

The Comparison of Physiology Learning in Undergraduate Medical and Dental Students

Learning of
Physiology in
Undergraduate
in Integrated
Curriculum

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ABSTRACT

Objective: To study the difficulties and problems associated with learning of Physiology in undergraduate medical and dental students in integrated curriculum.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Ziauddin Medical College and Ziauddin Dental College, Ziauddin University, July 2017 to June 2018.

Materials and Methods: The study participants included 1st, 2nd, 3rd year medical students and 1st and 2nd year BDS students. There were 225 participants, 147 MBBS and 78 BDS students. A questionnaire was distributed to each medical and dental student. There were 23 items included in the questionnaire from why is Physiology hard for students to learn? The items were related to subject, teaching and learning of Physiology. The medical and dental students were asked to select a response for each item on like rt scale from 1 to 5.

Results: Regarding the Physiology learning responses, the comparison was done between MBBS and BDS students. A significant difference was found in factors including basic concepts (<0.001), use of scientific terms (0.01), covering large content in one lecture (0.01) and integration (0.002).

Conclusion: The medical and dental students identified the factors causing difficulties and problems in learning physiology and the reasons of these difficulties.

Key Words: Physiology, Teaching, Learning

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INTRODUCTION

To create 21st century physicians, the prime objective is to train future doctors and dentists who can effectively integrate the new sciences and technology into humane patient care¹. Medical education must progress and develop because future doctors will come across patients in quite different health care circumstances from the present². To meet the needs of medical education, numerous medical schools have started to design innovative medical curricula in their bachelor programs². There is now increased emphasis on developing competencies and active learning strategies³. Curriculum integration of subjects is a significant strategy in medical education⁴.

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Integration has essential importance in medical education because basic science learning placed in clinical context is considered more meaningful and relevant by students⁵.

In the first two years of medical school, basic science knowledge forms a foundational framework for clinical skills⁶. An understanding of basic science concepts helps in learning the signs and symptoms of various diseases in the clinical years⁷. The retention of basic science concepts has a positive correlation with clinical knowledge⁸. In integrated curricula, basic science educators need to focus on their teaching content according to clinical relevance⁹. To more closely relate the basic and clinical sciences, early patient contact in the foundation years is provided simultaneously with basic science teaching¹⁰. For the competent medical practice, the understanding of applicability of basic science education in the establishment of diagnosis and treatment is critically important¹¹.

Physiology is one of the basic science subjects taught at undergraduate level in medical and dental professional education¹². The importance of Physiology lies in its application in clinical practice¹³. In the recent innovative development of preclinical curricula, Physiology is facing changing trends in teaching. The employment of student centered learning methods has been found to be valuable in building of physiological concepts¹⁴. As Physiology learning is concerned with

understanding the dynamics and mechanisms of human body and it is required for good clinical practice, a questionnaire was designed to study the various aspects of Physiology learning. The objective of the study was to compare the difficulties and problems associated with learning of Physiology in undergraduate medical and dental students in integrated curriculum.

MATERIALS AND METHODS

The study design was cross sectional. The study was conducted at Ziauddin Medical and Ziauddin Dental College. The study participants included 147 MBBS students and 78 BDS students. The participants were selected by convenient sampling technique. The duration of the study was one year, from July 2017 to June 2018. The study was approved by Ethics review board of Ziauddin University. The participants were enrolled in the research study after getting the ethics approval. Informed consent was obtained from each participant.

To find out the difficulties and problems associated with Physiology learning, the questionnaire was distributed to 147 medical and 78 dental students. The questionnaire contained 23 items from why is Physiology hard for students to learn? The medical and dental students were asked to select a response for each item on likert scale from 1 to 5. The MBBS and BDS students provided their perspective about the difficulties and problems in learning physiology and the reasons of these difficulties. The questionnaires were collected and the data was analyzed.

The data were analyzed using SPSS version 20. The results of the quantitative data were expressed as mean

\pm SD. The comparison of qualitative data was expressed by Chi Square test. In all statistical analysis, only p-values ≤ 0.05 were considered significant.

RESULTS

There were 147 MBBS and 78 BDS students in the study. The mean age of students was 19.3 ± 1.4 years (male 34% & female 66%). The group comparison is shown in table I. Figure I showed Physiology learning response comparison of groups on the basis of individual items 1 to 12 in the questionnaire. Figure II showed score comparison of groups based on individual items 13 to 23.

Table I showed comparison of Physiology learning responses between MBBS and BDS students. It included items related to basic concepts, new researches in medical science, scientific terms, interaction between systems, well defined physiology syllabus, understanding physiology, commitment of time, case study, passing physiology by using short books, teaching by using concepts, correlating different topics, guiding students about learning resources, using graphs and flow charts, integration of physiology teaching, covering large content in lecture, responding to student questions and use of active learning methods. The frequency, percentage and chi square value for each item is mentioned in the table.

In figure 1, the x-axis showed the 12 individual items in Physiology learning response section and the y axis showed the individual score of each item.

In figure 2, the x-axis showed the 11 individual items in Physiology learning response section and the y axis showed the individual score of each item.

Table No.1: Comparison of Physiology learning response between MBBS and BDS students

Q.No.	n	Program	Frequency			Percentage			Chi Square
			A	B	C	A	B	C	
1	225	MBBS	95	22	30	57.6	88	85.7	<0.001
		BDS	70	3	5	42.4	12	14.3	
2	224	MBBS	125	13	8	63.5	76.5	80	0.336
		BDS	72	4	2	36.5	23.5	20	
3	225	MBBS	116	14	17	63.7	58.3	89.5	0.06
		BDS	66	10	2	36.3	41.7	10.5	
4	225	MBBS	109	27	11	65.3	62.8	73.3	0.761
		BDS	58	16	4	34.7	37.2	26.7	
5	225	MBBS	125	16	6	62.2	88.9	100	0.014
		BDS	76	2	0	37.8	11.1	0	
6	225	MBBS	122	19	6	64.6	70.4	66.7	0.835
		BDS	67	8	3	35.4	29.6	33.3	
7	225	MBBS	131	9	7	64.2	69.2	87.5	0.38
		BDS	73	4	1	35.8	30.8	12.5	
8	225	MBBS	132	10	5	63.8	83.3	83.3	0.247
		BDS	75	2	1	36.2	16.7	16.7	
9	225	MBBS	119	21	7	63.3	75	77.8	0.347
		BDS	69	7	2	36.7	25	22.2	
10	225	MBBS	100	28	19	62.5	65.1	86.4	0.08

		BDS	60	15	3	37.5	34.9	13.6	
11	225	MBBS	58	25	64	67.4	59.5	66	0.66
		BDS	28	17	33	32.6	40.5	34	
12	225	MBBS	130	12	5	64.8	63.2	83.3	0.632
		BDS	70	7	1	35.2	36.8	16.7	
13	225	MBBS	77	42	28	66.4	71.2	56	0.238
		BDS	39	17	22	33.6	28.8	44	
14	225	MBBS	71	35	41	70.3	67.3	56.9	0.18
		BDS	30	17	31	29.7	32.7	43.1	
15	225	MBBS	113	19	15	62.8	67.9	88.2	0.104
		BDS	67	9	2	37.2	32.1	11.8	
16	225	MBBS	116	19	12	64.8	90.5	48	0.01
		BDS	63	2	13	35.2	9.5	52	
17	225	MBBS	107	22	18	63.3	73.3	69.2	0.515
		BDS	52	8	8	36.7	26.7	30.8	
18	225	MBBS	93	25	29	72.1	67.6	49.2	0.009
		BDS	36	12	30	27.9	32.4	50.8	
19	225	MBBS	126	10	11	63.3	83.3	78.6	0.206
		BDS	73	2	3	36.7	16.7	21.4	
20	225	MBBS	126	16	4	62.4	88.9	100	0.059
		BDS	76	2	0	37.6	11.1	0	
21	225	MBBS	115	20	12	62.3	74.1	85.7	0.122
		BDS	69	7	2	37.7	25.9	14.3	
22	225	MBBS	117	20	9	64.6	60.6	90	0.31
		BDS	64	13	1	35.4	39.4	10	
23	225	MBBS	61	44	42	66.3	65.7	63.6	0.939
		BDS	31	23	24	33.7	34.3	36.4	

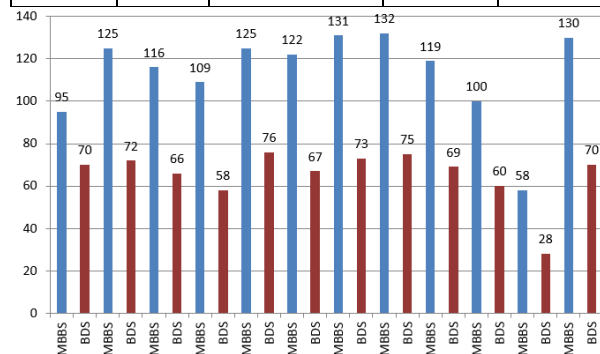


Figure No.1: The comparison of individual Physiology learning response items 1 to 12 between MBBS and BDS students

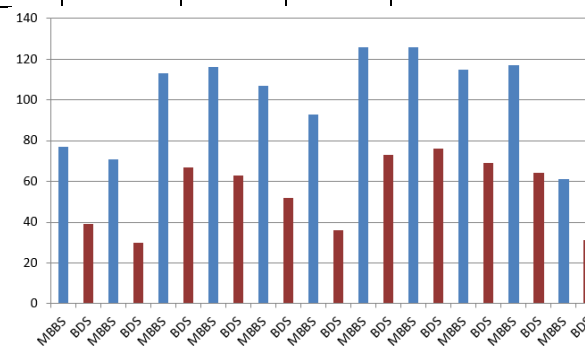


Figure No. 2: The comparison of individual Physiology learning response items 13 to 23 between MBBS and BDS students

DISCUSSION

In this study, difficulties and problems related to Physiology learning were revealed. As shown in Table I, there was a significant difference in Physiology learning response items 1, 5, 16 and 18 between MBBS and BDS students. Item 1 was related to knowledge of basic concepts of physics and chemistry. The finding related to item 1 in our study is consistent with Michael¹⁵'s study. In this study, it is mentioned that the ability to employ something learned in one context in the other context, is a difficult task, and this accounts for students' incapability to use their prerequisite knowledge (chemistry and physics) in learning

physiology. In Michael's study the physiology faculty was asked to fill a questionnaire regarding difficulty in studying physiology. In a study done by Calthorpe et al¹⁶ students were asked to identify the difficult topics according to the modules. Item 5 was regarding the ability to understand the scientific and medical terms. In our study, there was a marked difference in MBBS and BDS students regarding the understanding of scientific terms. Item 16 was related to teachers presenting large subject content in one lecture¹⁷. It is evident that active learning, student-centered strategies to teaching physiology work better than passive strategies¹⁸. Item 18 was regarding the integration of Physiology teaching with other skills. For preparing

students it is important for educators to use teaching strategies that makes the students involve in active learning, which increases their motivation, enhances their thinking, deepens learning and builds up collaboration in the classroom¹⁹. Although no single teaching method ensures a thorough understanding of a topic, various methods are being used in many institutes to reinforce lectures in teaching physiology, such as case-stimulated learning, problem-based learning and patient-centered learning¹⁹. In rest of the table items, there was no significant difference observed.

Physiology is a segment of core curriculum for all students studying in medicine and related professions²⁰. It needs to be studied effectively so as to be placed in the context of disease when the students graduate and practice in the community²¹. The medical students rated the discipline of Physiology as one of the most difficult and toughest course²⁰. Causal reasoning, use of graphs and sectionalize were remarkably important than any other aspect of teaching in making physiology hard to learn¹⁵.

There is a remarkable difference between teaching and learning. In reality, there is excessive teaching and inadequate learning²². Teaching is not only passing the information to students but it is to make students understand the content that is taught. Physiology is a complex and continuously evolving subject, and teaching it, is not an easy task²³. A substantial body of knowledge about cognitive processes and teaching and learning methods has gathered over the years²³. Even with an active learning approach, physiology is hard to learn²².

The duty of Physiology teachers is to help students learn the subject in an effective way. An urgent need of reforms is required to improve the teaching efficacy of human physiology in medical schools.

CONCLUSION

The medical and dental students identified the factors causing difficulties and problems in learning physiology and the reasons of these difficulties.

Author's Contribution:

Concept & Design of Study:	Sadaf Fatima
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