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The Perception of Biochemistry Teachers about the Integrated Modular Curriculum of Undergraduate Medical Students: Advantages and Areas Needing Improvement

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ABSTRACT

Background: The teaching and learning process has two pillars, comprising students and teachers. Many studies have been conducted to determine the impact of an integrated modular curriculum. **Objective:** This study aims to find out the perception of a biochemistry teacher regarding the integrated modular curriculum on students of the first and second year MBBS. **Study Design:** Cross-sectional study. **Settings:** Department of biochemistry, University medical & dental college, The University of Faisalabad. **Duration:** 2 months from January 15, 2025, to March 15, 2025. **Methods:** The study was started after taking ethical approval from the ethical review board of the University of Faisalabad. The study included 50 biochemistry facilitators teaching under an integrated modular curriculum at various public and private medical colleges of Pakistan. Exclusion criteria involved teachers with experience of teaching in a traditional curriculum only. The purposive sampling method was employed. With informed consent, a structured Google Form questionnaire was emailed to participants. Data was analyzed using IBM SPSS software. **Results:** Of 50 teachers, 33 (66%) were satisfied with the integrated curriculum. Most biochemists (44, 88%) found it relevant to clinical subjects. Teachers noted benefits like improved interdepartmental interaction (41, 82%), communication skills (31, 62%), theory-practical alignment (33, 66%), and research culture (35, 70%). However, 29 (58%) faced challenges with multidisciplinary timetabling, and 40 (80%) saw a need to revise biochemistry content and objectives. Chi-square analysis proved a strong correlation between overall satisfaction and interdepartmental interactions. **Conclusion:** Biochemistry facilitators are satisfied with the integrated curriculum, though some areas need improvement.

Keywords: *Teachers' perspective, Integrated curriculum, Biochemistry.*

INTRODUCTION

Curriculum can be described as a group of strategies employed to impart knowledge to students. The medical curriculum has evolved from apprenticeship with a medical expert to a subject-based approach in the previous century. For nearly a decade, a more integrated modular approach has been introduced around the world, including in Pakistan. This evolution has removed the boundaries between subjects and allowed basic sciences and clinical subjects to interact in a way that is more useful in developing clinically skillful doctors who can provide better patient care and satisfaction.[1] However, this transition from the didactic method to a more student-centered approach has faced some resistance from teachers involved in medical education. To make this system acceptable, one must have a thorough understanding of the teachers' viewpoints, as they are the major collaborators.[2]

The importance of biochemistry in medical sciences cannot be ignored. Biochemistry influences medical

sciences in multiple ways, including the normal functioning of the human body at the molecular level and the biochemical basis of disease, as well as its diagnosis and management. The evolution of molecular genetics has not only enabled doctors to understand the genetic basis of disease but also to develop treatments for various hereditary diseases with the help of genetic engineering. The genetic scissors CRISPR/Cas9 has been developed, representing a breakthrough in the management of cancer and other diseases.[3]

Biochemistry, one of the basic science subjects taught in the first two years of the traditional undergraduate medical curriculum, has now been divided into various modules having spiral integration with other subjects. The content of the syllabus, learning objectives, assessment policies, and total number of hours allocated to the subject have been revised in the integrated modular curriculum 2k23 introduced by the governing university throughout the affiliated public and private sector medical colleges. This study was conducted to address the impact of these changes on the teachers of biochemistry, who are now more appropriately called the facilitators.[4]

METHODS

A cross-sectional study was conducted at the University Medical and Dental College, Faisalabad (The University of Faisalabad), where the integrated modular curriculum was introduced in 2023. Ethical approval Ref: TUF/IRB/06/25 dated 13.01.2025 from the ethical review committee of the University of Faisalabad was taken. A total of 50 faculty members from the Biochemistry departments of multiple public and private sector medical colleges were engaged, irrespective of their designation. Their designation and institutes were not disclosed. Informed consent was taken from all participants. Exclusion criteria involved teachers with experience of teaching on the traditional curriculum. The study was conducted from January 15, 2025, to March 15, 2025. A purposive sampling technique was employed. Data was collected through structured questionnaires from faculty members.[5] The questionnaire was validated by using the Delphi technique by sending to four medical educationists. All the questions were closed-ended. Some questions were regarding the pros of integrated modular curriculum while others covered the cons. (table 1 and table 2) A Likert scale was used to assess the level of agreement on 5-point scale ranging from strongly agree (SA)=5, agree (A)= 4, neutral (N)= 3, disagree (D)= 2, strongly disagree (SD)=1. Data was analyzed using IBM SPSS software.

RESULTS

The responses of teachers were collected via Google Forms. The responses to various questions, when analyzed on the Likert scale, indicated that most of the teachers were satisfied with the integrated modular curriculum. As far as overall satisfaction is concerned, 33(66%) of the 50 biochemistry teachers were satisfied with this transformation from the traditional to modular approach of teaching and learning in medical education.[6] Even more teachers 41(82%) gave this system credit for improving the harmony among different departments. When the relevance of biochemistry with clinical topics was evaluated, 44(88%) of the 50 facilitators agreed, and none of the faculty members thought there was no relevance between the biochemical content taught in a module to the clinical subjects. Approximately 35 (70%) teachers agreed that the integrated modular curriculum has increased the research culture among health professionals. Also, 31 (62%) teachers comprehended that the communication skills of students have been refined with the introduction of the novel system 33(66%) of our respondents claimed that the practical included in the modular system corresponded well with the theoretical contents of each module. Regarding OSPE and OSVE as assessment tools, 35 respondents (more than 70%) agreed to this format of practical and viva examination for undergraduate medical students. Some of the faculty members were not satisfied, as 12 respondents claimed disagreement and 9 remained neutral.

However, the response to some of the questions highlighted the demerits of this system. The framing of time tables to meet the allocated hours for an increased number of subjects was a hard task, as thought by 29(58%) of the teachers. 41 and 40 (approximately 80%) respondents respectively thought there is need to modify the content and the specific learning objectives of the subject of biochemistry.

A comparison between two survey questions regarding overall satisfaction and interdepartmental interactions was done on IBM SPSS software using chi square. A strong association was found between the two variables.

A similar chi square analysis was done using the same software by comparing the responses to the question regarding increased interdepartmental interactions to those of framing of the time tables for integrated modular curriculum. The results indicated a strong correlation between the two parameters.

Table 1: Pros of the integrated modular curriculum

Questions	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
Do you find the integrated modular curriculum in medical teaching satisfactory?	6(11.5)	27(51.9)	11(21.2)	5(9.6)	1(1.9)
Does studying Biochemistry in the integrated modular curriculum enhance interdepartmental interactions?	13(25)	28(53.8)	4(7.7)	5(9.6)	0
Do you think the integrated modular curriculum has helped connect Biochemistry with clinical subjects?	16(30.8)	28(53.8)	4(7.7)	2(3.8)	0
Do you think that teaching biochemistry in the integrated modular curriculum is helpful in research?	6(11.5)	29(55.8)	6(11.5)	9(17.3)	1(2.4)
Do you think that modular integrated curriculum has enhanced the development of communication skills?	7(13.5)	24(46.2)	12(23.1)	6(11.5)	1(1.9)
Do you think that biochemistry practicals included in integrated modular curriculum collaborate with the theory content?	4(7.7)	29(55.8)	8(15.4)	8(15.4)	1(1.9)
Are you satisfied with OSVE as an assessment tool in Biochemistry in the integrated modular curriculum?	4(7.7)	25(48.1)	9(17.3)	10(19.2)	2 (3.8)
Are you satisfied with OSPE as an assessment tool in Biochemistry in the integrated modular curriculum?	6(11.5)	29(55.8)	5(9.6)	7(13.5)	3(5.8)

Table 2: Cons of the integrated modular curriculum

Questions	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
Do you think framing of the time tables for integrated modular curriculum is a time consuming task?	13(25)	16(30.8)	15(28.8)	6(11.5)	0
Do you think there is need to modify the content of biochemistry in integrated modular curriculum?	18(34.6)	23(44.2)	7(13.5)	2(3.8)	0
Do you think that specific learning objectives of medical biochemistry in integrated modular curriculum need modification?	18(34.6)	22(42.3)	6(11.5)	4(7.7)	0

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	77.040[a]	20	.000
Likelihood Ratio	35.393	20	.018
N of Valid Cases	50		

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	58.193[a]	16	.000
Likelihood Ratio	23.837	16	.093
N of Valid Cases	50		

Figure 1: Association of interdepartmental interactions with level of satisfaction

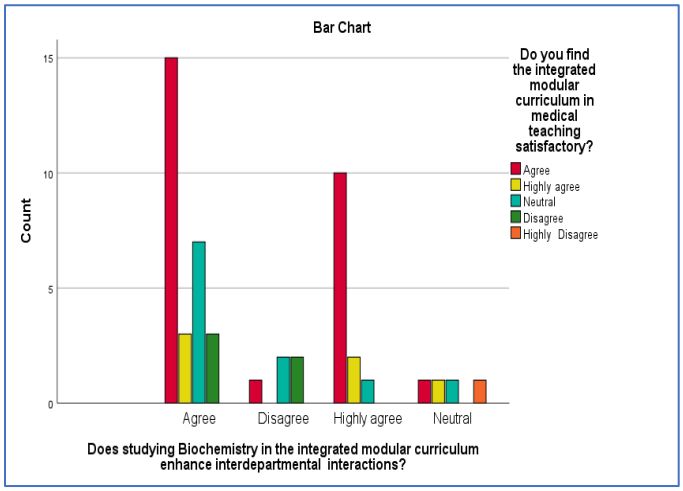
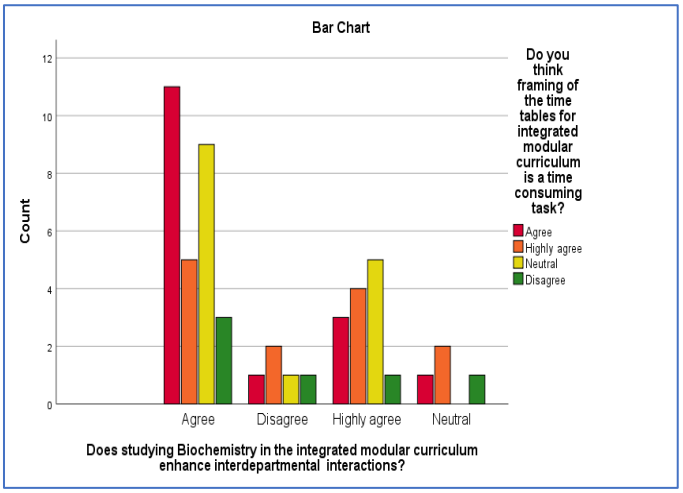


Figure 2: Association of interdepartmental interactions with difficulty in framing of time tables



DISCUSSION

The medical curriculum needs to undergo continuous development to meet international standards. Around the globe, the medical curriculum has shifted towards a modular disease-oriented approach, although there is diversity among the approaches used by various institutes.[7] The formation of the World Federation for Medical Education (WFME) in 1972 by the World Medical Association (WMA) and the World Health Organization (WHO) has greatly promoted this transformation of curriculum and novel learning and teaching methodologies. In this perspective, the University of Health Sciences, has introduced the integrated modular curriculum 2k23, followed by a second version. A third version of this curriculum has now been received. This curriculum has been implemented in all affiliated medical colleges of UHS. This has led to fundamental changes to the teaching style and social structure of these institutes. The learning process has become deeper and more applicable with increased interdisciplinary interactions.

Teachers teaching this curriculum must shift from this stage to a more student-centered approach. This was discussed by Nawabi S *et al*, that the role of teachers in modern medical education is not only as information providers but also as role models and academic advisors.[8] The need for time is that every medical educator must be well acquainted with their 12 roles as outlined by Harden and Crosby.[9,10] Thus, the need to explore the perception of teachers, who are one of the major stakeholders, was duly felt. Our study focused on the biochemistry faculty only. Biochemistry, taught as a major subject to first-year and second-year medical students, is now integrated with other basic and clinical subjects to enhance the understanding of normal body processes as well as the disease state. It was found that overall, 64% of the teachers were satisfied with this novel curriculum, which is based on spiral integration.

A study conducted by Asad M & Khaliq T proved that the integrated approach is warmly welcomed by the teachers(88%), and they think it will be helpful in generating professional and clinical skills in doctors.[11] Most of the teachers found this curriculum helpful in promoting interdepartmental interaction(82%) and improving communication skills(62%).[12] Also, the participants thought that the content of biochemistry is very well integrated with clinical subjects(88%). In addition, 66% of the teachers appreciated the relevance of the theoretical contents to the practical included in the curriculum. 70% of the assessors agreed to use OSPE and OSVE as assessment tools. Radke SA *et al*, wrote that OSPE can be favored as an assessment method as it can involve cognitive and psychomotor domains and is more effective.[13]

On the other hand, 80% of participants suggest some reforms in the curriculum regarding the contents and learning objectives of biochemistry. Also, the shift to an integrated curriculum has burdened the faculty in terms of time management (58%). This was also discussed by Raza Zaidi SH *et al* in a mixed-method study; the participants stated that the burden has tremendously increased with the introduction of the integrated modular curriculum.[14]

In the current study, an independent chi-square test performed on IBM SPSS software examined the relationship of the overall satisfaction level of the faculty with the integrated modular curriculum and their perception regarding interdepartmental interactions. The analysis revealed a significant association between these variables. This advocates that faculty members who perceived improved interdepartmental relationships were also more likely to report higher overall satisfaction with the curriculum. This finding aligns with existing literature emphasizing that effective collaboration among departments is a critical facilitator for successful curriculum integration. A similar statistical analysis was done using the two variables: difficulty in framing timetables and interdepartmental interactions. The analysis demonstrated a strong correlation between these two variables. This suggests that faculty who considered increased interactions across departments as an advantage of the integrated modular curriculum thought that framing a timetable for the same curriculum was a difficult task. Sadiq N *et al* carried out similar research involving senior faculty members who expressed their dissatisfaction and complained about the lack of faculty development programs, teamwork, and interdepartmental communications, which are a must for an integrated modular curriculum.[15] As studied by Cheema KM *et al*, the teachers think that there is a need of suitable workshops and training sessions for the faculty for the correct implementation of the integrated modular curriculum.[16]

CONCLUSION

Thus, it has been concluded in our study that the merits and demerits of the integrated modular curriculum stand together on the podium. This curriculum is rightly introduced to produce a seven-star doctor, but the teacher's perspective is equally important. Generally, the teachers are comfortable with this innovation, but some reforms are, however, needed. Workshops must be arranged to prepare the faculty for this transition, and further studies must be carried out to be acquainted with the teachers' feedback. Systematic faculty development programs and periodic feedback mechanisms should be employed to optimize the implementation of the integrated medical curriculum.

LIMITATIONS

The limited number of subject specialists involved in teaching an integrated curriculum is a hindrance. The short period of three years in which the integrated curriculum has been taught under UHS is also a limiting factor in our research.

SUGGESTIONS / RECOMMENDATIONS

Regular Faculty training workshops must be organized. Review and improvement of the curriculum must be done regularly. Feedback from faculty and students taken at the end of each block may be beneficial in this regard.

CONFLICT OF INTEREST / DISCLOSURE

There was no conflict of interest.

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