed based on a literature review with necessary modifications, was administered to these selected medical students to evaluate various aspects of pharmacology education, learning methodologies and their attitudes. Participants received a brief explanation and their participation was voluntary, with informed consent obtained from all participants. Data collection occurred over a three-month period at Tertiary care hospital in Vadodara, Gujarat, India, following ethical guidelines to ensure participant confidentiality and anonymity.

Result: A significant 93.4% demonstrated awareness of the Essential Medicines concept, while 84.9% emphasized the need for additional resources in p-drug selection. Additionally, 72.3% were well-informed about the Pharmacovigilance Program of India (PVPI), and 81.9% recognized the influence of effective doctor-medical representative communication on prescribing practices. In our study, case-based teaching preference was notably high. The usefulness of Multiple Choice Questions (MCQs) in internal assessment tests garnered strong support. Parallel integration of topics for better understanding and learning was well-received. Views on the usefulness of role-play/videos for improved patient communication varied .

Conclusion: Study highlights the importance of effective communication with patient pharmacovigilance program. Furthermore, our findings support the growing preference for case-based teaching, referring standard textbooks new teaching methods like Multiple Choice Questions (MCQs), parallel integration of specific system, making videos/ role play for communication skill in medical education. These insights reflect the dynamic nature of medical education and the continuous pursuit of preparing healthcare professionals with the requisite knowledge and skills for responsible practice.

Keywords: Pharmacology, competency, Teaching, medical education.

Introduction

Medical education is a dynamic field constantly evolving to meet the demands of modern healthcare practice. [1] One of the significant transformations in recent years has been the adoption of Competency-Based Medical Education (CBME) curricula, designed to produce physicians equipped with the skills and knowledge necessary for contemporary healthcare delivery. [2] The implementation of CBME programs represents a paradigm shift from traditional didactic teaching methods to a competency-driven approach, emphasizing not only the acquisition of medical knowledge but also the application of clinical skills and the development of appropriate attitudes and behaviors. [3] Pharmacology forms the cornerstone of clinical practice, influencing treatment decisions

and patient outcomes.4 The CBME approach seeks to ensure that medical graduates not only possess a solid foundation in pharmacological knowledge but also the ability to apply this knowledge effectively in real-world patient care scenarios. [4] Understanding current perceptions held by future medical practitioners regarding pharmacology and its role in both research and clinical practice may be helpful for improving teaching on this subject and introducing appropriate changes into the curriculum when and where necessary. [5] Enhancing clinical pharmacology education is vital for safe drug therapy, but India's undergraduate pharmacology curriculum lacks clinical focus. Inspired by efforts to improve pharmacology teaching, our study evaluates teaching and assessment methods for medical undergraduates. [6]

The integration of CBME frameworks into medical education is an ambitious endeavor with the potential to reshape medical pedagogy, and it is vital to assess how students are responding to these changes. [7] Understanding the KAP of students regarding CBME competencies in Pharmacology will provide valuable insights into the effectiveness of the curriculum, shed light on areas that may require refinement, and ultimately contribute to the enhancement of medical education programs nationwide.

Material and Methods

The prospective study aimed to gather feedback and suggestions for improving teaching methods, exploring learning approaches, and assessing student attitudes toward clinical applications of pharmacology among second-year MBBS students.

The study included the current batch of 2nd professional MBBS students, totalling 166 subjects, who had been exposed to the new competencies in clinical pharmacology. A 20-question questionnaire, developed based on a literature review with necessary modifications, was administered to these selected medical students to evaluate various aspects of pharmacology education, learning methodologies and their attitudes.

Participants received a brief explanation of the study's aims and objectives before completing the questionnaire, and their participation was voluntary, with informed consent obtained from all participants. Data collection occurred over a three-month period at Tertiary care hospital in Vadodara -Gujarat, India, following ethical guidelines to ensure participant confidentiality and anonymity.

The collected responses were entered into Microsoft Excel for analysis, with frequency and percentage distributions calculated for participant answers. Additionally, the study used the chi-square test to examine associations between knowledge, attitude, and practice among the participants, identifying potential correlations or patterns in the data.

A scoring system was developed to assign points based on response quality, with a maximum score of five for positive responses. Responses were categorized into negative attitude (<40% total score), neutral attitude (41%–60% total score), and positive attitude (>60% total score). Data from Google Forms were exported and analyzed in Microsoft Excel©, with results presented as percentages in tabular format.

Results

Among 200 second year MBBS students approached for participation, 166 students willingly agreed to take part in the study. Our study revealed positive perspectives on various competency topics among medical students.

A significant 93.4% demonstrated awareness of the Essential Medicines concept, while 84.9% emphasized the need for additional resources in p-drug selection. Additionally, 72.3% were well-informed about the Pharmacovigilance Program of India (PVPI), and 81.9% recognized the influence of effective doctor-medical representative communication on prescribing practices. Almost all participants, 99.4%, stressed the importance of establishing good patient rapport. Furthermore, 95.2% acknowledged the practicality of selecting essential medicines from the Essential Medicine List (EML). However, an equal 95.2% disagreed with directly referring severe disease patients without prior communication. Regarding reporting adverse drug reactions (ADR), 48.2% found it challenging, while 51.8% did not encounter difficulties.

Table 1: Student Perceptions of Key Competency Topics in Pharmacology Education

Competency topics	Yes	No
Knowledge of Essential Medicine concept	93.4%	6.6%
More resources are essential for comparison of p-drug selection process	84.9%	15.1%
Knowledge of PVPI (Pharmacovigilance Program of India)	72.3%	27.7%
Doctor-medical representative communication with promotional literature influences doctors' prescribing	81.9%	18.1%
Necessary to create a good rapport with patient	99.4%	0.6%
Selecting essential medicine from Essential Medicine List (EML) helpful in	95.2%	4.8%

clinical practice		
Refer the patient suffering from a severe disease (HIV/TB/ Cancer) to higher center directly without communicating?	4.8%	95.2%
Importance of communicating drug information with the patients	95.8%	4.2%
Reporting ADR is difficult	48.2%	51.8%

In our study, case-based teaching preference was notably high, with 54.8% strongly agreeing (SA), 41% agreeing (A), and only 3.2% in neutral or lower categories (N, DA, SDA). Awareness of referring to standard textbooks as a measure of rational drug use was relatively lower, with 24.1% in the SA category, 63.3% in the A category, and 12.6% in the neutral or lower categories (N, DA, SDA). The usefulness of Multiple Choice Questions (MCQs) in internal assessment tests garnered strong support, with 53% in the SA category, 36.7% in the A category, and 10.3% in the neutral or lower categories (N, DA, SDA). Parallel integration of topics for better understanding and learning was well-received, with 40.4% in the SA category, 51.2% in the A category, and only 8.4% in the neutral or lower categories (N, DA, SDA).

Table 2: Student Perspectives on Teaching Methods and Study Resources

Competencies	SA	A	N	DA	SDA
Case based teaching preference more helpful compared to traditional textbook teaching method	54.8%	41%	1.2%	2%	1%
Awareness to refer standard textbooks as a measure of rational use of drugs	24.1%	63.3%	10.8%	1.8%	0
Usefulness of MCQ's in Internal assessment test	53%	36.7%	8.4%	1.9%	0
Better understanding and learning by Parallel integration of topics	40.4%	51.2%	3.8%	4.6%	0
SA=Strongly agree, A=Agree, N=Neutral, DA=Disagree, SDA=Strongly disagree					

In our survey, students conveyed their attitudes toward various pharmacology competencies. A significant proportion, comprising 41.6% who strongly agreed (SA) and 49.4% who agreed (A), emphasized the need for more practice in rational drug use, underscoring the importance of practical training. The importance of the Essential Medicine List (EML) to public health was recognized, with 34.9% in the SA category and 57.2% in agreement (A). Conversely, only 1.2% strongly agreed that learning p-drug selection is unimportant, with 49.4% in disagreement (DA) and 34.9% strongly disagreeing (SDA), highlighting its perceived significance. Reporting of Adverse Drug Reactions (ADR) as mandatory found support, with 47% in the SA category and 41.6% in agreement (A). Views on the usefulness of role-play/videos for improved patient communication varied, with 24.7% in the SA category and 41% in agreement (A). Patient beneficence through prescription designed according to p-drug criteria garnered attention, with 25.9% in the SA category and 54.2% in agreement (A), emphasizing its potential benefits.

Table 3: Student Attitudes toward Pharmacology Competencies

Competencies	SA	A	N	DA	SDA
More practice required for rational use of drugs	41.6%	49.4%	8.4%	0.6%	0
Essential Medicine List (EML) importance to public health	34.9%	57.2%	4.6%	3.3%	0
Learning p-drug selection is not important for a doctor	1.2%	3.1%	11.4%	49.4%	34.9%
Reporting Adverse Drug Reaction (ADR) should be mandatory?	47%	41.6%	9.6%	1.8%	0
Importance of Role-play/ videos for better communication with a patient	24.7%	41%	25.9%	6%	0
Patient beneficence by prescription being designed according to p-drug criteria	25.9%	54.2%	19.3%	0.6%	0

In our study, students identified several reasons for not reporting Adverse Drug Reactions (ADR).

These included time constraints, insufficient doctor-patient communication, limited awareness, patient ignorance of ADRs, and a general lack of understanding about pharmacovigilance in India.

These findings underscore the need for increased awareness, communication, and education efforts to enhance ADR reporting and patient safety in the region.

Discussion

Our study highlights the significance of Essential Medicines Lists (EMLs) in the context of medical education and healthcare delivery. In our study, a substantial 93.4% of medical students were aware of EMLs, emphasizing their importance. Moreover,

95.2% acknowledged the practicality of selecting essential medicines from the EML. Notably, 34.9% strongly recognized the EML's importance to public health, and an even larger majority (57.2%) were in agreement. These results underscore the relevance of EMLs and the crucial role of resource support in both medical education and healthcare delivery. Turning to Tank et al.'s [8] study, they observed that a majority of respondents, specifically 71.71% of interns and 86.57% of resident doctors, demonstrated awareness of the concept of Essential Medicines (EM). However, only a small fraction, 2.43% of interns and 3.35% of resident doctors, knew the exact number of drugs on the Indian EML. This finding aligns with a study by Mahajan R et al. [9] suggesting a consistent lack of measures to update professional knowledge regarding EMLs. Tank et al. [8] emphasize that not only the selection but also the appropriate use of essential medicines is crucial for enhancing the quality of healthcare.

In our study, 84.9% of participants recognized the need for extra resources in p-drug selection, indicating its importance. Additionally, patient beneficence through prescription aligned with p-drug criteria found support, with 25.9% in the SA category and 54.2% in agreement (A), underlining its potential benefits. These findings illustrate the value and relevance of teaching p-drug selection in medical education. Manjhi et al. [10] 's study highlights the importance of competency-based medical education (CBME) and the need for rational drug selection skills among medical students. It aligns with the broader goals of medical education, aiming to produce cost-effective and competent healthcare providers. By instructing students on criteria-based drug selection, it lays the groundwork for responsible prescribing in their future careers, contributing to ongoing efforts in medical education to enhance prescribing competence. Additionally, a study by Devi et al. [11] found that students believed the P-drug selection process improved their understanding of pharmacology, further emphasizing its educational value.In the context of awareness about the term P-drug and the associated criteria, there are notable variations in different studies. A study from Western Gujarat by Tank et al. [8] reported relatively lower awareness levels among interns and resident doctors, with 21.95% and 18.12% respectively. In contrast, other studies, such as those conducted by Kanthi et al. [12] , Hooli et al. [13], and Tekulapally et al. [14], revealed higher awareness percentages ranging from 35% to 63.2%.

In our study, 47% of participants supported mandatory reporting of adverse drug reactions (ADRs), indicating a strong sense of responsibility toward pharmacovigilance. Additionally, 48.2% found ADR reporting challenging, while 72.3%

were well-informed about the Pharmacovigilance Program of India (PVPI). Kharadi et al.'s [15] research among 2nd-year medical students showed promising results, with 95% correctly defining pharmacovigilance, 96% aware of the National Pharmacovigilance Programme of India, and 99% acknowledging the necessity of reporting ADRs, indicating improving knowledge and awareness. A study by Meher et al.'s [16] among undergraduate medical students found a positive attitude toward pharmacovigilance, despite lower knowledge and practice scores, suggesting receptivity to the concept but room for improvement in practical skills. Shashi Marko's [17] study on medical students highlighted that most recognized the importance of reporting ADRs and advocated for comprehensive pharmacovigilance education for healthcare professionals, emphasizing the need for integrating pharmacovigilance into medical education.

Our study highlighted the recognition of effective doctor-medical representative communication's importance (81.9%) and the significance of establishing patient rapport (99.4%). Moreover, a majority disagreed with direct referral without prior communication (95.2%), and These findings align with Ayat A. Al Ali and Ahmed G. Elzubair's study [18], where 51.9% of physicians had a good rapport with patients, emphasizing effective doctor-patient communication. Mohsin F Butt's [19] article supported the significance of patient rapport, particularly using a patient's occupation as a conversation starter. Austad et al.'s [20] systematic review emphasized the influence of communication on students' attitudes, consistent with our focus on doctor-medical representative communication in medical practice. Our findings resonates with Bich N. Dang's [21] research, which emphasizes the significance of trust and rapport in the early doctor-patient relationship, particularly among new patients. Patients in Dang's study highlighted actions that can reduce anxiety and build trust, mirroring the importance of communication and rapport-building that our study also underscores.

In our study, we observed a substantial preference among Second MBBS students for case-based teaching over traditional textbook methods, with an overwhelming 96.8% of participants favoring the former. This aligns closely with the findings in Papanna et al.'s [22] study, where Problem-Based Learning (PBL) emerged as the most favored teaching method among medical students. These results collectively point to a consistent and growing trend in medical education, emphasizing the appeal of active and problem-based learning approaches. Furthermore, our study shed light on the students' acute awareness of the importance of standard textbooks, with a substantial 87.4% recognizing their significance in evidence-based

learning. While Papanna et al. [22] did not directly assess textbook awareness, our findings harmonize with the overarching consensus within medical education that underscores textbooks as invaluable reservoirs of knowledge and information. Another distinctive aspect of our study is the spotlight on the perceived usefulness of Multiple Choice Questions (MCQs) for internal assessments. A remarkable 89.7% of students found MCQs beneficial for evaluating their understanding. Our study accentuated the students' preference for parallel integration of topics to enhance their understanding, with a significant 91.6% of students endorsing this approach. This resonates with Papanna et al.'s [22] recommendation for a blended approach that combines traditional and problem-based teaching methods for effective learning. Moreover, Nanda et al. [23] also acknowledged students' willingness to embrace Problem-Based Learning (PBL) while recognizing certain advantages of traditional pedagogy. There were varying views on the utility of role-play/videos for patient communication improvement (24.7% strongly agreed, 41% agreed). These collective findings underscore the importance of offering a diverse array of teaching methodologies to cater to varying learning preferences, all while affirming the relevance of effective assessment tools, like MCQs, role-play, making videos for communication within medical education.

A study by Chéron et al.'s [24] study complements our findings, emphasizing the alignment between their research and our study. Their examination of case-based questioning reveals that students create questions well-matched to the level of medical licensing exams, reinforcing the relevance of case-based learning. This parallels our study, which underscores students' strong preference for case-based teaching. Chéron's [24] findings also highlight students' confidence in diagnosing questions, echoing our study. Additionally, their observation of students' comfort with negatively formulated questions and preference for accuracy aligns with our study's focus on the significance of Multiple Choice Questions (MCQs) as effective assessment tools in medical education. Kaniganti et al.'s [25] study examined the impact of Case-Based Learning (CBL) and Multiple Choice Questions (MCQs) in Pharmacology tutorials for 2nd MBBS students. They found no significant difference in post-test scores between the CBL and MCQ groups. Both methods promoted self-learning and clinical application, but were considered time-consuming and raised presentation concerns. These results align with our study's support for case-based teaching, emphasizing its effectiveness and value in medical education.

Limitations of our study include a single-center focus, potentially limiting the generalizability of findings to other medical institutions. The use of a questionnaire-based approach may introduce response bias and may not fully capture students' actual behavior and practices. Additionally, the cross-sectional nature of the study provides only a snapshot of student perceptions at a specific point in time, and longitudinal data would offer a more comprehensive understanding of how attitudes and knowledge evolve over time. Lastly, while the study assessed students' knowledge and attitudes, it did not directly measure their practical skills or behavior in clinical settings, which are essential components of competency-based medical education. Despite these limitations, our study provides valuable insights into students' awareness, attitudes, and preferences regarding pharmacology competencies, offering a foundation for further research and curriculum development in medical education.

Conclusion

In conclusion, our study emphasizes the vital role of Essential Medicines Lists (EMLs) in medical education and healthcare, aligning with similar research on rational drug selection and pharmacovigilance teaching. It also highlights the importance of effective communication with patient. Furthermore, our findings support the growing preference for case-based teaching, referring standard textbooks new teaching methods like Multiple Choice Questions (MCQs), parallel integration of specific system, making videos/ role play for communication skill in medical education. These insights reflect the dynamic nature of medical education and the continuous pursuit of preparing healthcare professionals with the requisite knowledge and skills for responsible practice.

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