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ORIGINAL ARTICLE

Visual live anatomical demonstrations among medical students by Surgeons.

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ABSTRACT… Objective: To determine the results of visual live anatomical demonstrations among medical students by Surgeons. **Study Design:** Prospective study. **Setting:** Department of Anatomy, Liaquat College of Medicine & Dentistry & Darul Sehat Hospital. **Period:** Period of 3 years on the students of Batch 2017, 2018 and 2019. **Material & Methods:** Total 300 students of first year medical students (MBBS) with full attendance in class over the year were included in study. The mode of presentations was theoretical, video and power-point presentations and through live surgeries. Exclusion criteria students with absenteeism in classes. **Results:** Out of 100 students enrolled every year, only 75 students were included due to full attendees as per inclusion criteria. Total of 225 students were enrolled. The mean age of students was 19.4 ±0.57 years in every year students. The students were assessed in their term exams and pre-prof exams and showed significant difference in pre-presentation and post-presentation scores. Another group scores with live surgical demonstrations compared those without live visual surgical demonstrations 75.89± 3.9 vs 74.7± 4.6 in year 2017, 79.46 ± 4.9 vs 74.8 ±4.3in year 2018) and 84.8± 3.4 vs 76.41± 4.3 in year 2019 students showed statistical significant difference p value -0.000. **Conclusion:** The teaching of anatomy by surgeons has markedly improved performance and live visual demonstrations showed increase in interest of medical students.

Key words: Pre & Post-presentation Scores, Visual.

INTRODUCTION

Anatomy is the foundation stone of medical education building the career of students in almost all the health fields.[1-3] To maximize students learning and improving performances to yield better results has been shown by many studies but no conformity has been reached regarding teaching techniques, in fact some studies have shown loss of interest especially in surgical careers.[2-6] However, the increasing interest of surgeons in clinical teaching has been seen with motivation in contributing to training of upcoming generation.[7]

Many authors have stressed on changing the method of teaching and curriculum and identifying factors influencing perception of medical students about surgeons and surgical career.[6-10] To achieve this goal, learning environment firstly should be favorable and information should be conveyed in a way where learner focus on understanding the reason behind factual information which is presented in textbooks.[11] Exposure of practicing surgeons with medical students will increase interaction and interest in surgical anatomy and surgical field. Special tutorials with visual demonstrations, internships, and final year rotations should be used to develop individual interest. This approach may benefit all the health field professionals.[11] The anatomists are the main educators and professionals that owes the anatomical teaching but due to increasing medical colleges there has been decreased anatomist and clinician therefore are also were implied in basic sciences field which has dramatically response in medical student's knowledge and interest.

According to the learning pyramid by lectures student retention capability is only 5%, however by audio and visual demonstration it increases

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to 20%.[12] A cross-sectional study in 2015 has found anatomy as a difficult subject to retain with 90.55% students wants to have teaching video sessions 54.38% wants to study only clinical anatomy.[4] Isascon et al in 2017 has found that learning scores after video demonstrations improved from 39% to 88%.[13] The aim of our study was to evaluate the learning capacity of students by visual demonstration of surgical anatomy by visual video demonstrations and attending patient live surgeries, by general surgeons working in anatomy departments and its effect on their scores in their term examinations or semesters.

MATERIAL & METHODS

This was a prospective study conducted for a period of 3 years on the students of Batch 2017, 2018 and 2019 in department of Anatomy in Liaquat College of Medicine & Dentistry & Darul Sehat Hospital. The study was conducted after taking ethical committee review from College and hospital. Every year there are total 100 new students enrolled in college. Total number of students were 300 in three years. This was a single blind trial; students were not being told about stratification of groups. It was a non-probability convenient type of sampling. Inclusion criteria included medical students of first year MBBS with full attendance in class over the year. Exclusion criteria students with absenteeism in classes.

Data was collected from students of Department of Anatomy in Liaquat College of Medicine & Dentistry & Darul Sehat Hospital meeting inclusion criteria. Informed consent was taken from the students after identifying objective of the study and assured for confidentiality of information. Students were assessed in term 1, 2 and term 3 and then final Pre-prof exam with a predesigned questionnaire with assessment made before the presentation and termed as pre-presentation assessment and the other assessment done after the presentation; the pre and post-presentation plotters were given distribution of 10% each in all terms and then 40% marks for final pre-prof marks assessed by researcher (surgeon and anatomy lecturer with greater than 5years experience). Another method of demonstrations assessed was through live visual teaching in general surgeries (Group A n=37) and other group attending class lectures through above same modes of presentations (group B n=37) –e; through power point presentation, figures and live video surgical demonstrations of pathologies together with anatomy were showed. Two groups A and Group B made according to interest and feasibility of attending surgeries out of their daily lectures with active interest in surgery too.

Data was analyzed by statistical software package SPSS version 24.0. Statistical analysis was expressed as frequencies and percentages. Descriptive statistics including student's age, gender, was entered. Pre-presentation and post presentation plotters i-e marks were made and mean and standard deviation were calculated in term 1, 2, 3. The two groups were also analyzed for their performance and t-test was used and $P < 0.05$ was considered significant.

RESULTS

Out of 100 students enrolled every year, only 75 students were included due to full attendees as per inclusion criteria so the total students were n=225. However, results of every year students were taken and listed separately. The mean age of students was 19.4 ±0.57 years in every year students.

The data was divided in two parts; assessment of students by their performance in their first term, second term, third term and in final term i-e; preprof exam. Students were assessed pre-presentation by 10 questions related to topics and post presentation assessment was plotted with mean of scores were calculated with standard deviation. The mode of presentation was through interactive sessions, discussing pathologies and showing visual demonstrations. There was a significant difference in pre-presentation and post presentation scores in all terms in every year students as shown in Table-I. However, the mean and standard deviation of final pre-prof exam didn't show marked differences from post-presentation scores i-e: 77.88± 3.8, 77.52± 3.7, 77.75±3.9 (Table-I).

The second part of assessment was of two groups

A and B with group A, n=37 students had been to live surgeries in surgical department; while the other group continue to receive daily college lectures through interactive sessions, discussing pathologies and showing visual demonstrations. This same sequence was followed in all first year students of 2017 till 2019. In this group A, marked differences in pre-presentation scores and also after lectures and at the end of Term assessments showed marked differences in post presentation scores 45.45± 5.7 vs 74.0±4.3in year 2017 students in term 1,45.85 ±5.6 vs 73.83 ±4.7 in term 1in 2018 and 43.91± 6.4 vs 72.25 ±12.1 in term 1 in 2019. (Table-II). Similar were the results in both pre ad post presentation scores in term2, 3 and pre-prof in every year. There was also difference noted from group B pre-presentation scores and pre-presentation scores of group A with a significant difference found with p value of 0.000. Not only this group A also showed a difference in performance in final pre-prof exams 75.89± 3.9 vs 74.7± 4.6 (2017), 79.46 ± 4.9 vs 74.8 ±4.3 (2018) and 84.8± 3.4 vs 76.41± 4.3 (2019) with statistically significant p value 0.000. (Table-II).

Examinations	Weightage (%)	Marks obtained by 1st year students n=225		
.		2017 N=75	2018 N=75	2019 N=75
Pre-presentation spotter (term 1)	10%	45.45± 5.7	45.8± 5.65	43.9 ±6.4
Post-presentation spotter (term 1)	10%	74.03 ±4.3	73.8 ±4.7	72.25 ±12.1
Pre-presentation spotter (term 2)	10%	44.47±5.5	43.39 ±6.3	44.4 ±5.5
Post-presentation spotter(term 2)	10%	73.55±4.4	74.45 ±4.1	73.6 ±4.4
Pre-presentation spotter (term 3)	10%	39.05 ±5.47	39.80 ±5.42	42.31±5.2
Post-presentation spotter(term 3)	10%	76.67±4.3	76.13 ±4.6	76.8 ±4.2
Preprof exam	40%	77.83± 3.8	77.67± 3.6	77.87±3.8

Table-I. Student performance in examinations

Examinations	Weightage (%)	Number of first year students n=225						
		2017 N=74		2018		2019		T test value
		Gp A n=37	Gr B n=37	Gr A n=37	Gr B N=37	Gr A n=37	Gr B n=37	
Pre-presentation scores (term I)	10%	51.76±3..8	45±5.8	45.4±5.4	45.4 5.4	46.8±6.2	52.8±15.2	
Post-presentation scores (term I)	10%	82.8±4.5	74.8±4.3	51.2±15.8	51.2 15.842.1 6.5	75.0±4.6	75±4.6	
Pre-presentationscores (term II)	10%	51.1±4.6	52.8 ±15.2	42.1±6.5	42.11 6.5	49.2±5.0	45.1±4.6	
Post-presentation scores(term II)	10%	77.9±5.3	75±4.6	77.6±4.7	77.6 4.7	81.35±4.7	76.4±4.1	
Pre- presentation-scores(term III)	10%	54.08±3.3	68.7±15.6	44.1±6.4	44.1 6.4	48.7±3.8	43.8±5.5	
Post-presentation scores(term III)	10%	76.5±4.5	76.5±4.5	72.3±3.4	72.3.8 4.3	80.9±4.9	74±4.1	
Final Pre-prof exam	40%	75.89±3.9	74.7±4.6	79.46±4.9	74.8 4.3	84.8±3.4	76.41±4.3	0.000

Table-II. Student performance between groups
A: Live Demonstrations, B: No Live Demonstrations

DISCUSSION

Anatomy is an essential component of basic sciences and an important component of applied medical sciences.[1,5-10] Globally it has been a concern to strengthen the basic anatomical demonstrations to increase interest among new first year students and simultaneously increase their clinical interests in different fields and management of simple pathologies associated with their anatomical demonstrations.[2-5] It has been seen that demonstrations by surgeons has given rise to increasing students' interests in subject but also increases their career planning in field of surgery. Recently study by Zhang et al has found 78% students in favor of teaching anatomy by surgeons as it gives them better understanding of clinical and anatomical significance of underlying structures.[14] Around 98% students were in favor of developing integrating clinical in anatomical demonstrations. Our study was based on determining impact of differences in teaching students by surgeons through visual demonstrations and also by viewing them live surgeries. Common surgical cases were included in anatomy curriculum which showed their interest and help them in their problem solving skills and their focused critical rational.[15]

In our study students have shown marked improvement in sessions conducted in their term/ semester exams before presentations and after presentations which were given through theoretical, diagrams and visual demonstrations of surgeries in their lectures. In 3 year period, first year students of every year were assessed in their term exams and preprof exams. There was around 10-15% improvement in scores after demonstrations and this has impacted their overall scores at the end of term exams. Also it has been seen that written feedback by students was remarkable for the surgeons teaching due to more clinical exposure related to basic anatomy teaching. Another Qualitative study also identified that teaching with clinical context is an essential element in retention of anatomy for the safe practice clinically.[16] Mc Bride et al also demonstrated that active learning with more conceptual information results in more anatomy retention among the students even in later clinical years.[17]

In the other part of the study, students with more keen towards active learning (Group A) and wants to participate in viewing during live surgeries of basic anatomy lectures taught in class were compared with the other half of the students who did not take part in active learning approach a part from their daily college lectures. This group A showed best scores compared to other half of the group even in pre-presentation scores and also post presentation scores. Study by Hicks et al also shows that training by both surgical and anatomical instructors is essential as this makes basic foundational training more strong specially among the students pursuing surgery as their career.[18] Isascon et al has seen improvement in learners scores from 39% to 88% after video laparoscopic tutorials and showed more interest in anatomy lectures.[13] Estai et al also focuses on teaching practices as anatomy makes their foundation stone and therefore if this is buildup we can ensure safe clinical practices by medical graduates entering into clerkship or residency programs.[19] Increasing competence and confidence has also been seen in students who have good basic anatomical knowledge and this impacts their patient's management thereafter in their clinical fields.[20-23]

CONCLUSION

The teaching of anatomy by surgeons has markedy improved student's performance and live visual demonstrations apart from lectures should also be incorporated as part of te curriculum to increase the interest of first year medical students to ensure safe clinical practices in future.

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3	Muhammad Khurram Zia	Teaching, Surgical demonstrations, Data collection	
4	Alvia Saad	Paper writing, Data collection & interpretation, Proof reading.	