



Original Article



Evaluating Perception of Undergraduate Medical Students About Integrated Modular System

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ARTICLE INFO

Keywords:

Integrated Modular Curriculum, Medical Education, Total Perception Scores, Sub-Variable Scores

How to Cite:Fatima, N., Bani, M. U., Rehman, F. U., Khan, M. A. Y., Sultan, M., Mehsood, N., Ullah, U., & Haq, Z. U. (2025). Evaluating Perception of Undergraduate Medical Students About Integrated Modular System: Undergraduate Medical Students About Integrated Modular System. *Pakistan Journal of Health Sciences*, 6(11), 32-37. <https://doi.org/10.54393/pjhs.v6i11.3196>***Corresponding Author:**Mehran Ullah Bani
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ABSTRACT

The Integrated Modular System (IMS) is a structured program that begins with basic medical concepts and integrates all medical science components both horizontally and vertically. **Objectives:** To assess total perception scores, sub-variable scores, and the associations between research and demographic variables. **Methods:** An analytical cross-sectional study was conducted at Gomal Medical College using a quantitative approach with undergraduate students. Stratified random sampling was applied. The sampling frame comprised official enrollment lists from GMC's registrar. Strata were defined by academic year (Year 1-Final Year) to ensure proportional representation. Within each stratum, students were randomly selected using Google Sheets' RAND function to generate random numbers assigned to roll numbers. The top 40 unique random numbers per year were selected. A self-administered questionnaire, scored on a five-point Likert scale, assessed student perceptions across four sub-variables and three demographic variables. Scores were categorized as poor, fair, or good using Bloom's criteria. SPSS version 27.0 was used to compute frequencies, percentages, and perform chi-square and Fisher's exact tests. **Results:** Out of 200 participants, 72.5% had fair perception, 16.5% good, and 11.5% poor. No significant association was found between gender or residence and total perception score. However, a significant association existed between students' year of study and their perception score. **Conclusions:** Students generally had an average yet cautiously positive perception of IMS, especially regarding learning behaviour and future outcomes. Concerns remain about achieving IMS goals and resource availability. DME should enhance evaluation guidelines and time allocation, while administration must improve self-directed learning resources.

INTRODUCTION

The medical education system, supported by adequate resources and proper implementation, directly influences students' learning habits, clinical skills, critical thinking, and research capabilities [1]. With great advancement in every field of science and technology, medical sciences have also been going through a tremendous amount of upgrading and refinement by shifting toward an interdisciplinary approach [2]. The outdated conventional system failed to match expanding curricula, prompting the need for a modern, well-planned, and efficiently timed learning approach [1, 3]. Strengthening the integration of basic science education with clinical practice is

recognized as an effective approach to improving medical education and can serve as a foundational strategy for curriculum development [4]. An integrated modular system is a structured program which starts with the basic concepts of medicine and incorporates all components of medical sciences in a horizontal as well as vertical manner [5, 6]. The Integrated Modular System promotes coordinated, system-based teaching, where departments align content like physiology and pathology in a liver module requiring cross-departmental and institutional collaboration [7]. Integrated curricula blend early clinical exposure with continued science teaching, unlike



traditional models that separate science and clinical training by years [8]. This approach broadens professional knowledge and skills, while also supporting better career guidance and employability for graduates [9]. The evaluation of the effectiveness of the integrated modular system among students in every medical college is essential to find out the advantages, drawbacks and areas that need further improvement [3]. The majority of students appreciated the integrated modular system of teaching in a study conducted at a public sector medical college [10]. Another research concluded that the majority of students were satisfied with the integrated curriculum but were not satisfied with the time allocation for each module [11]. A clear institutional vision is essential for adopting an integrated curriculum, but the rapid rise of medical colleges and the lack of experienced educators in Pakistan may stall progress [12].

As a new system, the Integrated Modular System may face challenges during adaptation, which can be addressed by incorporating student feedback to reveal its effectiveness and underlying issues [13]. No prior research has explored students' perceptions of the Integrated Modular System (IMS) at Gomal Medical College, Dera Ismail Khan. This study aims to assess whether IMS meets its objectives, the adequacy of available resources, and its impact on learning and career readiness. Findings guide improvements in curriculum, resource allocation, and policy, helping enhance the system's effectiveness and aligning it with students' educational needs.

METHODS

The study used a quantitative, cross-sectional design at Gomal Medical College (GMC), Dera Ismail Khan, from October to December 2024. Ethical approval was obtained from the Ethical Review Committee of GMC, MTI, Dera Ismail Khan (144/GJMS/JC). A sample of 200 students was selected using stratified random sampling via Google Sheets, with 40 students chosen from each year. Five strata were created, each representing an academic year, and students were randomly selected from each stratum using their assigned roll numbers. The sample size was determined using the Raosoft calculator, assuming a 95% confidence level, 5.40% margin of error, and 63% response distribution, based on a population of 571 students. Inclusion criteria included all undergraduate students at GMC; those who did not consent were excluded. Data were collected using a self-administered, validated questionnaire approved by the Community Medicine Department and piloted with 20 students. The Cronbach alpha value was calculated as 0.745. A five-point Likert scale was used for responses (1 = Strongly Disagree to 5 = Strongly Agree). The primary variable was student perception, divided into four subdomains: achievement of

aims/objectives, resource availability, learning behaviour, and future outcomes each with five items. Demographic data (gender, residence, year) was also recorded. Mean scores calculated based on Likert scores for perception and subdomains were calculated and categorized using Bloom's criteria: <3 as "Poor," 3–3.9 as "Fair," and 4–5 as "Good." Statistical analysis was done using SPSS version 27.0, which included frequencies, percentages, chi-square and/or Fisher's exact test, with a significance level of $p < 0.05$ and 95% confidence interval.

RESULTS

The demographic characteristics of the participants are presented in table 1.

Table 1: Demographic Characteristics of the Participants

Years	Male	Female	On-campus	Off-campus	Total
1 st Year	26	14	31	9	40
2 nd Year	24	16	28	12	40
3 rd Year	28	12	30	10	40
4 th Year	26	14	33	7	40
Final Year	29	11	33	7	40
Total	133 (66.5%)	67 (33.5%)	155 (77.5%)	45 (22.5%)	200

After analyzing students' perceptions of the Integrated Modular System (IMS), 22 students (11%) had a poor overall perception, 145 (72.5%) had a fair perception, and 33 (16.5%) had a good perception. The first sub-variable, "achievement of aims and objectives," showed 19.5% poor, 57.5% fair, and 23% good perception. For "availability of resources," 40% had a poor perception, 46.5% fair, and only 13.5% good, indicating concerns about resource adequacy. The third sub-variable, "improvement in learning behaviour," revealed a more positive outlook, with 12% poor, 47.5% fair, and 40.5% good perception. The final sub-variable, "future outcomes," showed 14% poor, 41% fair, and 45% good perception, reflecting optimism about long-term benefits. These findings collectively highlight cautious acceptance of the IMS, with particular concerns about resources but hope for future outcomes and learning improvements, as mentioned in figure 1.

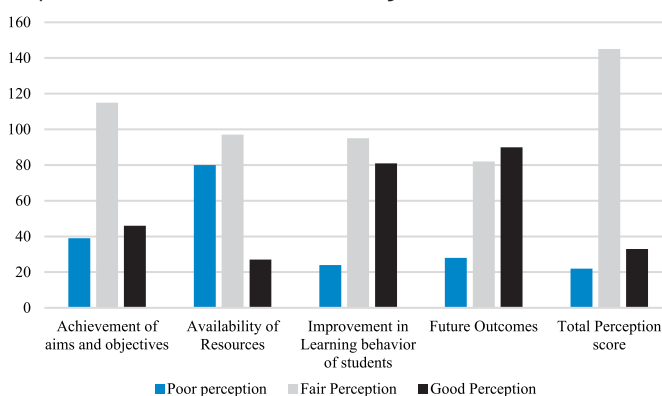


Figure 1: Students' Perceptions of the Integrated Modular System

Chi-square analysis showed no significant association between total perception score and gender ($p=0.435$) or residence ($p=0.254$). A significant association was found with year of study ($p=0.026$). Confidence intervals were calculated to generalize perception scores to the population, as mentioned in table 2.

Table 2: Chi-Square Analysis Between Total Perception Score and Gender

Perception Category	Group	Lower	Upper
Poor Perception	Overall	5%	18%
	Male	7%	21%
	Female	2%	13%

	On-campus	5%	18%
	Off-campus	4%	16%
Fair Perception	Overall	64%	81%
	Male	62%	80%
	Female	63%	81%
	On-campus	65%	83%
	Off-campus	53%	73%
Good Perception	Overall	10%	25%
	Male	8%	23%
	Female	12%	27%
	On-campus	7%	22%
	Off campus	16%	33%

The analysis shows how often each of the sub-variables

was rated on a 5-point Likert scale, from "Strongly Agree" to "Strongly Disagree," based on responses from 200 people. The frequency of students was represented as n. Explore the data to see how each item was rated and uncover the trends in the responses, as in table 3.

Table 3: Sub-Variables Rated on A 5-Point Likert Scale, Based on Responses from 200 People

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Sub-variable 1: Achievement of Aims and Objectives of IMS					
The integration of basic medical sciences and their clinical correlates strengthens both your medical concept and clinical skills.	93	75	19	7	6
Learning objectives are precise, clear and delivered accurately.	14	93	50	30	13
The end-of-modular assessments are according to the learning objectives, and are graded timely manner.	37	80	41	28	14
The subjects among the modules are integrated Properly and no repetition of topics is observed.	41	75	31	42	11
The teacher's evaluation and the curriculum feedback are taken regularly at the end of the module by the DME.	22	28	35	66	49
Sub-variable 2: Availability of Resources					
The resources for self-directed learning, like the library, are always available to the students.	28	46	27	42	57
The number of faculty available for each The department is enough.	38	93	40	22	7
The faculty is well-trained according to the requirements of IMS.	24	64	50	44	18
IMS provides ample Opportunities for high-quality research.	24	58	57	44	17
The time allotted to each module is sufficient to cover all topics completely.	26	45	26	67	36
Sub-variable 3: Improvement in the Learning Behaviour of Students					
Scenario-based learning helps you apply your theoretical knowledge and in critically.	88	72	21	14	5
Small group discussions enhance collaboration, participation and communication skills among students.	78	71	24	15	12
Students prefer to prepare the whole syllabus rather than focusing on frequently asked questions.	37	66	49	32	37
IMS fosters collaboration and teamwork among students.	38	80	49	25	8
IMS promotes lifelong learning habits.	30	75	56	24	15
Sub-variable 4: Future Outcomes					
Students find the IMS very relevant to real-world practice.	45	44	43	16	12
The integrated modular system accommodates different learning styles and preferences.	32	99	39	22	8
IMS prepares the students very well for the professional exams.	56	72	44	19	9
The IMS prepares you very well for future specialization or residency programs.	41	71	58	17	13
The students of GMC would like to recommend IMS to future medical students.	73	70	27	14	16

DISCUSSIONS

The concept of an integrated curriculum in medical education with an organ system approach was introduced in the Case Western University School of Medicine in 1952 and quickly gained widespread acceptance. It has been studied in China since the 1990s [14]. Subsequently, Khyber Medical University, Peshawar, adopted this approach in its affiliated colleges in 2018, aligning with global trends to improve the quality and coherence of medical education. The purpose of our study was to evaluate the perceptions of medical students currently enrolled at Gomal Medical College regarding the modern educational system introduced at their institution. In our study, most students (72.5%) exhibited a Fair response based on their total perception scores. This finding was consistent with Masood *et al.* findings, which also reported a satisfactory or impartial level of perception among 45.4% students [15]. 72.6% students strongly affirmed that integrated teaching helps in clinically applying basic knowledge in a study by Wajid *et al.* This finding WAS consistent with the responses to the first item of our questionnaire [16]. Studies have also shown that the integrated PBL curriculum model positively influences the development of clinical thinking skills in undergraduate medical students. The PBL group showed similar pre-test high-level clinical thinking as the control group (82.81% vs. 81.43%) but significantly higher post-test results (92.13% vs. 85.71%), indicating the PBL curriculum's effectiveness [17]. 58% of our participants were positive about the proper integration of subjects in each module, while 52% participants felt that it was well to very well integrated in a study conducted in Ethiopia [18]. Additionally, 40% of our students were satisfied with assessment strategies, while 51.3% of respondents in a study conducted by Atta *et al.* were dissatisfied with assessments [19]. Students were utterly dissatisfied with the role of DME in teachers' evaluation and curriculum feedback, as observed in our study. No relevant study was found that evaluated the role of DME in the effective implementation of IMS. Aziz *et al.* highlighted in a qualitative study about the challenges in curriculum development and interdepartmental collaboration within integrated modular curricula [11]. Regarding satisfaction with faculty, 32% of our students agreed, and 25% were neutral, which contrasts with a study of Atta *et al.* where 46.3% were strongly satisfied with the teaching strategy [19]. A significant portion (33.5%) disagreed and (29.8%) strongly disagreed with the time allotment for each module, according to our study, aligning with findings by Jalil and Usmani, in which 21.9% strongly disagreed and 29.8% disagreed when asked about the appropriate time given for module completion [20]. Over half of the students were concerned about learning resource availability,

similar to Masood *et al.* findings, where 34.4% students were not satisfied with computers and internet access, but 44.4% students agreed with the availability of other resources [15]. Scenario-based learning was deemed helpful by over 70% of students, compared to only 24.2% who found it useful in the study by Jalil and Usmani [20]. Small group discussions were also greatly appreciated by the respondents of our research 97.1% participants found it useful in another study, and also 55.1% participants acknowledged the role of IMS in encouraging teamwork and collaboration among students in a study by Fatima *et al.* [3]. No statistically significant difference in perception by gender was observed in our study, which is in accordance with the analysis carried out by Wajid *et al.* [16]. There was a significant difference in students' perception by year of study as analyzed in our study, which was in conformance with the study conducted by Jalil and Usmani. [20]. Additionally, there was no significant difference observed in the perception of on-campus and off-campus students. No relevant article could be found that associated the residence status of students with their perception of IMS.

A major limitation of this study is its focus on a single institution, which restricts the generalizability of results. Including multiple institutions in future research would offer a broader perspective. The exclusion of faculty and administrative views also limits the depth of analysis. Based on our findings, in future, we recommend that the DME standardize teacher evaluation and curriculum feedback, revise module time allocation, and strengthen library and internet facilities to support effective self-directed learning.

CONCLUSIONS

GMC students show a generally positive perception of IMS, consistent with earlier studies. IMS is valued for enhancing learning behaviour and professional development, with significant differences by year but not gender or residency. However, students expressed concerns about DME's evaluation role and poor support for self-directed learning. Positive feedback was noted for scenario-based learning and teamwork, highlighting the system's alignment with real-world practice and diverse learning needs.

Authors' Contribution

Conceptualization: FUR

Methodology: NF, MUB, MS, NM, UU, ZUH

Formal analysis: NF, MS, NM

Writing and Drafting: NF, MUB, MAYK, UU

Review and Editing: NF, MUB, FUR, MS, NM, UU, ZUH

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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