

# Impact of Integrated Modular Pharmacology Curriculum on Undergraduate Medical Student's Performance

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## ABSTRACT

**Background:** Continuous efforts to reform health profession are being exercised around the world through change in medical curriculum. Gradual shift of medical teaching towards integration of basic and clinical subjects is a need of time. However, the impact of this change on students' performance is yet not defined completely.

**Aim:** To compare pharmacology final professional result status & mean score of undergraduate medical students taught by integrated and conventional curriculum.

**Methods:** This observational, cross-sectional study was conducted on 305 undergraduate medical students of Azra Naheed Medical College. Students who were educated & assessed by two different teaching system were noted and compared. Result status and exam score of Final term examination in Pharmacology subject were noted and compared. Data were analyzed using SPSS 22. Chi-square test and was applied for statistical significance, and p-value <0.05 was considered significant.

**Results:** The study reflects that 55% of students are male while 45% are female. Our study indicates statistically significant higher passing percentage and exam score of students belonging to integrated modular system compared to conventional teaching system i.e., (98% Vs 89%) and (204.98±1.45 vs 188.04 ±2.45). Also, the curriculum design and result status were significantly associated with each other (Pearson chi square P-value 0.003).

**Conclusion:** Undergraduate medical students performed better under integrated modular system than conventional teaching.

**MeSH words:** Integrated modular curriculum, Traditional medical curriculum, Assessment score, medical education,

## INTRODUCTION

Medical education experts aim to produce medical graduates with the best clinical and communication skills. The medical degree has now been reinvented because of the high level of professional skills and research in the medical profession. Continuous efforts to reform medical education are being attempted around the world<sup>1</sup>. In this context, different types of curricula have been adopted according to requirement of medical graduates<sup>2</sup>.

In traditional curriculum of MBBS, students learn passively by didactic lectures, and assessment is taken at the end of the year. The students are unable to interlink the concepts of a particular topic with other subjects<sup>3</sup>. In the end, it becomes the sole responsibility of students to correlate all the knowledge gained in different subjects to apply for the final diagnosis and treatment of patients. Abraham Flexner, An education reformer, has criticized the current status of conventional teaching methods for mere fact memorization and recall. He also commended the need to improve medical education in South Asia<sup>4</sup>.

In contrast an integrated curriculum is about connecting academic knowledge with practical things. Different disciplines organize and integrate a concept to be learned around by students<sup>5</sup>. It has been concluded that the retention of knowledge and clinical applicability of the basic sciences would be enhanced by an integrated teaching method<sup>6,7,8</sup>. Many authors are of the view that an integrated curriculum not only helps in building concepts but side by side it may include superficial learning of basic sciences if its clinical counterpart is given more weightage<sup>9</sup>.

Previously only two medical institutes in Pakistan were providing modular integrated teaching systems, The Agha Khan and Ziauddin University Karachi. In the past few years, there have been trends to include problem-based learning and integrated teaching in health care setup in Pakistan<sup>10</sup>. In lieu of this, Pakistan Medical Commission has put stress on producing the best quality professionals in the light of modern scenario. It has now emphasized on need-based curriculum that stimulates student learning styles to make them community-oriented health care providers<sup>11</sup>.

Azra Naheed Medical College (A constituent college of the Superior University), was established in 2011 in Lahore<sup>12</sup>. The institute continues to offer quality medical education to its undergraduate and postgraduate medical students by offering an innovative and tailored curriculum through best teaching and learning practices. Since its inception, the conventional medical curriculum has been taught for the whole five years duration of MBBS studies followed by clinical rotations. However, an effective integrated curriculum has been introduced a few years back with curriculum content being spirally integrated with the coordination of basic and clinical departments.

The faculty of all the disciplines are involved in the curriculum development of particular modules including teaching, learning and assessment techniques. To support the deep learning of a particular topic from different aspects, horizontal integration is planned among the basic sciences subjects. However, in vertical integration, clinical subjects are incorporated during the basic sciences phase of the curriculum in the early years<sup>13,14</sup>.

This revolutionary shift in the curriculum would not only meet the requirement of global medical education standards but would also play a role in patient-oriented care in health care organizations<sup>15</sup>. To accommodate modern trends, several new modalities have also been adopted at our institute including problem-based learning, integrated seminars, student-directed learning, small group discussions, and formative assessments<sup>16,17</sup>.

The impact of launching an integrated modular curriculum on students' academic performance had not been evaluated at Azra Naheed Medical College in previous years. The present study was aimed to compare the assessment score of students in modular integrated and conventional curriculum in the subject of Pharmacology.

The objective of the study was to determine pharmacology final professional result status and assessment scores of undergraduate medical students exposed to the integrated and conventional curriculum.

## METHODOLOGY

This cross-sectional, retrospective comparative study<sup>18</sup> was conducted at Pharmacology Department, Azra Naheed Medical College, Lahore for a duration of 2 months from April-May 2022 after getting approval from Institutional Ethical Committee. The

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project was initiated after approval from the Institutional Review Board Committee of Superior University.

**Study Population:** We included 3<sup>rd</sup> year MBBS students of session 2019–2020 and 2020-2021 as study population (n=305).

**Sampling technique:** Total 305 students were included in the study by census sampling. Group A consisted of 168 students (Traditional curriculum group) while group B students were educated by integrated modular system (n=137).

**Variables:** The data of 3<sup>rd</sup> Professional MBBS examination result 2019-2020 and 2020-2021 was taken from the student affair/pharmacology department. Total marks in pharmacology subject (Quantitative variable) and result status (Qualitative variable) were noted<sup>19</sup>.

**Statistical Analysis:** Data were analyzed using SPSS version 22. Descriptive statistics like percentages were calculated for categorical variable. Chi-square test for independence was applied to see the relation of two categorical variables i.e., curriculum design and student's performance in final term exams. While Quantitative variable i.e., total marks was compared between the groups using independent sample t-test. p-value <0.05 was considered statistically significant at 95% confidence interval.

**RESULTS**

The demographic parameters showed that the mean age of study population is 20±2.45 years. Out of 305 students, 168(55%) were male while 137(45%) were female shown in figure 1. Our results also showed that Group B students (n=137) have more passing percentage than group A (n=168) i.e., (98% Vs 89%) and it was found to be significantly different from each other. Moreover, the two variables i.e., curriculum design and result status were significantly associated with each other (Pearson chi square P-value 0.003) (Table 1, Fig 2). We concluded that the Mean exam score of group B, (integrated modular system cohorts) 204.98±1.4 was significantly higher than group A (Traditional curriculum cohorts) 188.04 ±2.45 with P value <0.001 (Table 2).

Table 1: Depicting Result status of group A and B students

	Pass	Fail
Group A (Conventional teaching system)	150	18
Group B (Integrated Modular system)	134	3

P value (Pearson chi square 2-sided) 0.003

Table 2: Total marks in pharmacology final examination of group A and B students

	Mean ± S.E.M	P-value (Independent sample t-test (2-tailed))
Group A (Conventional teaching system)	188.04 ±2.45	
Group B (Integrated Modular system)	204.98±1.45	

Fig 1: Gender percentage of Group A and B students

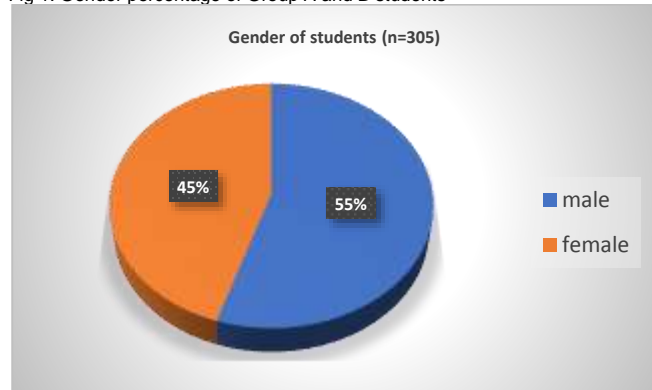
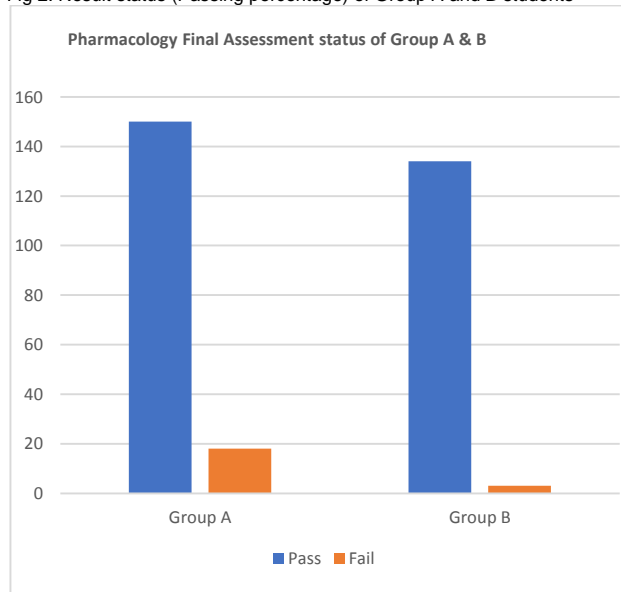


Fig 2: Result status (Passing percentage) of Group A and B students



**DISCUSSION**

The need for initiation of integrated teaching as policy is a demand from various academicians in Pakistan and elsewhere. There is a need of structured module based integrated curriculum, based on body organ or system which is taught by multidisciplinary faculty. The curriculum and process should be reviewed by the faculties periodically to make changes based on previous experience<sup>20</sup>.

Our study results clearly indicated that students who were educated by integrated modular system, scored better than the students who were educated by conventional system. Moreover, their passing percentage was also significantly better than the other group. Student centered learning, integration of basic and clinical subjects and frequent small group problem-based discussions may have added to the better results of our students taught by integrated modular curriculum. This finding is in line with a previous study conducted at a medical college in India in 2016 where two cohorts of 2<sup>nd</sup> year MBBS students were evaluated in terms of exam scores. One group was taught by integrated teaching while other was exposed to traditional teaching. Mean score of pre and post-test was noted and Integrated teaching cohort score was found to be better in than traditional group<sup>5</sup>.

Interestingly our study findings do not correspond to a previous research conducted at Liaquat National medical college, in 2017-18, where both student groups did not produce any significantly different mean assessment score in various subjects of undergraduate medical subjects. The reason for this conflicting result might be the small sample size of students enrolled in that study<sup>20</sup>.

This research project revealed that the learning by integrated teaching has potential to improve the knowledge, skills, and comprehensive learning despite the fact that the students and faculty find it exhaustive. We need to put more efforts to make it more interesting and interactive hence that students should not lose interest during integrated teaching sessions. If the planning and implication of integrated teaching are done properly, it may lead to better learning outcomes. This might be useful to improve their professional skills and to be a better-qualified health professional.

**Limitation of Study:** Regarding study design, Assessment of only one subject of the medical sciences, i.e., Pharmacology, was included in our study. For comparison of curriculum, teaching methodologies, and its impact on assessment, it is suggested to use the same methodology for multiple subjects. This should be

kept in mind before generalizing the findings of this study to other specialties.

## CONCLUSION

We concluded that students educated by integrated modular system had better performance in final term exams than the ones educated by traditional system. Ours is one of the fewest studies reporting impact of integrated medical curriculum on Students' performance conducted in Pakistan. Therefore, we believe this study could provide insight into this type of curriculum, including its benefits and challenges.

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**Disclaimer:** No

## REFERENCES

- Kanter MH, Nguyen M, Klau MH, Spiegel NH, Ambrosini VL. What does professionalism mean to the physician? *Perm J*. 2013;17(3):87-90. doi:10.7812/TPP/12-120
- Dubin B. Innovative Curriculum Prepares Medical Students for a Lifetime of Learning and Patient Care. *Mo Med*. 2016;113(3):170-173.
- Vare V, Kurle D, Bagle T, Hire R, Shukla A. Evaluation of teaching methods in pharmacology among MBBS students. *Int. J. Basic Clin. Pharmacol*. 2017 Jun;6:1352-7.
- Amin Z, Burdick WP, Supe A, Singh T. Relevance of the Flexner Report to contemporary medical education in *South Asia. Acad Med*. 2010;85:333-9.
- Yadav PP, Chaudhary M, Patel J, Shah A, Kantharia ND. Effectiveness of integrated teaching module in pharmacology among medical undergraduates. *Int J Appl Basic Med Res*. 2016;6(3):215-219. doi:10.4103/2229-516X.186962
- Kulasegaram, K.M.; Chaudhary, Z.; Woods, N.; Dore, K.; Neville, A.; Norman, G. Contexts, concepts and cognition: Principles for the transfer of basic science knowledge. *Med. Educ*. 2017, 51, 184-195.
- Desy, J.; Busche, K.; Cusano, R.; Veale, P.; Coderre, S.; McLaughlin, K. How teachers can help learners build storage and retrieval strength. *Med. Teach*. 2017, 40, 407-413.
- Harden, R.M.; Stamper, N. What is a spiral curriculum? *Med. Teach*. 1999, 21, 141-143.
- Rahim A, Iqbal K. parameters assessed for quality and management of the modular system by the students of first and second-year MBBS. *Khyber Med Univ J*. 2013; 5:86-90.
- Sandila MP, Siddiqui NA, Bawa MT, Huda N. An integrated curriculum for MBBS. *J-pak med assoc*. 2001 Feb 1;51(2):60-2.
- Jawaid SA. Proceedings of National Medical Conference organized by Azra Naheed Medical College in collaboration with Pakistan Aspirin Foundation (April 28<sup>th</sup> 2018). *Pak J Med Sci*. 2018;34(4):1043-1050. doi:10.12669/pjms.344.15905
- AZRA NAHEED MEDICAL COLLEGE: (n.d.). Data accessed from <https://anmc.superior.edu.pk/> on 6-8-22
- Vygotsky LS. *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press; 1980.
- Alrasheedy AA. Multidisciplinary Integrated Pharmacotherapy Curriculum in a Doctor of Pharmacy Program: Educators' Perceptions, Views, and Perspectives. *Journal of medical education and curricular development*. 2020 Jan; 7:2382120519897279.
- McHugh D, Yanik AJ, Mancini MR. An innovative pharmacology curriculum for medical students: promoting higher order cognition, learner-centered coaching, and constructive feedback through a social pedagogy framework. *BMC med edu*. 2021 Dec;21(1):1-8.
- Bradley, P, Mattick, K. Integration of basic and clinical sciences—AMEE 2008. UK: Peninsula College of Medicine and Dentistry; 2008. <https://amee.org/getattachment/Conferences/AMEE-Past-Conferences/AMEE-Conference-2008/Introduction-to-Medical-Education-Bradley-Mattick.pdf>. Accessed June 12, 2018.
- Harwood KJ, McDonald PL, Butler JT, Drago D, Schlumpf KS. Comparing student outcomes in traditional vs intensive, online graduate programs in health professional education. *BMC medical education*. 2018 Dec;18(1):1-9.
- Gurpinar, E., Musal, B., Aksakoglu, G., & Ucku, R. (2005). Comparison of knowledge scores of medical students in problem-based learning and traditional curriculum on public health topics. *BMC medical education*, 5(1), 7. <https://doi.org/10.1186/1472-6920-5-7>
- Haranath PS. Integrated teaching in medicine – Indian scene. *Indian J Pharmacol* 2013;45:1- 3.
- Uneeb SN, Zainab S, Khoso A, Basit A. Knowledge scores in annual and modular curriculum among medical students from Karachi, Pakistan. *Journal of the Pakistan Medical Association*. 2021 Jan 15;71(2):681-5.