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Research Article

"Evaluation of the Foundation Course of the CBME Curriculum in Indian Medical Education using the CIPP model."

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ABSTRACT

Background: The Foundation Course (FC), mandated by the National Medical Commission, was introduced in the Competency-Based Medical Education (CBME) curriculum for students admitted from 2019. It aims to familiarize students with the medical college environment, improve patient care skills and foster communication skills. This study evaluates its effectiveness for the first batch of Indian Medical Graduates (IMG) using the CIPP Model.

Objectives: 1. Assess the FC's relevance and alignment to student needs. 2. Evaluate resources and teaching methods. 3. Analyse course delivery effectiveness and student engagement. 4. Determine the long-term impact on IMG competencies.

Methods: A questionnaire-based study involving 118 IMGs in their Compulsory Rotatory Internship in a medical college in northeastern India done in 2024.

Results: The FC was moderately relevant (mean = 3.12), with medical ethics training rated highest (mean = 3.58) and clinical skills training lowest (mean = 2.77). Course materials and faculty were adequate (median = 3.5), but students desired more interactive methods. Course structure received positive feedback (mean = 3.92). Digital tools received moderate feedback (mean = 3.65). The FC helped in transitioning to the MBBS curriculum (mean = 3.89), with communication (85.7%) and basic clinical skills (72.3%) identified as the most gained competencies. A strong correlation (r = 0.67) was found between course relevance and internship competency.

Conclusion: The FC demonstrated moderate effectiveness, especially in communication and medical ethics, supporting students' transition into the MBBS curriculum. Further refinement is needed to achieve CBME objectives and enhance long-term impact.

Keywords: Foundation Course, Competency-Based Medical Education, CBME, Program Evaluation, CIPP model, National Medical Commission.

Introduction:

Medical education in India has seen significant reforms with the introduction of the Competency-Based Medical Education (CBME) curriculum by the National Medical Commission (1). A key element of this curriculum is the Foundation Course, which aims to help Phase-I MBBS students transition into the medical profession. This course equips students with essential knowledge, communication skills, ethical principles and professionalism (2).

The Foundation Course is designed to bridge the gap between pre-university education and the rigorous demands of medical training. It focuses on competency-based learning, emphasizing critical thinking, problem-solving and professional behaviour (3). The course integrates various domains, including medical ethics, communication skills, self-directed learning, and digital learning tools, ensuring that students develop a well-rounded understanding of their roles as future healthcare professionals (4).

Despite the structured framework of the Foundation Course, its effectiveness remains underexplored, particularly from the perspective of medical graduates who have completed their early clinical training. Program evaluation is essential to determine the extent to which educational interventions achieve their intended objectives and to identify areas for improvement (5).

The CIPP (Context, Input, Process, Product) Model, developed by Stufflebeam, is widely used for educational program evaluation and provides a comprehensive framework for assessing educational interventions (6-10). The model evaluates:

1. Context: The relevance of the Foundation Course to students' needs.
2. Input: The resources, faculty, and digital learning tools used in course implementation.
3. Process: The effectiveness of course delivery and student engagement.
4. Product: The long-term impact on students' competencies as interns.

This study aims to evaluate the effectiveness of the FC, from the experiences of the first batch of Indian Medical Graduates (IMG), using the CIPP Model (Context, Input, Process, Product).
The objectives of the study are:

1. To assess the relevance and alignment of the Foundation Course with the needs of students.
2. To evaluate the resources, teaching methods, digital and other resources used in delivering the course.
3. To analyze the effectiveness of course delivery methods and student engagement.
4. To assess its overall impact on students' preparedness for internship, focusing on the development of essential competencies.

By systematically evaluating the Foundation Course using the CIPP Model, this study offers evidence-based recommendations aimed at enhancing its future implementation and maximizing its educational impact.

Methods:

Study Design and Setting: This was a questionnaire-based cross-sectional study conducted in a government medical college in the northeastern part of India in 2024.
Study Population and Sampling: The study was conducted on 118 Indian Medical Graduates currently in their Compulsory Rotatory Internship, the first cohort under the CBME curriculum. Complete enumeration method of sampling was used.
Data Collection Tool and Procedure: A structured questionnaire was developed using Google Forms. A mixed-methods approach was used, integrating quantitative survey responses and qualitative feedback from participants. The questionnaire link was shared with students through institutional communication channels. Participants were given sufficient time to complete the form, and responses were collected anonymously.
Ethical Considerations: The study was conducted after obtaining ethical clearance from the Institutional Ethics Committee. Informed consent was obtained from all participants before they filled out the questionnaire. Participation was voluntary, and confidentiality was strictly maintained.
Data Analysis: The collected data were exported from Google Forms into Microsoft Excel and analyzed using descriptive and inferential statistics. Descriptive and inferential statistical analyses were performed on Likert-scale ratings, while thematic analysis was applied to open-ended responses.

Results:

The findings of the study are presented under four domains, incorporating both quantitative survey responses and qualitative feedback from participants.
1. Context Evaluation: The context evaluation focused on assessing the relevance and alignment of the Foundation Course with the needs of the phase-I MBBS students. The responses provided insights into how well the course addressed key educational domains.
Relevance of the Foundation Course: The overall perceived relevance of the Foundation Course to medical education had a mean score of 3.12 (±1.05), suggesting a moderately positive perception. While some students found it highly relevant, others felt its applicability could be improved.
Knowledge Acquisition Support: When asked how well the Foundation Course addressed their needs as phase-I MBBS students in knowledge acquisition, the mean score was 3.06 (±1.02). This indicates a mixed response, with a fair number of students rating it satisfactory, while some found room for improvement.
Communication & Professional Skills Development: The course's effectiveness in developing communication and professional skills received a slightly higher rating, with a mean of 3.29 (±1.02). This suggests that most students acknowledged its role in fostering these skills, though improvements may still be needed.
Medical Ethics Training: Among the evaluated domains, medical ethics training was rated the highest, with a mean score of 3.58 (±0.99). This implies that the course was perceived as particularly beneficial in sensitizing students to ethical aspects of medical practice.
Clinical Skills Training: The lowest-rated domain was clinical skills training, with a mean score of 2.77 (±1.22). This finding highlights a potential gap in practical skill development, suggesting the need for better integration of clinical exposure within the Foundation Course.These results indicate that while the Foundation Course was generally well received, certain aspects, particularly clinical skill development, require further enhancement to better align with student expectations and curricular needs.

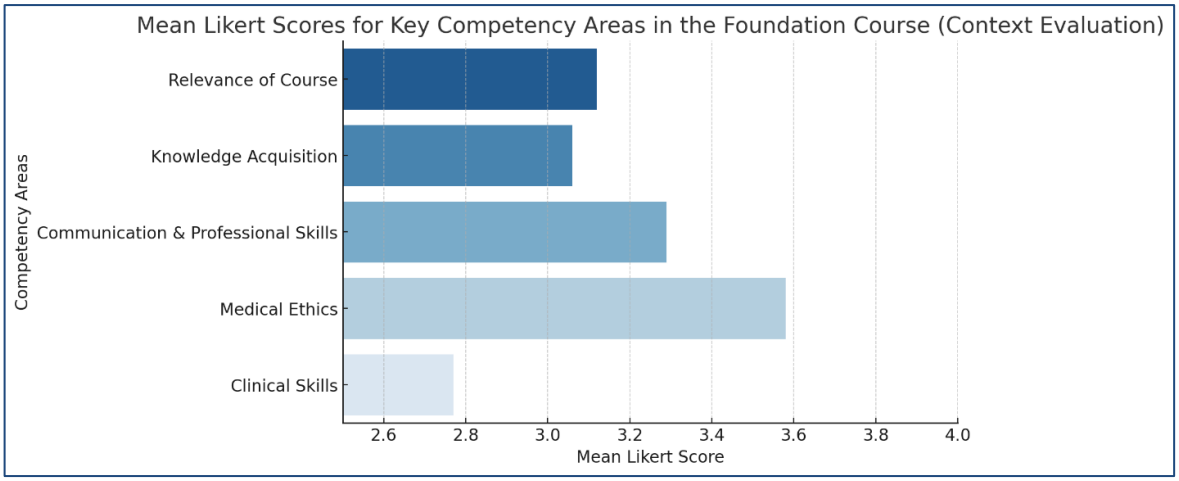

Fig.1: Bar chart showing Mean Likert scores for key competency areas in the Foundation Course (Context Evaluation).

2. Input Evaluation: This component of the CIPP model assessed the adequacy of resources, faculty effectiveness, teaching methods, and course structure. The quality of course materials, including textbooks, presentations, and online resources, was rated moderately high, with a median Likert score of 3.5 (IQR: 3–4). Similarly, the adequacy of resources provided to support learning received a comparable rating.

The effectiveness of instructors in delivering course content was evaluated with a median score of 3.5 (IQR: 3–4), indicating general satisfaction but also highlighting areas for improvement. Teaching methods were rated similarly, reflecting the appropriateness of instructional strategies for Phase-I MBBS students.

Regarding course structure, respondents appreciated the organization of lectures, practical sessions, and group discussions, yielding a median score of 3.5 (IQR: 3–4). However, qualitative responses suggested a need for better integration of interactive learning activities.

Overall, while the inputs provided for the Foundation Course were considered adequate, there is room for improvement in terms of faculty training and the integration of more engaging instructional methodologies.

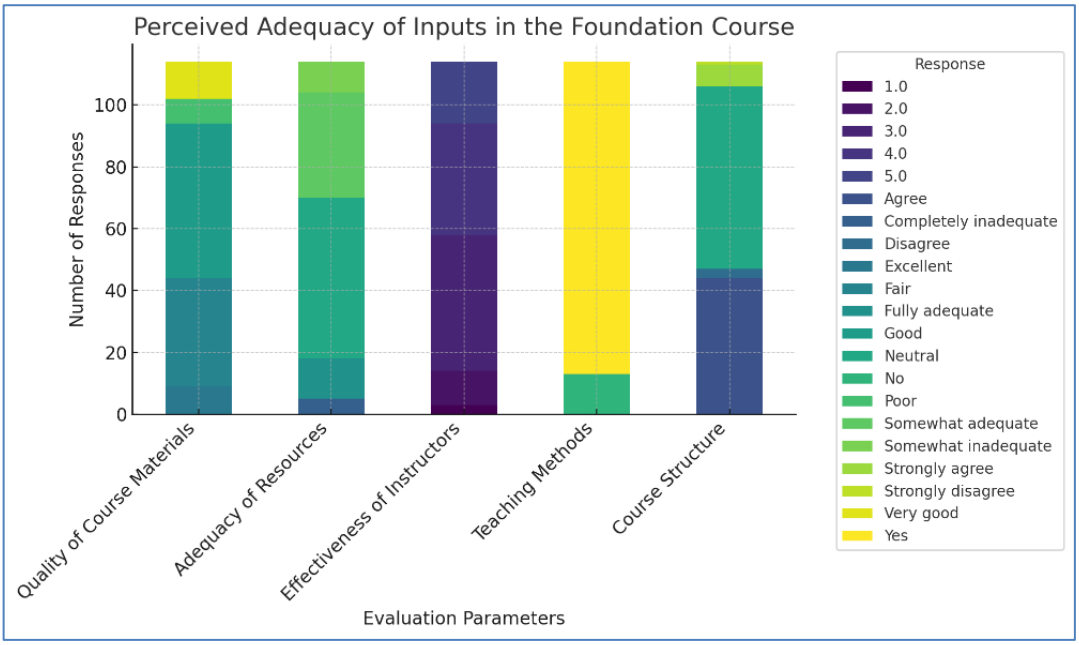

Fig 2: Stacked Bar Representation of the perceived adequacy of course materials, faculty effectiveness, teaching methods, and course structure in the Foundation Course (Input Evaluation).

3. Process Evaluation: This section focused on assessing the effectiveness of course delivery methods, interaction opportunities, engagement, and the integration of digital learning tools.

Overall Learning Experience: Most participants rated their learning experience positively, with a mean Likert score of 3.92 (SD = 0.87), indicating a generally favorable perception of the course.

Effectiveness of Course Structure: The structure of the foundation course, including lectures and practical sessions, was rated 3.78 (SD = 0.92) on a Likert scale, reflecting students' views on its conduciveness to learning.

Opportunities for Interaction: A majority (91.2%) of students felt there were enough opportunities for interaction, while 8.8% indicated otherwise.
Knowledge Acquisition & Communication Skills: These aspects were strongly correlated (r = 0.74), indicating that students who found the course effective for knowledge acquisition also felt it enhanced their communication skills.
Qualitative Feedback on Teaching Methods: Thematic analysis revealed that students valued interactive sessions, group discussions, and case-based learning, but some expressed concerns about passive lecture-heavy sessions.
Suggested Improvements:

- Greater clinical exposure through early patient interactions and hands-on activities.
- Enhanced use of digital learning platforms for better engagement.
- More structured modules on professionalism and ethics.

Active Participation & Engagement: When asked whether the course encouraged active participation: 62.3% responded "Yes", 33.3% answered "Maybe", Only 4.4% indicated otherwise
Integration of Digital Learning Tools: The effectiveness of digital tools in the course was rated 3.65 (SD = 0.94), showing moderately positive student feedback.
Additionally, 50% of students felt that technology enhanced their learning experience, 42.1% were unsure, 7.9% did not perceive any significant benefit.
The process evaluation highlights that the course structure and overall learning experience were well-received, though some students desired more opportunities for interaction. Digital learning tools played a moderately positive role, with suggestions for further improvements in their integration.

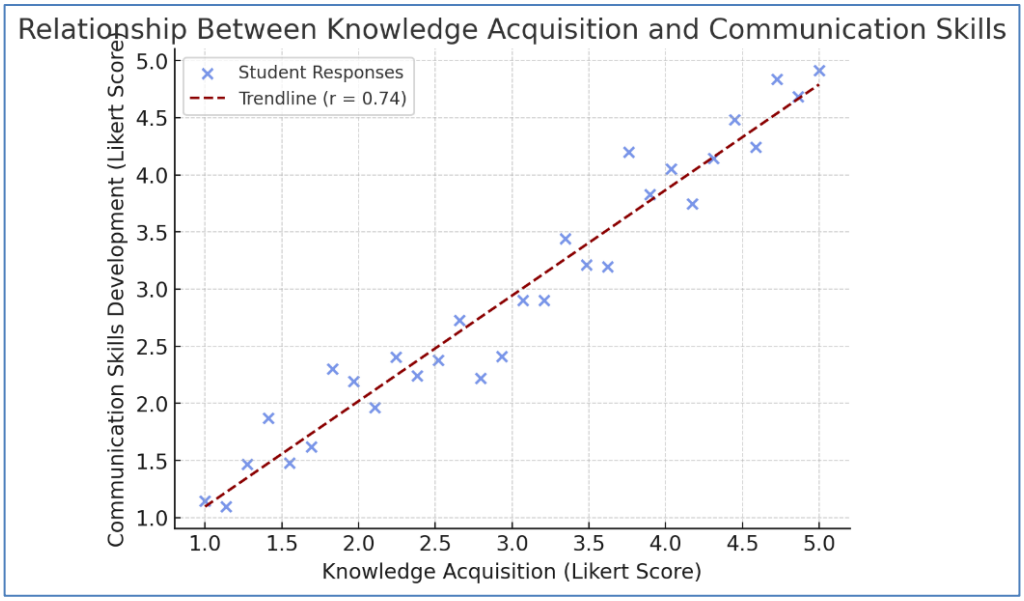

Fig 3: Scatter plot showing the correlation between Knowledge Acquisition and Communication Skills Development among students (r = 0.74, p < 0.05) (Process evaluation).

4. Product Evaluation: The product evaluation of the Foundation Course aimed at assessing its overall impact on students' preparedness for internship, focusing on the development of essential competencies.
Transition into the MBBS Curriculum: Participants rated the extent to which the Foundation Course facilitated their transition into the MBBS curriculum. The mean Likert score for this parameter was 3.89 (SD = 0.85), indicating a generally positive reception. Most respondents (78.4%) rated the course as moderately to highly effective in easing their transition into medical education.
Skills and Knowledge Gained: When asked about specific skills or knowledge gained from the Foundation Course, the most frequently selected responses were:

- Communication skills (85.7%)
- Basic clinical skills (72.3%)
- Professionalism and ethics (69.5%)
- Stress management techniques (64.2%)

Open-ended responses reinforced the significance of early exposure to medical ethics, stress-coping mechanisms, and time management strategies, which many interns reported applying in their daily practice.
Preparedness for the Clinical Setting: When asked whether the Foundation Course enhanced their readiness for clinical work, 68.9% of participants responded "Yes", indicating that the course positively

impacted their preparedness. A smaller proportion (21.6%) responded "Maybe", while 9.5% felt the course had limited impact on their clinical preparedness.

Long-Term Impact on Learning and Patient Care: A significant proportion of interns (74.2%) believed the Foundation Course positively influenced their learning strategies and approach to patient care. 17.5% were uncertain, while 8.3% felt there was no lasting impact on their learning or patient management skills.

Contribution to Competencies as an Intern: When asked to assess the Foundation Course's contribution to their current competencies, the mean Likert score was 3.76 (SD = 0.91). The highest-rated aspects included:

- Professional behaviour
- Teamwork and collaboration
- Confidence in patient interactions

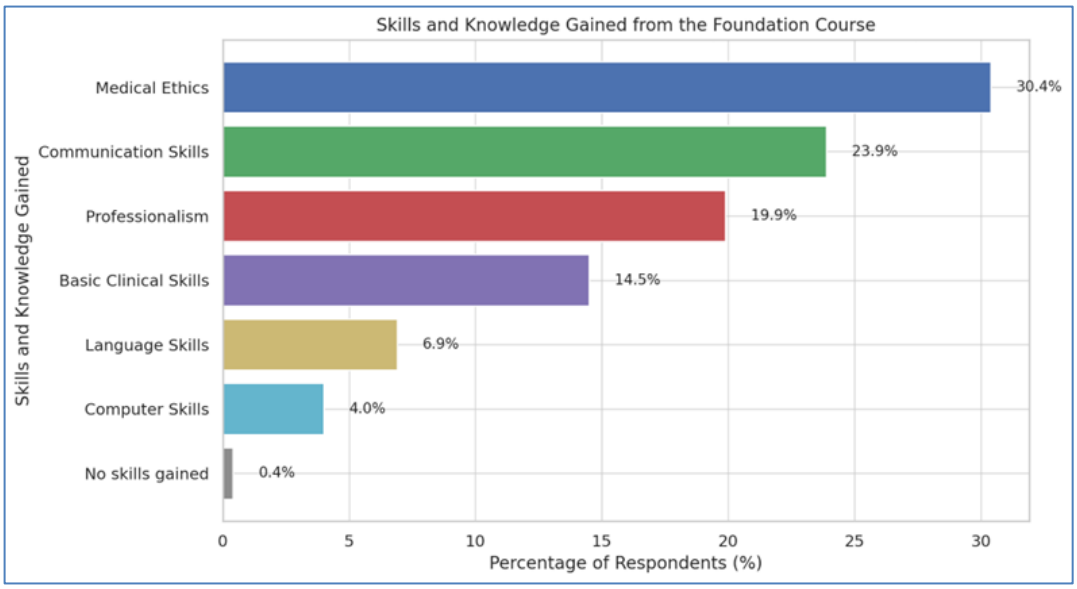

Fig 4: Horizontal bar chart representing the percentage of respondents who gained specific skills and knowledge from the Foundation Course (Product Evaluation).

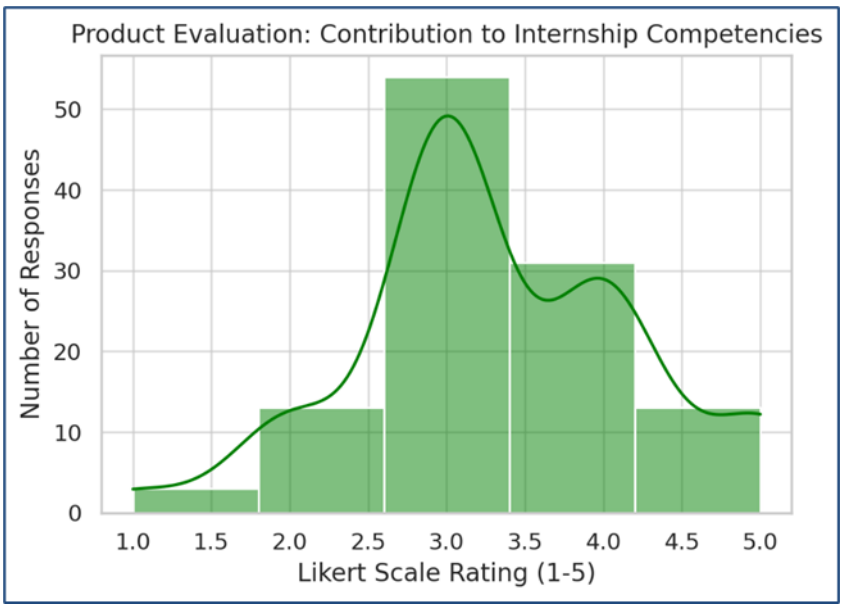

Fig 5: Histogram showing how students rated the Foundation Course's contribution to their internship competencies (Product Evaluation).

Strongest Correlation: The relevance of the Foundation Course and its contribution to internship competencies were significantly correlated (r = 0.67), reinforcing its importance in early medical training.

Areas for Further Strengthening: Responses suggested the need to align the curriculum more closely with real-world medical challenges to ensure a smoother transition to clinical responsibilities.

Discussion:

The findings of this study indicate that the Foundation Course under CBME was moderately effective, yet improvements are needed in clinical skills, digital learning integration, and active learning strategies. While it positively impacted internship competencies, further enhancements could enhance its student-centered and clinical relevance.

1. Context Evaluation: The shift to CBME in India emphasizes outcome-based education with a strong foundation in professionalism, ethics, and communication (1,2). A well-structured Foundation Course is crucial in preparing medical students for this transition. Previous studies highlight the need for such preparatory courses, ensuring that students adapt effectively to the rigorous demands of medical training (3,4). The findings from our study align with existing literature, demonstrating that students perceived the course as relevant to their medical education and foundational learning. However, variability in students' perceptions indicates the need for further refinement in curriculum implementation to enhance its contextual effectiveness (5).

2. Input Evaluation: Effective curriculum delivery requires well-defined resources, faculty training, and the integration of digital learning tools (6). Faculty readiness and institutional support significantly influence program success (7,8). Our study observed that while most students found the course well-structured, some areas, particularly digital integration, required further enhancement. The increasing role of technology-enhanced learning in CBME suggests that additional emphasis on interactive digital tools could improve knowledge retention and engagement (9,10).

3. Process Evaluation: Process evaluation is crucial in identifying how well the course was executed (9,11). The study highlighted high student satisfaction with communication and professional skills training, echoing findings from previous research that stress the importance of early exposure to these competencies (12,13). However, areas such as medical ethics and clinical skills integration received comparatively lower ratings, indicating gaps in implementation that warrant curriculum modifications. Prior research suggests that structured mentorship and hands-on experiences could bridge these gaps (14,15).

Although the foundation course provided multiple opportunities for interaction (as perceived by 91.2% of students), qualitative feedback suggested that passive lecture-heavy sessions reduced engagement. This aligns with studies emphasizing the importance of active learning strategies in competency-based medical education (CBME) (16,17). The use of digital learning tools received a moderately positive response (mean Likert score = 3.65, SD = 0.94), but 42.1% of students were uncertain about their effectiveness. Similar findings have been reported in other CBME evaluations, where structured digital learning integration enhanced student engagement and performance (18,19).

While the overall learning experience and course structure were well-received, future iterations should focus on enhancing digital learning platforms, increasing interactive sessions, and introducing early clinical exposure. These recommendations are in line with existing literature advocating for blended learning approaches to improve student participation and learning outcomes (20,21).

4. Product Evaluation: The product evaluation of the Foundation Course aimed to assess its long-term impact on students' competencies as Indian Medical Graduates. The findings suggest that the course was moderately effective in facilitating the transition into medical education and enhancing essential skills, but there remain areas for improvement.

Most students (78.4%) found the Foundation Course moderately to highly effective in easing their transition into medical education, with a mean Likert score of 3.89 (SD = 0.85). This aligns with previous studies highlighting the importance of structured orientation programs in reducing initial academic stress and improving adaptability (9,12). The positive reception suggests that the course plays a crucial role in helping students adjust to the rigorous demands of the MBBS curriculum (13).

Communication skills (85.7%) and basic clinical skills (72.3%) were the most frequently cited benefits, followed by professionalism and ethics (69.5%) and stress management techniques (64.2%). These findings reinforce existing literature emphasizing the need for early professional development and stress-coping strategies in medical training (14,16). Open-ended responses further highlighted the practical application of these skills during internship, supporting the notion that early exposure to medical ethics and time management can lead to long-term professional benefits (17,18).

About 68.9% of participants agreed that the Foundation Course enhanced their readiness for clinical work, whereas 21.6% were uncertain, and 9.5% felt limited impact. This mixed response reflects ongoing concerns in medical education regarding the gap between preclinical learning and clinical practice. Prior research suggests that incorporating early patient interactions and simulation-based learning can further strengthen clinical preparedness (19,20).

A majority (74.2%) believed the course positively influenced their learning strategies and approach to patient care, though 17.5% remained uncertain, and 8.3% reported no lasting impact. The moderate level of perceived benefit suggests that while the course lays a strong foundation, additional reinforcement through case-based learning and digital learning tools could enhance its long-term impact (21,22).

The mean Likert score of 3.76 (SD = 0.91) suggests a moderate contribution of the Foundation Course to internship competencies, with the highest-rated aspects being professional behaviour, teamwork, and confidence in patient interactions. These findings align with studies emphasizing the role of structured preclinical training in fostering professional identity formation (23,24).

The strong correlation (r = 0.67) between the perceived relevance of the Foundation Course and its contribution to internship competencies reinforces its importance in early medical training. However, responses also suggested that aligning the curriculum more closely with real-world clinical challenges could enhance its impact. Specifically, students recommended greater hands-on clinical training, better integration of digital learning tools, and more active learning strategies, consistent with best practices in CBME (25,26).

Recommendations Based on Study Findings:

Based on the findings of this study, it can be said that the FC is moderately effective, but further improvements could enhance its effectiveness. The following recommendations are proposed to strengthen its impact:

1. Enhancing digital learning tools for better engagement.
2. Strengthening early clinical exposure through practical sessions.
3. Implementing periodic faculty training to optimize teaching.
4. Conducting longitudinal studies to assess the course's lasting impact.

Conclusion

This study provides a comprehensive evaluation of the Foundation Course in CBME using the CIPP model. While the course was perceived as beneficial, specific areas, particularly digital learning, ethics training, and early clinical exposure require further refinement. Future curriculum modifications should prioritize evidence-based strategies to ensure an optimal learning experience for medical students.

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