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Case Based Discussion

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IMPACT OF CASE BASED DISCUSSION AS AN INSTRUCTIONAL TOOL ON THE ANNUAL EXAMINATION RESULTS IN OPHTHALMOLOGY FOR FOURTH YEAR UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

Objective: Determine the effectiveness of case-based discussion (CbD) in terms of annual professional ophthalmology examination performances (scores) at undergraduate level involving students.
Study Design: Quasi experimental study.
Place and Duration of Study: FMH College of Medicine and Dentistry for under graduate 4th year MBBS class in Ophthalmology (13 months' duration), from Dec 2013 to Dec 2014.
Material and Methods: After approval from the IRB, scores of the historical control group, consisting of all 4th year MBBS students from previous four years included (64, 89, 96 and 85 respectively) were collected, who underwent traditional teaching. A total of 113 students were enrolled using non-probability convenience sampling technique in the interventional group of the study, who were exposed to CbD. Their scores in the annual university examination were collected in the subject of ophthalmology. The data was analyzed for its normalcy and Mann Whitney test was applied for comparison. Scores of both groups were correlated using pearson's coefficient of correlation to determine similarity of constructs measured through traditional assessment method and CbD.
Results: There was statistically insignificant difference (*p*-value 0.087) between scores obtained by historical controls and those who received intervention (CbD). There was insignificant negative correlation in (-0.028) between scores obtained through traditional assessment and CbD.
Conclusion: CbD fosters higher order thinking among undergraduate students in Ophthalmology. However, traditional assessment methods do not measure constructs that should be evaluated among undergraduate students, urging formal evaluation of the assessment items for further improvement.

Keywords: Assessment, CbD, Medical College, Ophthalmology, Undergraduate students.

INTRODUCTION

Outcome Based Education 'OBE' focuses[1] on learner and programme's outcome rather than the process to attain them[2]. As we know, "assessment drives learning"[3,4] and when this driving force is employed through the work-place based assessment (WPBA), learning enhances manifolds, as WPBA is a formative assessment with feedback as its inherent component. Case-based discussion (CbD), Mini-clinical evaluation exercise (MiniCEX), and Direct observation of procedural skills (DOPS) are among the few tools of WPBA, which are meant to measure performance of post-graduate residents at the place of training[5]. Case based discussion CbD has a structured rubric to evaluate professional approach and clinical judgement ability of the students in managing clinical cases complemented with provision of immediate feedback, as is the case with all WPBA tools. This feedback is very valuable for improvement because it is available during the process of learning and not at the end. Therefore, it helps in steering learning towards the desired learning outcomes. This added advantage of CbD provides the window of opportunity for the student for self-analysis[6] and improvement before the examination. The method of case retrieval, reuse of information, solution testing and revisiting of learning are summarized and their actual understanding is discussed at a level

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where improvement can be made to achieve better results in the final summative assessment.

High Fidelity Simulation and CbD were compared for teaching of pediatric emergency in final year medicine students. No significant difference was found between the two instructional modalities[7]. CbD has been shown to be effective in optometry for work place practice as well as nursing for communication skills, problem solving ability and learning motivation[4,9]. The literature supporting CbD for under graduate teaching is limited, however applying the basic idea of acquiring practical knowledge whether to post graduate or to under graduate level follows the same principle in the field of medical education[9]. Theoretically, CbD at under graduate level appears to be an essential tool for assessing clinical skills, communication skills and professional competence[6]. No other assessment method provides practice-based information about student/physician's performance in cognitive, interpersonal areas, and professionalism, the way CbD provides. This information generates specific feedback, which enables students to rectify their mistakes accordingly, thus ensuring positive educational impact. In summary, CbD is known for the improvement of communication skills, self-confidence, critical decision making, self-directed learning. It promotes tolerance, sustains self and peer pressures, research orientation, approach and lifelong learning[6].

Limited evidence regarding the use of CbD at undergraduate level and its promising results at postgraduate level in terms of educational impact provide justification for this study. Therefore, the objective of this study is to determine the effectiveness of CbD in terms of annual professional ophthalmology examination performances (scores) at undergraduate level involving students who are in the process of clinical maturity.

MATERIAL AND METHODS

This quasi experimental quantitative study, consisting of an interventional and historical control groups, was conducted at FMH College of Medicine involving 4th year MBBS students in the subject of Ophthalmology from December 2013 to Dec 2014 after approval from the IRB. The historical control group, consisting of all 4th year MBBS students from previous four years included (64, 89, 96 and 85 respectively), underwent traditional teaching i.e. class room and clinical teaching involving case presentations and discussion, bedside case discussion and slit lamp side teaching covering the basic and essential areas according to their level of clinical teaching. A total of 113 students were enrolled using non-probability convenience sampling technique in the interventional group of the study. This group underwent Ophthalmology training after informed consent and training workshop to participate in a CbD before the start of their clinical training. The clinical training involved structured teaching using CbD following the table of specifications (TOS) defined for CbD in the light of the designated curriculum[10]. In order to safe guard the learning process, the conventional clinical training provided to historical group was also imparted in addition to CbD in the given time to intervention group. This ensured comprehensive skill teaching to minimize the chances of compromised training from total transformation from one system to another and to prevent the element of surprise in the final summative examination.

The training was conducted in 5 batches each containing twenty plus students. The table of specification (table-I) containing all the essential topics for their level of study with allocation of one disease pattern for CbD to each student was allocated.

The students were given twenty minutes to present the case and another ten minutes to discuss and to have a feedback and a score out of 10 from the supervisor. The students also received a-ten- minute peer feedback and a score out of 10 from the peer and the students was also asked to mark their own performance during the CbD out of 10 as well.

The data collection tools used for CbD at under graduate level of teaching and training included.

1. CbD Performa 1 (attached as annexure C) for the understanding and acknowledgement of CbD as a tool of WPBA, modified from the original CbD AMEE performa.
2. CbD Performa 2 (attached as annexure E) for assessment of the students on a scale on practical cases allotted, discussed, assessed and reviewed if needed as per the instruction, modified from the original CbD AMEE performa.

The scores allotted by the peer, the Supervisor and the individual himself on a scale of 10 were used for formative purposes only. The final University exam results (written, clinical and total) were compared with the historically controlled group (n=334 including previous four years classes of 64, 89, 96 and 85 respectively). The examination pattern for all the groups was standardized as per University criteria and is same for both the control and intervention groups.

Data analysis consisted of calculating means and standard deviations of final University exam results (written, clinical and total) for the control (n=334) and intervention (n=113) groups using SPSS version 17. Mann Whitney test was used for this non-parametric data, using *p*-value of 0.05 as significant.

Table-I: Table of specifications (ToS).

S. No.	Topic	No. of Tasks	Percentage (%)
1	Eye Lids/Adnexa	2	10
2	Conjunctiva	1	5
3	Cornea	1	5
4	Sclera	1	5
5	Lacrimal apparatus	1	5
6	Orbit	1	5
7	Lens	2	10
8	Glaucoma	2	10
9	Vitreous	1	5
10	Retina	2	10
11	Optic Nerve	1	5
12	Visual pathway	1	5
13	Neuro Ophthalmology	1	5
14	Ocular injuries	1	5
15	Refractive errors	1	5
16	Medical Ophthalmology	1	5
	Total	20	100

Table-II: Mean scores and SD of historical control and interventional group.

Component	Year	n	Mean	SD
Theory	2010	68	67.8235	6.55389
	2011	89	62.9551	7.10939
	2012	96	67.8229	7.35133
	2013	85	62.7412	7.67053
	2014	113	70.1593	8.26845
Practical	2010	68	69.1029	7.54319
	2011	89	69.9551	6.40651
	2012	96	79.3021	7.09057
	2013	85	69.9176	8.91656
	2014	113	66.8230	6.88584

RESULTS

Descriptive statistics revealed skewness in the data as depicted in table-III and in the histogram (fig-1).

A *p*-value=0.087 indicating no significant difference between the scores of two groups.

Negative correlation -0.028 indicating that historical controls were assessed in a different way than the interventional group (table-V).

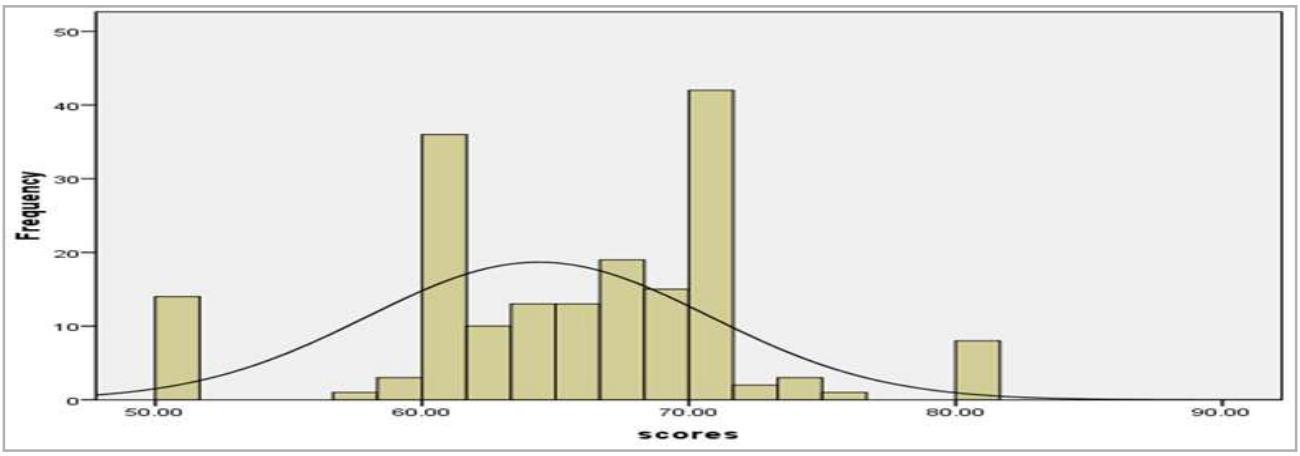

Figure-1: Histogram depicting nature of data.

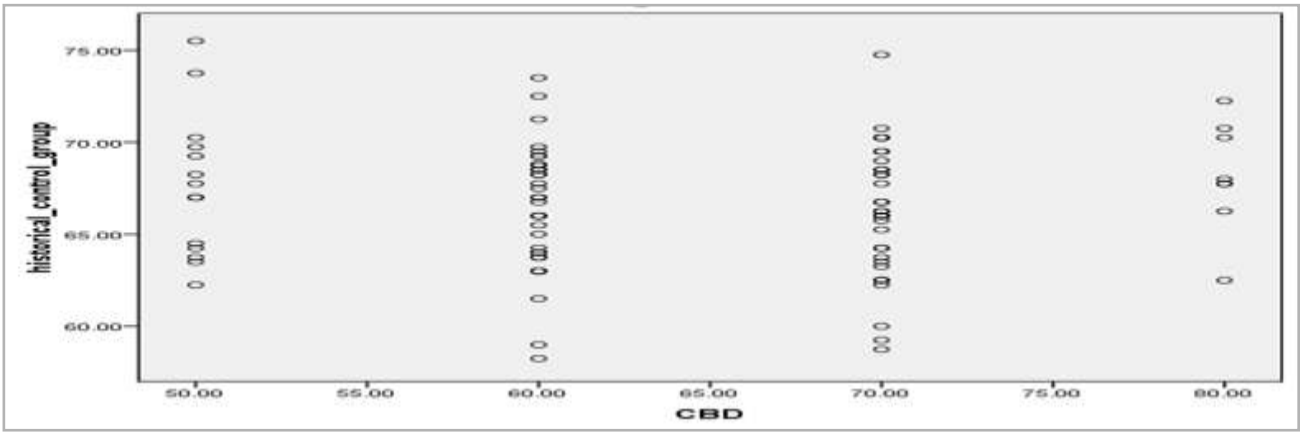

Figure-2: Scatter plot depicting negative correlation between scores of historical controls and the interventional group.

DISCUSSION

CbD is known to foster higher order thinking e.g. problem solving skills, but when applied to the under graduate medical students, it materialized active learning of clinical skills by the students with overwhelming response towards learning.

WPBA entails the evaluation of daily clinical practices employed in the working situation. Simply, it is an "assessment of what doctors and medical students actually doing practice"[11]. WPBA is potentially the best way of assessing professional competence, i.e. the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, judgement, emotions, values and reflection in day to day practice[12]. A CbD focuses entirely on the doctor's real work and at all times explores exactly what was done and why and how any decision, investigation or intervention was decided upon[13]. CbD evaluates what the trainees actually did rather than what they think they might do. This is the most striking difference between CbD and objective structured clinical examination (OSCE),

which assesses the physician performance under examination conditions[14]. This infers that CbD and OSCE measure different constructs or dimensions of the professional practice. The University uses objectively structured performance evaluation (OSPE), a derivative of OSCE to evaluate clinical skills. Hence, the scores obtained through these two methods are bound to have a poor or negative correlation, as indicated in our study (r=-0.028).

CbD has been demonstrated to have significant face and content validity[15]. In addition, it has been established that (with sufficient sampling) good levels of reliability[16] and validity with assessor training can be achieved in CbD[17]. In this study, table of specification was developed to ensure content validity in light of the University syllabus. As regards the face-validity, students' informal feedback confirmed that CbD was perceived by students as a useful educational activity because of authentic clinical tasks such as clinical reasoning and problem solving in a real life situation (table-I).

CbD, as one of the tools of WPBA, provides significant educational impact on the training and learning cycle of a medical student due to increase in the contact time and close interaction between the supervisor and the trainee[18], together with the allocation of a supervisor/tutor who indirectly becomes a mentor for the student. It eventually becomes one of the most effective means of judging the competence of a students whether at under or post graduate level[19]. Instant feedback by the supervisor and the colleague as it is incorporated in this study can be used to implement modifications in the clinical training[20]. The direct observation of trainees performance and one-on-one encounter at the work place in a real-life is only made useful by the associated feedback, thus triggering instant reflection[21]. Hence, it leads to timely correction. At the same time, the success of the training programme depends on good understanding of the WPBA and achieving expertise through intense assessor training particularly in the objective evaluations and in providing effective and timely feed-back. Sensitization and introductory seminars about

Table-III: Normalcy of the data.

Groups	Mean	Std. Deviation	Skewness	Kurtosis
Historical control group	66.6394	3.54997	-0.059	0.012
CBD	64.0000	8.58533	-0.009	-0.637
Total	65.3197	6.68322	-0.421	0.535

Table-IV: Comparison between historical controls and interventional group.

	Groups	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Sig.
scores	Historical control group	90	97.09	8738.00	3457	0.087
	CBD	90	83.91	7552.00		
	Total	180				

Table-V: Correlation between scores of historical controls and interventional group

		Historical_Control_ Group	CBD
Historical_Control_ Group	Pearson Correlation	1	-0.028
	Sig. (2-tailed)		0.795
	N	90	90
CBD	Pearson Correlation	-0.028	1
	Sig. (2-tailed)	0.795	
	N	90	90

WPBA and CbD in this study may be the first step in grooming the staff about appropriate use of this assessment instrument as an instructional tool.

CbD has an established role in postgraduate training for quite some time now. It is reported to enhance the depth of learning and better understanding of the subject[14]. In this study CbD was applied to the under graduate level and its impact was evaluated in terms of student's performance in the annual university examination in both theory and practical examination/OSPE. The understanding of the process of CbD by the students was satisfactory and their scores during the study were also very encouraging. They approached CbD encounters in a very mature way and showed improvement as the process continued. However, the annual examination scores achieved by the students were lower in the practical component, whereas, they improved in the theoretical component of the examination (table-II). The annual results showed significant improvement of the theory component marks with mean of 67.82 (2010-2013) to 70.16 for the batch under study, whereas in the practical component, there is decrease in the marks with mean of 69.10 (2010-2013) to 66.82 for 2104 batch under study. The aggregate however remains comparable. There was significant improvement in general in the annual examination result in the subject of Ophthalmology, when compared to the scores given by the supervisor during the CbD process. However, the comparison between scores of historical controls and experimental group revealed no statistical difference (*p*-value =0.087) indicating sound traditional teaching system in place in the institution. Whereas, negative correlation (r=-0.028) between scores of historical controls and experimental group indicates that both groups were assessed in different dimensions/constructs. The traditional assessment items being used, usually, do not measure clinical reasoning and problem-solving skills which are measured by CbD, as confirmed by our results as well. The reason being constructing items to measure higher order thinking skills is not easy. Hence, faculty resorts to item construction which measures recall of knowledge, understanding, and at the most interpretation of knowledge[22].

CONCLUSION

Negative correlation between scores from traditional assessment and CbD scores indicates that traditional assessment items do not assess clinical reasoning and problem solving skills, which should ideally be tested, if professionally competent graduates are to be produced.

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CONFLICT OF INTEREST

The study and the authors have no conflict of interest to declare.

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