

## RESEARCH ARTICLE

# Comparative study between academic performances of traditional versus competency-based medical education M.B.B.S. curriculum students in Pharmacology

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Received: September 01, 2022; Accepted: October 02, 2022

## ABSTRACT

**Background:** The new competency-based undergraduate curriculum (CBME) was implemented in India from the academic year 2019. However, there has been no clear-cut comparison on its effect on the academic performance of the students. **Aim and Objective:** This study aims to find the comparison between students of traditional and CBME curriculum in the subject of pharmacology based on their academic parameters. It also aims to establish comparison and correlation of academic performance with gender, home place area, and mode of learning used. We also aim to determine whether objective parameters like multiple choice question (MCQ) section of preliminary examination show any correlation with final university examination performance. **Materials and Methods:** This is a cross-sectional type of study. Seventy-seven students from traditional old curriculum and 98 students from CBME new curriculum batches participated with informed consent. The data for analysis between old and new curriculum batches were done using the mark obtained in final university examination in the subject of pharmacology. Quantitative parameters, that is, total marks overall, total theory marks, total marks in practical and oral viva combined, total marks in internal assessment and MCQ marks of preliminary examination, and qualitative variables such as gender of the student, home place area, that is, rural or urban and mode of learning used (physical or physical and digital) were obtained from the participants. IBM-SPSS version 25 software was used to perform descriptive statistics, independent *t*-tests, and Pearson's correlation. **Results:** The results clearly demonstrate that the old curriculum batch of 2018 performed better than 2019 in overall as well as practical aspects of the subject. Pearson's correlation between all the quantitative parameters, that is, total marks overall, total theory marks, total marks in practical and oral viva combined, total marks in internal assessment, and MCQ marks of prelims for the batch of 2019 showed positive correlation with each other. **Conclusions:** This study concludes that the old curriculum batch performed better than new curriculum batch in the subject of pharmacology. MCQ examination held in offline mode helps in better correlation with final university results as compared to online mode.

**KEY WORDS:** New Curriculum; Academic; CBME; Pharmacology; Comparison

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Website: [www.njppp.com](http://www.njppp.com)

DOI: 10.5455/njppp.2023.13.09461202202102022

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## INTRODUCTION

The new competency-based undergraduate curriculum was implemented in India from the academic year 2019. Various experts in the field have appraised<sup>[1,2]</sup> as well as criticized the changes brought forward by this.<sup>[3,4]</sup> However, there has been no clear-cut comparison on its effect on the academic

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performance of the students.<sup>[5]</sup> Since these students are the future physicians of India, it is highly imperative to find out flaws and make improvements in this curriculum at early stages.<sup>[6]</sup> In this novel study, we aimed to find out the comparison between students of old and new curriculum in the subject of Pharmacology based on their academic parameters. The study also aims to establish comparison and correlation of academic performance with gender, home place area, and mode of learning used. We also aim to determine whether objective parameters such as multiple choice question (MCQ) section of preliminary examination shows any correlation with final university examination performance.

## MATERIALS AND METHODS

The data for analysis between old and new curriculum batches were done using the marks obtained in final university examination in the subject of pharmacology. The old curriculum batch was selected as 2018 batch which appeared in Winter-2020 examination. The new curriculum batch was selected as 2019 batch which appeared in Winter-2021 examination. Ethics approval GMCJ/IEC Approval/087/2022 was obtained from the Institutional Ethics Committee before starting the study. The data were collected from both the batches using form [Table 1] on the following parameters of the subject of pharmacology:

1. Total marks overall.
2. Total marks in theory
3. Total marks in practical and oral viva combined
4. Total marks in internal assessment.

Other qualitative variables include gender of the student, home place area, that is, rural or urban and mode of learning used (physical or physical and digital). To compare performance of student in internal assessment examination with university examination, we chose an objective parameter, that is, marks obtained in MCQ section of preliminary examination of both the batches.

Informed consent was obtained from the participants. Seventy-seven students from 2018 and 98 students from 2019 batches submitted the forms. The collected data were analyzed using IBM-SPSS version 25 software. All the marks were converted into respective percentages to allow for better comparison because the maximum marks obtainable are different for both the batches. Since we are comparing same variables from two different groups, independent t-test was performed. Pearson's correlation was also used to find correlation between all the quantitative parameters, that is, total marks overall, total theory marks, total marks in practical and oral viva combined, total marks in internal assessment, and MCQ marks of prelims.

For performing independent t-test, two workflow operations were designed. We compared the parameters based on

first, total marks overall and second, and practical and oral viva marks combined, so that a fair idea between overall performance and practical performance is obtained. Same comparisons were performed in both the workflows which are listed in Table 2.

## RESULTS

The results obtained from the workflows were analyzed and noted. The mean, standard deviation, and standard error mean were noted. Only the significant results ( $P < 0.05$ ) are shown in Tables 3 and 4 to help in better interpretation. Descriptive statistics and Pearson's correlation performed on quantitative variables for 2018 and 2019 batch as given in methodology are shown in Tables 5-8.

**Table 1:** Data entry form along with all the parameters

Question/parameter for entry	Data entry
General parameters	
Batch	2018/2019
Gender	Male/Female
Home place area	Urban/Rural
Mode of learning	Physical/Physical and Digital
University Results	
Total Marks overall	
Total marks in theory	
Total marks in practical and oral viva combined	
Total marks in internal assessment	

**Table 2:** Comparisons performed between various parameters in the two workflows. One workflow based on total marks overall and second workflow based on practical and oral viva marks combined

Comparison performed
2018 versus 2019
2018 – male versus female
2019 – male versus female
2018 and 2019 combined – male versus female
Female – 2018 versus 2019
Male – 2018 versus 2019
Rural – 2018 versus 2019
Urban – 2018 versus 2019
2018 – urban versus rural
2019 – urban versus rural
2018 and 2019 combined – urban versus rural
2018 and 2019 combined – physical versus physical and digital
2018 – physical versus physical and digital
2019 – physical versus physical and digital
Physical and digital – 2018 versus 2019
Physical – 2018 versus 2019

**Table 3:** Comparisons based on total marks overall

Variables	Results obtained		
	Mean	S.D	Std. error mean
2018 versus 2019			
2018	75.8612	5.49980	0.62676
2019	66.2863	7.31897	0.73933
2018 – male versus female			
Male	NS	NS	NS
Female	NS	NS	NS
2019 – male versus female			
Male	64.3846	5.29389	0.68921
Female	69.1633	8.93599	1.43090
2018 and 2019 combined – male versus female			
Male	68.8246	8.23707	0.85414
Female	72.3985	7.57617	0.83665
Female – 2018 versus 2019			
2018	75.3328	4.46274	0.68056
2019	69.1633	8.93599	1.43090
Male – 2018 versus 2019			
2018	76.5294	6.59469	1.13098
2019	64.3846	5.29389	0.68921
Rural – 2018 versus 2019			
2018	75.8782	5.88192	1.25403
2019	65.6300	6.06937	0.98458
Urban – 2018 versus 2019			
2018	75.8544	5.39596	0.72759
2019	66.7020	8.03205	1.03693
2018 – urban versus rural			
Urban	NS	NS	NS
Rural	NS	NS	NS
2019 – urban versus rural			
Urban	NS	NS	NS
Rural	NS	NS	NS
2018 and 2019 combined – urban versus rural			
Urban	NS	NS	NS
Rural	NS	NS	NS
2018 and 2019 combined – physical versus physical and digital			
Physical	65.7255	7.54446	1.31332
Physical and digital	71.6087	7.85497	0.65917
2018 – physical versus physical and digital			
Physical	71.1330	6.55310	2.07227
Physical and digital	76.5669	5.00821	0.61185
2019 – physical versus physical and digital			
Physical	NS	NS	NS

(Contd...)

**Table 3:** (Continued)

Variables	Results obtained		
	Mean	S.D	Std. error mean
Physical and digital	NS	NS	NS
Physical and digital – 2018 versus 2019			
2018	76.5669	5.00821	0.61185
2019	67.1793	7.28366	0.84104
Physical – 2018 versus 2019			
2018	71.1330	6.55310	2.07227
2019	63.3743	6.79359	1.41656

All values are in percentage. NS denotes not significant values. Independent t-tests have been performed for all comparisons. All values have  $P < 0.05$

**Table 4:** Comparisons based on practical and oral viva marks combined

Variables	Results obtained		
	Mean	Std. dev.	Std. error mean
2018 versus 2019			
2018	81.1688	5.49498	0.62621
2019	78.5000	5.10357	0.51554
2018 – male versus female			
Male	NS	NS	NS
Female	NS	NS	NS
2019 – male versus female			
Male	NS	NS	NS
Female	NS	NS	NS
2018 and 2019 combined – male versus female			
Male	NS	NS	NS
Female	NS	NS	NS
Female – 2018 versus 2019			
2018	NS	NS	NS
2019	NS	NS	NS
Male – 2018 versus 2019			
2018	81.5441	6.48468	1.11211
2019	77.9322	4.65671	0.60625
Rural – 2018 versus 2019			
2018	83.0682	4.68863	0.99962
2019	78.0263	5.87936	0.95376
Urban – 2018 versus 2019			
2018	NS	NS	NS
2019	NS	NS	NS
2018 – urban versus rural			
Urban	NS	NS	NS
Rural	NS	NS	NS
2019 – urban versus rural			
Urban	NS	NS	NS

(Contd...)

**Table 4: (Continued)**

Variables	Results obtained		
	Mean	Std. dev.	Std. error mean
Rural	NS	NS	NS
2018 and 2019 combined – urban versus rural			
Urban	NS	NS	NS
Rural	NS	NS	NS
2018 and 2019 combined – physical versus physical and digital			
Physical	77.2727	6.00012	1.04449
Physical and digital	80.2324	5.15149	0.43230
2018 – physical versus physical and digital			
Physical	NS	NS	NS
Physical and digital	NS	NS	NS
2019 – physical versus physical and digital			
Physical	NS	NS	NS
Physical and digital	NS	NS	NS
Physical and digital – 2018 versus 2019			
2018	81.7910	5.07157	0.61959
2019	78.8400	4.84361	0.55929
Physical – 2018 versus 2019			
2018	NS	NS	NS
2019	NS	NS	NS

All values are in percentage. NS denotes not significant values.  
Independent *t*-tests have been performed for all comparisons. All values have  $P < 0.05$

**Table 5: Descriptive statistics for batch 2018**

Variables	Mean	Std. Deviation	N
Total marks overall	75.8612	5.49980	77
Practical and oral viva combined	81.1688	5.49498	77
Theory marks	71.9318	7.43266	77
Internal assessment marks	79.4800	4.36098	77
MCQ preliminary marks	94.2370	5.26988	77

All values are in percentage

**Table 6: Descriptive statistics for batch 2019**

Variables	Mean	Std. Deviation	N
Total marks overall	66.2863	7.31897	98
Practical and oral viva combined	78.5000	5.10357	98
Theory marks	59.5459	7.53483	98
Internal assessment marks	67.7551	18.23296	98
MCQ preliminary marks	59.6842	11.32359	95

All values are in percentage

2018 batch performed better than 2019 batch. However, no other home place area comparison was found significant. Students who used physical as well as digital resources for learning performed better overall than those who used on physical resources. These workflows clearly demonstrate that the old curriculum batch of 2018 performed better than 2019 in overall as well as practical aspects of the subject. Pearson's correlation between all the quantitative parameters, that is total marks overall, total theory marks, total marks in practical and oral viva combined, total marks in internal assessment, and MCQ marks of prelims for the batch of 2019 showed positive correlation with each other [Figure 1]. However, for the 2018 batch, the marks obtained in the MCQ preliminary examination did not show correlation with any other university data variables. This might be attributable to the fact that the preliminary examination of 2018 batch was held online while that of 2019 batch was held in offline mode. This ensures better security and reliability of the results for extrapolation.

The results for performance difference between urban and rural students were found insignificant in our study in contrast to a study where rural students performed better than urban students.<sup>[7]</sup> The results for performance difference in overall score between female and male students were found significant in our study in contrast to a study where female students performed similarly like male students.<sup>[8]</sup>

This is the first study of its kind which bring about the actual comparison between the two curriculums. It will help in identifying areas of changes which can be implemented in the early stages through policy changes. This study provides a large-scale comparison between the two batches. However, we have not factored in the time for preparation and have not performed matching between the two groups.

## DISCUSSION

When total marks overall in pharmacology were considered in the first workflow, the following results were obtained. 2018 batch performed better than 2019 batch. Females of 2019 batch performed better than their male counterparts. However, no such comparison was found in 2018. If the data of both batches are combined, females performed better. Females and males of 2018 batch performed better than 2019 counterparts, respectively. Students from rural and urban home place of 2018 batch performed better than 2019 batch. However, no such significant comparison on home place areas was found within the batches themselves. Students who used physical as well as digital resources for learning performed better overall than those who used on physical resources. Similar result was seen in 2018 batch but not in 2019 batch. When practical and oral marks combined in pharmacology were considered in the second workflow, the following results were obtained. 2018 batch performed better than 2019 batch. While males of 2018 batch performed better than 2019 batch, no other gender based comparison was found significant. Rural students of

**Table 7: Correlation statistics for batch 2018**

Variables	Total marks overall	Practical and oral viva combined	Theory marks	Internal assessment marks	MCQ preliminary marks
Total marks overall					
Pearson Correlation	1	0.760**	0.957**	0.689**	0.064
Sig. (2-tailed)		0.000	0.000	0.000	0.581
N	77	77	77	77	77
Practical and oral viva combined					
Pearson Correlation	0.760**	1	0.579**	0.543**	0.158
Sig. (2-tailed)	0.000		0.000	0.000	0.171
N	77	77	77	77	77
Theory marks					
Pearson Correlation	0.957**	0.579**	1	0.529**	0.002
Sig. (2-tailed)	0.000	0.000		0.000	0.987
N	77	77	77	77	77
Internal assessment marks					
Pearson Correlation	0.689**	0.543**	0.529**	1	0.136
Sig. (2-tailed)	0.000	0.000	0.000		0.237
N	77	77	77	77	77
MCQ preliminary marks					
Pearson Correlation	0.064	0.158	0.002	0.136	1
Sig. (2-tailed)	0.581	0.171	0.987	0.237	
N	77	77	77	77	77

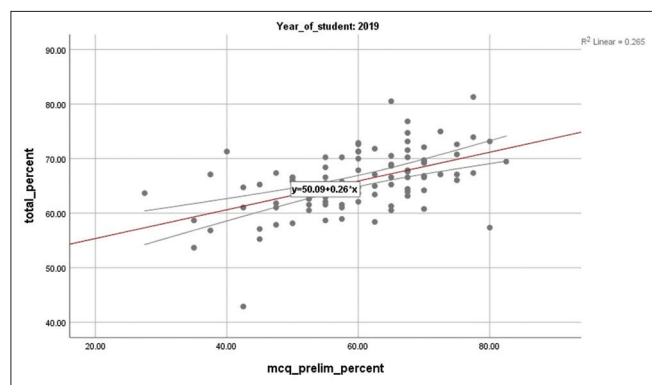
\*\*Correlation is significant at the 0.01 level (2-tailed). Significant values are marked with\*\*

**Table 8: Correlation statistics for batch 2019**

Variables	Total marks overall	Practical and oral viva combined	Theory marks	Internal assessment marks	MCQ preliminary marks
Total marks overall					
Pearson Correlation	1	0.611**	0.848**	0.818**	0.515**
Sig. (2-tailed)		0.000	0.000	0.000	0.000
N	98	98	98	98	95
Practical and oral viva combined					
Pearson Correlation	0.611**	1	0.461**	0.344**	0.360**
Sig. (2-tailed)	0.000		0.000	0.001	0.000
N	98	98	98	98	95
Theory marks					
Pearson Correlation	0.848**	0.461**	1	0.426**	0.437**
Sig. (2-tailed)	0.000	0.000		0.000	0.000
N	98	98	98	98	95
Internal assessment marks					
Pearson Correlation	0.818**	0.344**	0.426**	1	0.534**
Sig. (2-tailed)	0.000	0.001	0.000		0.000
N	98	98	98	98	95
MCQ preliminary marks					
Pearson Correlation	0.515**	0.360**	0.437**	0.534**	1
Sig. (2-tailed)	0.000	0.000	0.000	0.000	
N	95	95	95	95	95

\*\*Correlation is significant at the 0.01 level (2-tailed). Significant values are marked with\*\*





**Figure 1:** Linear correlation between total marks overall with MCQ marks of preliminary examination for the batch of 2019

A cohort study is required in the future studies to provide a better result.

## CONCLUSION

This study concludes that the old curriculum batch performed better than new curriculum batch in the subject of pharmacology. MCQ examination held in offline mode helps in better correlation with final university results as compared to online mode. The new curriculum has been praised by various experts in the field and its effect may be seen in the coming years. However, such studies must be continuously conducted to give a better and more clear picture whether the curriculum is beneficial or not.

## REFERENCES

1. Kumar S. Implementation of new curriculum in UG (MBBS): A dream project of medical education technology. *Int J Med Sc*

*Educ* 2019;6:8-12.

2. Jacob KS. Medical council of India's new competency-based curriculum for medical graduates: A critical appraisal. *Indian J Psychol Med* 2019;41:203-9.
3. Dongre AR, Chacko TV. A critical review of new competency-based curriculum for community medicine using various curricular review frameworks. *Indian J Public Health* 2019;63:362.
4. Ananthakrishnan N. Competency based undergraduate curriculum for the Indian medical graduate, the new MCI curricular document: Positives and areas of concern. *J Basic Clin Appl Health Sci* 2018;1:34-42.
5. Kotur N, Anitha MR, Sappandi N, Murthy N, Kunjathur SM, Nagaraja SB, *et al.* Impact of new MBBS curriculum on the 1<sup>st</sup> year students and burden on teaching faculty: Are we making the balance? *Indian J Physiol Pharmacol* 2021;64:S59-61.
6. Rehan HS, Banerjee I, Suranagi UD, Goyal N. Do pharmacology faculties welcome the new competency-based undergraduate curriculum? A nationwide questionnaire-based study. *Natl J Physiol Pharm Pharmacol* 2020;10:450.
7. Faisal R, Shinwari L, Mateen H. Evaluation of the academic achievement of rural versus urban undergraduate medical students in pharmacology examinations. *Asian Pac J Reprod* 2016;5:317-20.
8. Faisal R, Shinwari L, Hussain SS. Academic performance of male in comparison with female undergraduate medical students in Pharmacology examinations. *J Pak Med Assoc* 2017;67:204-8.

**How to cite this article:** Sharp K, Teli SE, Mahajan H, Sonawane R. Comparative study between academic performances of traditional versus competency-based medical education M.B.B.S. curriculum students in Pharmacology. *Natl J Physiol Pharm Pharmacol* 2023;13 (Online First). DOI: 10.5455/njppp.2023.13.09461202202102022

**Source of Support:** Nil, **Conflicts of Interest:** None declared.