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Horizontal integration in first phase MBBS curriculum – Key for better comprehension

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Abstract: *Introduction:* After the covid-19 pandemic teaching the dissection demonstration-based subjects of first year MBBS students faced a lot hurdle due to make shift policy towards online teaching methods during the pandemic, which is still preferred by most of the students. But for examination of patients, diagnosis of case and develop surgical skills anatomical knowledge is essential which can't be developed solely by virtual mode of teaching. Present study aims to find out the perception of 1st year MBBS students towards horizontal integration programme on the ground of better comprehension and reproducibility in examinations. *Materials & Methods:* A standardized structured questionnaire-based study was conducted on students of 2023-2024 batch of first year MBBS students after horizontal integration programme. All the data collected were tabulated & analyzed and compared with previous studies. *Results:* 86.83% students opined that horizontal integration is definitely better than didactic lectures & 90.53% students opined that such method of learning increased their interest towards the topic. 93.82% students opined that such integrated session helped them to understand clinical applications more clearly and 81.48% students strongly want that such sessions must be organized at frequent intervals throughout the MBBS tenure. *Conclusion:* Integrated teaching method increases interest towards a topic as it helps students to know functional correlation of a structure at a same time with structural details and its clinical importance. Integration programs are definitely helpful for better perception of the topic and always welcomed by students.

Keywords: Horizontal, Integration, Curriculum, MBBS, Anatomy.

Introduction

Medical education is revolutionizing specially after Covid-19 pandemic that too affecting the subjects of basic medical subjects of pre and paraclinical zone. Teaching and learning anatomy faced many obstacles during Covid-19 period as this subject is dissection-based learning and the preventive protective methods like social distancing and initial closures of educational institutions diverted students towards app based virtual learning mainly [1].

Besides traditional Teaching Learning by didactic lectures many other methods are also available like, Self-directed learning (SDL), Horizontal integration, Vertical integration, Computer assisted learning, Problem based learning etc [2]. After removing subject based demarcations, a topic or organ system can be taught in a single classroom or session on an integrated mode removing corresponding superimposed parts for better comprehension and understanding [2]. More specifically horizontal integration is merging topics across disciplines in same phase of MBBS course [2]. Schmidt HG et al. analyzed that student taught in integrated curriculum & problem-based methods performed better and more accurately in diagnosis of diseases compared to those who trained in conventional curriculum [3].

Dullo P et al. also reported that such integrated learning methods are always beneficial for students as such sessions increase comprehensive ability of students and encourage them to explore the content. Students always desire for such sessions as

they get definite help from integrated curricula [4]. Harden RM opined that discipline-based study at the bottom level and inter-disciplinary integration in advanced level is an effective method for proper implementation of medical curriculum [5]. Present study aims to find out the perception of 1st year MBBS students towards horizontal integration programme on the ground of better comprehension and reproducibility in examination. This study aims to fill the gap in the literature addressing the link between teaching resources and their effectiveness in fulfilling learning outcomes.

Material and Methods

Place of study: Department of Anatomy, Nil Ratan Sircar Medical College & Hospital, Kolkata, West Bengal.

Time Period: The study is performed during a period of 6 months (November, 2023 to April, 2024).

Sample Size: Minimum sample size was calculated using the following formula:

$n = Z^2 \times p \times q/e^2 = (1.96)^2 \times 0.5 \times (1–0.5)/(0.07)^2 = 196$

for a 95% confidence interval, z=1.96, p (prevalence) = 0.5 ,q = 1–p, e = margin of error-7%

So, minimum sample size has to be 196. We included 250 students studying in 1st phase MBBS in NRS Medical College. Out of 250 students 246 students responded, so statistical analysis done on n=246.

Inclusion Criteria: All the students of first phase MBBS.

Exclusion Criteria: Students who has not participate in this study due to any cause.

Sample Design: The proposed research will be a Cross sectional descriptive study.

Methods of Data Collection: A questionnaire based cross sectional descriptive study was conducted on students of 2023-2024 batch of first year MBBS students of Nil Ratan Sircar Medical College & Hospital. After taking prior approval from institutional ethical committee a standardized structured questionnaire is prepared in Google form using Likert scale and validated by subject experts from different Medical Colleges of Bengal. The topics for curricular integration were chosen after medical education unit meeting involving Department of Anatomy, Physiology, Biochemistry. It was decided that Horizontal integration will be done – Liver, Kidney, Thyroid gland as per NMC guideline (Table 1).

Table-1: Topics selected for horizontal integration

	Anatomy	Physiology	Biochemistry
Liver	Gross & microscopic anatomy of liver in brief	Synthesis of bile	Biochemical basis of lab tests in different causes of jaundice
Thyroid	Gross & microscopic Anatomy of thyroid	Regulation of thyroid hormone synthesis	Biochemical basis of thyroid profile test
Kidney	Microscopic anatomy of Kidney & blood	Acid -base balance	Acute & Chronic renal failure - lab findings

At first a combined audiovisual lecture was conducted in collaboration of faculties of 3 basic science, Anatomy, Physiology & Biochemistry. After completion of curricular integration program, the purpose of our study were disclosed to all the students and then google form based questionnaire link was shared with the students through email and WhatsApp. The students were instructed to fill up the questionnaire and submit. Those who has submitted the response file was considered as gave informed consent.

Study Tools: Standardized structured self-completed questionnaire.

Validation: By Faculty members of Department of Anatomy of different Medical Colleges of Bengal.

Data Analysis: All the data were stored in principal investigators Google form drive. Data that were collected by google form was stored in Microsoft Excel sheet, were

downloaded & then tabulated. Proportion was analyzed and compared with previous studies.

Results

246 students attended the horizontal integration & responded. Demographic analysis of the students were as follows;

Out of 246 students, 53.65% students belonged to the urban area, 17.88% students to the suburban area, and ~~students~~ 28.45% students to the rural or remote area. Age of majority of first phase MBBS students recorded by present study was 20 years and above (Table.2).

Table-2: Showing proportion of students of different age groups of first phase MBBS curricula (n=246)

Age of first year MBBS students	Number	Percentage
18 years	11	4.47
19 years	55	22.36
20 years	81	32.93
21 years	56	22.76
22 years	27	10.98
23 years	16	6.50
Total	246	100

Table-3: Shows distribution & proportions of students' feedback on questionnaires of horizontal integration (n=246)

Sl No.	Questions-	Strongly Disagree (%)	Disagree (%)	Indifferent (%)	Agree (%)	Strongly agree (%)
1.	Session helped to understand topic better than didactic method	3 (1.21)	16 (6.50)	14 (5.69)	168 (68.29)	45 (18.29)
2.	Session has increased interest towards the topic	2 (0.81)	5 (2.03)	16 (6.50)	177 (71.95)	46 (18.69)
3.	Session helped in understanding clinical application	1 (0.40)	7 (2.84)	8 (3.25)	138 (56.09)	92 (37.39)
4.	Such sessions must be organized at frequent interval during MBBS tenure	3 (1.21)	8 (3.25)	34 (13.82)	154 (62.60)	47 (19.10)
5.	Session has reduced study time	11 (4.47)	45 (18.29)	39 (15.85)	118 (47.96)	33 (13.41)
6.	Session has helped to perform better in exam	13 (5.28)	26 (10.56)	31 (12.60)	132 (53.65)	44 (17.88)
7.	Session has helped to increase comprehension ability for the topic	4 (1.62)	7 (2.84)	24 (9.75)	163 (66.26)	48 (19.51)
8.	Topic was relevant	0 (0)	4 (1.62)	20 (8.13)	179 (72.76)	43 (17.47)
9.	Session helped to understand recent advances in medical field	2 (0.81)	5 (2.03)	17 (6.91)	154 (62.60)	68 (27.64)
10.	Session was well organized & well coordinated	5 (2.03)	8 (3.07)	32 (13)	89 (36.17)	112 (45.52)
11.	Presenter-audience interaction was more helpful	4 (1.62)	6 (2.43)	33 (13.41)	162 (65.85)	41 (16.66)

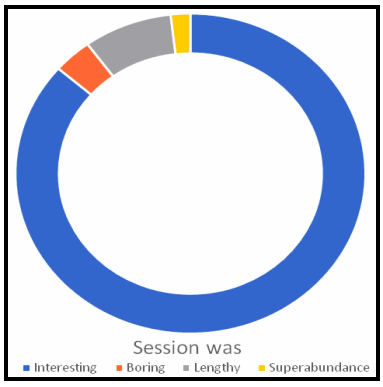
Out of these 246, 123 students (50%) opined that they attended the horizontal integration spontaneously but 116 students (47.3%) attended as because it is mandatory in NMC curriculum and rest of the students attended it on force. Analysis data showed 86.83% students think this method is definitely better than didactic lectures & 90.53% students opined that such

method of learning increased their interest towards the topic.93.82% students opined that such integrated session helped them to understand clinical applications more clearly and 81.48% students strongly want that such sessions must be organized at frequent interval throughout the MBBS tenure (Table.3). Though many of the students think that integrated teaching method doesn't reduces their study time, but mainly helped them to improve their comprehensive ability for the topic. The sessions increase the creativity of the students presenting as it promotes research and presentation skills which are definitely necessary in the job they are about to perform further. Moreover, interesting topics keeps the students aware of current ongoings and builds an interest to know more on the same. These integrations help students to understand how the subjects are interrelated.

Repetition is often the key to solidifying certain topics. But, reviewing the same thing over and over again might result in loss of interest. Such sessions offer an interesting & cooperative way of strengthening our core concepts. Along with class teaching, such sessions help students to learn more about the topic and clear doubts, if any. Interactive sessions make the topic more interesting. Present researchers found 3 main perspectives of students regarding this integration was;

1. Assemblance of all the scattered information amongst subjects about one topic.
2. Complete revision of the topic is done.
3. Clinical importance discussed very well. Presentation was interesting for 86% students, lengthy for 8% students, boring for 4% and overloaded with information for only 2% students (fig-1).

Fig.1: Diagram showing students feedback on presentation of horizontal integration



Discussion

Researcher like Maheswari K et al. [6] Khan AA et al. [7], Sadamate N et al [8] opined that Majority of the students prefer integrated system of teaching learning for better understanding of the topic. Priyanka AA done a comparative study amongst second year MBBS students to evaluate the effectiveness of integrated teaching in comparison to conservative didactic lecture in 2021and found that overall performance of students in integrated teaching group is much higher than regular groups. Students also opined that integrated teaching help them to understand the concepts and grow interest towards the subject [9].

Horizontal integration helps students to understand the subject to the depth and application of the knowledge on real life patients. Moreover integrated teaching can reduce repetition of same topic in a same phase as well as in different phase and effective utilization of academic calendar with reduction of load [10-11]. Majority of the students opined that integrated method of teaching is more effective that traditional teaching and helped them to collaborate basic and clinical subjects [12-13].

BasuM et al. conducted a pretest posttest basis comparative questionnaire based study amongst fifth semester students to find out the feasibility of doing integrated teaching and effects of integrated teaching relative to traditional teaching. They found that, integrated teaching is welcomed by faculties as well as students and more effective than didactic lectures [14]. In 2014 Medical school of Wuhan, China done a modification of basic sciences in MBBS curriculum by integrating histology or microanatomy with physiology like the teaching methods of University of Chicago. Sherer R et al assessed the outcome of such change and they found that students taught in integrated model surpass their peers in performance during exam who was taught in regular traditional method [15].

Rehma R et al. also opined that integrate teaching learning method was more effective than traditional method of teaching learning. Change from traditional to integrated mode of

teaching was well accepted by students and also helped faculties to improve their knowledge delivery for improvement of medical education [16]. Authors like Rajya Laxmi N et al. has opined that these integrated methods must be complementary to didactic lectures [17] but current trend of medical education are suggesting for synchronized education for best comprehension and understanding of subjects. Faculties must be encouraged to deliver more integrated sessions by administration [16].

In present study the researchers found that majority of the students of 1st phase MBBS are 20years + which is nearly similar to the findings by Sarkar S et al [18]. Re-integrating anatomy dissection procedures into undergraduate & postgraduate medical training will be beneficial along with other complementary teaching learning methods [19].

In 2022 Ray A et al. conducted a study on first phase medical students of different medical colleges of West Bengal and they found the most important fact regarding the preferences of teaching methods of present day in medical education system. They analyzed that student are ready to take up & utilize as much as 6 anatomy classes in a week but not by Didactic method. According to most of the students the first phase curriculum is needed to be reoriented with more & more vertical & horizontal integration of different disciplines for best understanding and better perception [20].

Conclusion

By studying the previous studies by various authors and analyzing the results of present study the current researchers think that first phase MBBS curricula is needed to revised by more and more incorporation of integrated teaching methods and proper alignment of practical knowledge and skills. Though there is not much chance for integrating all the three basic subjects but Anatomy and Physiology must be taught in combined integrated method.

Structural details of any structure taught in Anatomy lectures or dissection-demonstration must be followed by functional details of the same organ or structure in Physiology teaching. This will help students to understand better & will reduce the time taken to complete a same topic without undue repetition and practically use the Anatomy knowledge in next phase. In NMC guideline there are pretty many examples and suggestions for such integrations between Anatomy & Physiology, which is needed to be implemented properly during preparation of class routines and must be followed accordingly.

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