

Research Article

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Team based objective formative assessment method for postgraduate students: Evaluation of students' clinical performance and perceptions

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Abstract

Background- Team Objective Structured Bedside Assessment (TOSBA) is a ward based, directly observed group assessment tool. The present study was undertaken to assess the impact of TOSBA in improving clinical competence of postgraduate students and also to assess student and staff perceptions of this method of formative assessment. **Material and Methods-** To study the impact of TOSBA, the students were divided into 2 groups. Group A was taken as 'study group' and Group B as 'control group', both groups comprising of three students each. Consecutive students in each group were given ten minutes for performing one of three different standardized clinical tasks. The students were directly observed performing the tasks and were graded on their performance in each group. Group A students were provided with educational feedback by the examiner at the end of the session, whereas Group B did not receive any feedback, but were shown their grades at the end of each TOSBA session. A pre-test in first session and post-test at the end of total 3 TOSBA sessions, was conducted on both groups. Feedback was taken from both, the students and staff members, regarding their view about this method of assessment in the form of a questionnaire, on various points on a Likert scale. **Results and conclusion-** The mean score for post-test in the study group was (7.51 ± 0.67) whereas the mean post-test score in the control group, which was not subjected to feedback, was (6.34 ± 0.12), for which P value of <0.0001 was obtained, which was statistically highly significant. The present study showed that TOSBA, as a formative method of assessment, improves all the three major domains of the learner and reinforces team communication skills.

Keywords: Clinical competence, Postgraduate education, Teamwork, Assessment.

INTRODUCTION

The current medical education aims at outcome-based learning as the society and other stakeholders demand that they be examined by doctors who are competent and fit to practice. In order to achieve this, it is extremely important to have a valid and reliable assessment of student's clinical competence and performance.

A formative assessment tool that helps future student performance, in a practical setting, should be the goal. Both undergraduate and postgraduate assessment in India makes use of non-standardized real patients in long and short case format to assess clinical competence of the students. Such examinations are increasingly challenged due to certain drawbacks. The conventional long cases are often unobserved; the assessment relies solely on the candidate's presentation and does not assess the "shows how" level^[1]. Feedback is provided only on the "knows how" aspect. The affective and the psychomotor domains are not assessed. These findings led to the implementation of a bedside formative assessment (BFA) strategy^[2]. Team Objective Structured Bedside Assessment (TOSBA) is a ward-based, team assessment method, comprising of standardized tasks being allotted to each member of the team^[3,4]. In this method of assessment, both history taking and examination component are observed by the examiner. TOSBA is similar to the TOSCE (Team objective structured clinical examination) format in terms of team or group assessment strategy^[5,6]. TOSCE has a number of observed stations which are formed to assess different aspects of competence. A similar method of group OSCE (GOSCE) has been tried for postgraduate assessment of general practitioners in United Kingdom with good results^[7]. TOSBA is a ward-based

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assessment method, which does not require formation of multiple stations and has been tried in undergraduate formative assessment with good results [3,4]. Team assessment in TOSBA is done on real patients in bedside setting with a standardized check- list for each aspect of examination and the students are blinded for the patient records. OSLER (Objective Structured Long Examination Record) is another structured method of assessment which has the drawback that students are not directly observed during the history-taking component [8]. The standard Objective Structured Clinical examination (OSCE) format may not be feasible for formative assessment in view of increasing student numbers [9,10]. This situation favours the development of team assessment strategies like TOSBA.

TOSBA method has not been tested for post –graduate formative assessment. This pilot study was undertaken to evaluate the impact of TOSBA in improving the clinical competence and performance and team communication skills of post-graduate students and also to assess the staff and student perceptions of this method .

MATERIAL AND METHODS

Study Design

After sensitization of the residents and other colleagues, 2 groups- A and B, comprising of three students each, were made to perform

specific tasks at a bedside station, out of which Group A was initially the ‘study group’ and Group B acted as ‘control group’. The groups were made after voluntary consent of the students and staff members to participate in the study. The station comprised of an in-patient and a set of minimum three examiners. Consecutive students in each group were given ten minutes for performing one of three different standardised clinical tasks: (i) Brief and focused history taking, (ii) Targeted physical examination, (iii) Patient-specific differential diagnosis with relevant investigations and management plan. (Fig.1) The students were directly observed performing the tasks and graded on their performance (Table-1). The examiners were provided with a standardized checklist (Table-2) and a 9 point grading system (Table-1) for assessment of students’ clinical competence. Group A students were confidentially provided with educational feedback by the examiners. Group B did not receive any feedback. The TOSBA was repeated on weekly basis. On completion of each TOSBA session, all three examiners conferred and an agreed final grade was awarded and disclosed to students in each group. The group received an overall score along with individual student sub-score for each case. Over 6 weeks, students undertook a mean (95% CI) of 3 TOSBA events per group. Group B students were also later subjected to TOSBA sessions with feedback to overcome ethical issues. Pre-test (1st TOSBA session scores) and post –test (3rd TOSBA session scores) was performed on both study and control group for comparison. (Fig.1)

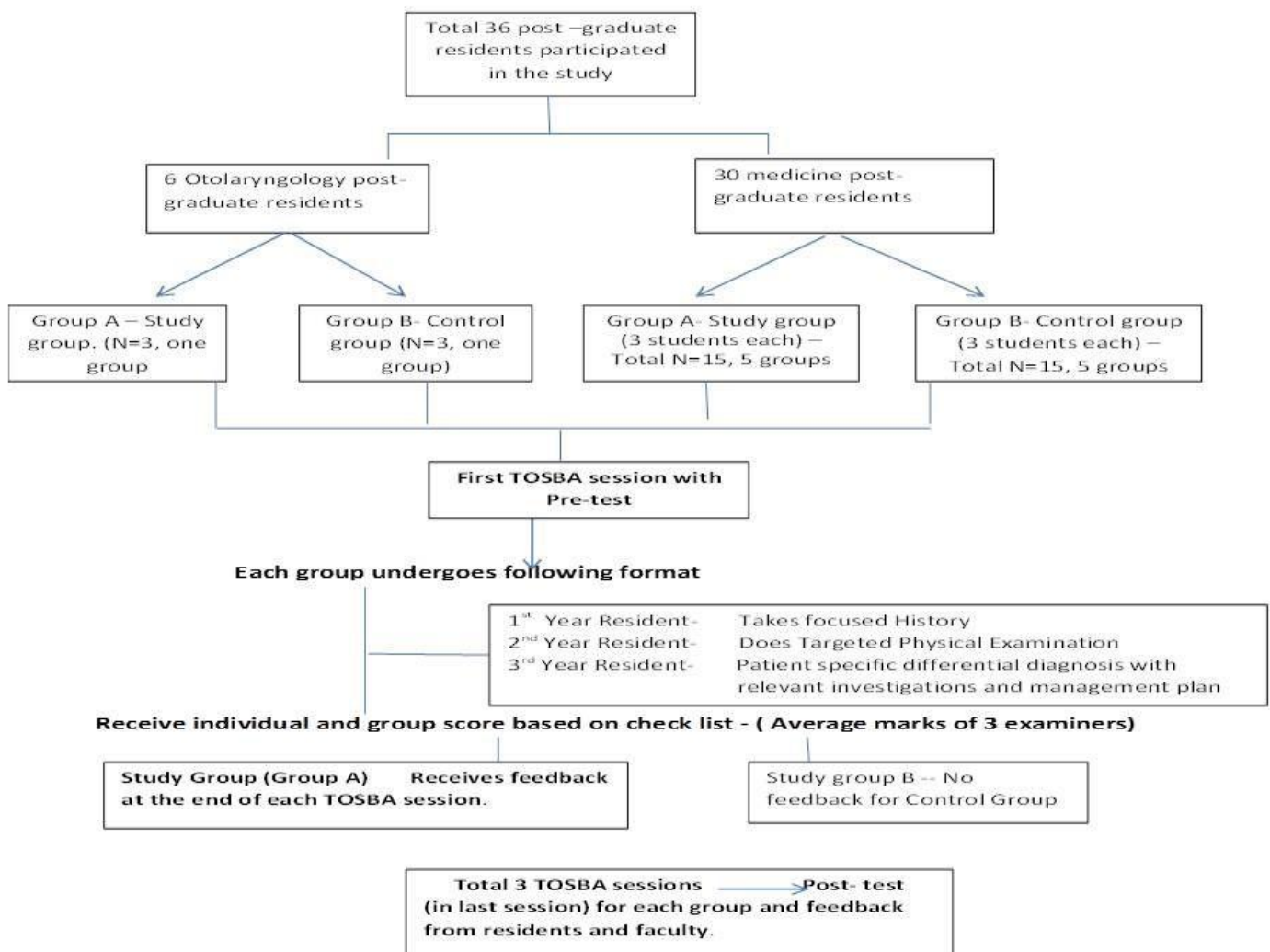


Figure 1: Flow chart showing enrolment of the post-graduate students and methodology adopted

Table 1: TOSBA Grading scheme

| No. | Basic clinical skill | Poor | | | Adequate | | | Good | | | Domain |
|-------|---|------|---|---|----------|---|---|------|---|---|-------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1 | HISTORY Concise and relevant history taking of the presenting complaint and other related information. | | | | | | | | | | Cognitive |
| 2 | CLINICAL EXAMINATION Method of performing relevant clinical examination. | | | | | | | | | | Psychomotor |
| 3 | DIAGNOSTIC REASONING SKILLS Logical most likely clinical diagnosis and other differential diagnoses with proper reasoning. | | | | | | | | | | Cognitive |
| 3 | KNOWLEDGE Investigation plan selecting cost-effective tests /procedures with knowledge of the likely results and their interpretation. Rational treatment plan with explanation. | | | | | | | | | | Cognitive |
| 1,2,3 | PROFESSIONALISM Respect, establishment of trust, taking care of patients' comfort and other ethical aspects. | | | | | | | | | | Affective |

Table 2: Sample checklist for the examiners

| | | | | | |
|---|-----|----|--|-----|----|
| <p>Patient History Taking Checklist for otology case (Sample Items)</p> <p>HISTORY</p> <p>Did the student ask:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Yes</td> <td style="width: 20%; text-align: center;">No</td> </tr> </table> <ol style="list-style-type: none"> 1. What is the presenting complaint? 2. Is there history of ear discharge/ type of discharge/ Which ear first? 3. Is there history of deafness/ which ear ? 4. Is there history of earache/ character of pain? 5. Are there any precipitating factors? – trauma/ URI/ swimming. 6. History of ringing in the ears. 7. History related to complications like giddiness, altered sensorium, facial asymmetry etc. 8. History of nasal complaints like nasal obstruction, epistaxis, recurrent sneezing, nasal discharge, headache, post-nasal drip. 9. Other relevant history like association of symptoms like hearing loss and ringing, hearing loss and facial asymmetry or hearing loss and giddiness etc. 10. Personal History? – habits, occupation etc. 11. Family history? 12. Past medical history. 13. Past treatment History. <p>Patient Physical Examination Checklist for otology case (Sample Items)</p> <p>Place check mark in column to show that the item was <u>done</u>, or was <u>done incorrectly</u>, or was <u>not done</u>.</p> <ol style="list-style-type: none"> 1. Examined the pinna, EAC, pre and post-auricular region. 2. Cleaned the ears for visualizing tympanic membrane. 3. Elicited mastoid tenderness. 4. Performed tuning fork tests. 5. Performed facial nerve examination 6. Looked for nystagmus/Performed fistula test / other vestibular function tests as indicated. 7. Performed other cranial nerve examination as indicated (corneal reflex, abducens nerve,etc.). 8. Examined nose and nasopharynx. 9. Examined throat. 10. Examined face, eyes and neck. <p style="text-align: right;">Continue...</p> | | | | Yes | No |
| | Yes | No | | | |

11. Examined other systems like central nervous system, respiratory system as indicated.

Interpersonal Skills (IS)/ Professionalism checklist (Dimensions)

During each examination, the examiners evaluated the doctor-patient communication skills/ professionalism of the students under following dimensions:

1. Interviewing skill;
2. Rapport building;
3. Personal manner including gentleness, empathy, taking care of patient comfort; ethical aspects;
4. Counselling and delivering information.

Sampling

6 otolaryngology and 30 medicine post-graduate residents were exposed to TOSBA over the course of the academic year in the year 2015. A core group of 6 clinical faculties carried out the TOSBA assessments in each department. Two student groups – Group A (Study group) and Group B(Control group) were formed at one time, each comprising of one resident from each year of course, i.e. first year, second year and third year who performed consecutive tasks as described. An average of 3 TOSBA sessions was conducted per student/ group on otology case in department of otolaryngology and Neurology case in department of Medicine. (Fig.1) Prior approval of institutional ethics committee had been obtained for this study.

Data analysis

A pre- test and a post- test were conducted on a case of one particular system (otology and neurology (medicine) in current situation) in TOSBA format for all the three participants in 1st TOSBA session and 3rd TOSBA session, respectively, and comparison was done in their level of clinical competency by a pre-defined 9 score grading system. (Table1) The feedback regarding student and staff perceptions about TOSBA method of formative assessment was obtained in the form of a questionnaire in which responses were rated using a 5-point Likert scale, viz. Agree, which included ‘Strongly agree’ or ‘Agree’ responses;

Disagree, which included ‘Disagree’ or ‘Strongly disagree’; and ‘Neutral’ responses.

RESULTS

36 post-graduate students and 12 staff members participated in the study including the researcher.

A comparison was done between the pre-test and post-test grades of all the residents in the ‘study’ and ‘control’ group as shown in table 3. The mean pre-test scores for study group and control group were (4.76 ± 0.87) and (4.11 ± 0.32), respectively.

The mean score for post-test in the study group(N=18) was (7.51 ± 0.67) whereas the mean post-test score in the control group subjects(N=18), who were not subjected to feedback, was (6.34 ± 0.12). (Table 3) Student ‘t test’ was applied and a statistically significant difference was found in the mean individual post –test scores of the residents, after three TOSBA sessions, between the ‘study’ and the ‘control’group.(t = 24.85, P < 0.0001, standard error of difference=0.19.). (Table 3)

Completed questionnaires were returned by all the 36 students (100%) and 12 staff members (100%), who found it extremely useful, the responses of which are shown in Fig. 2 and 3.

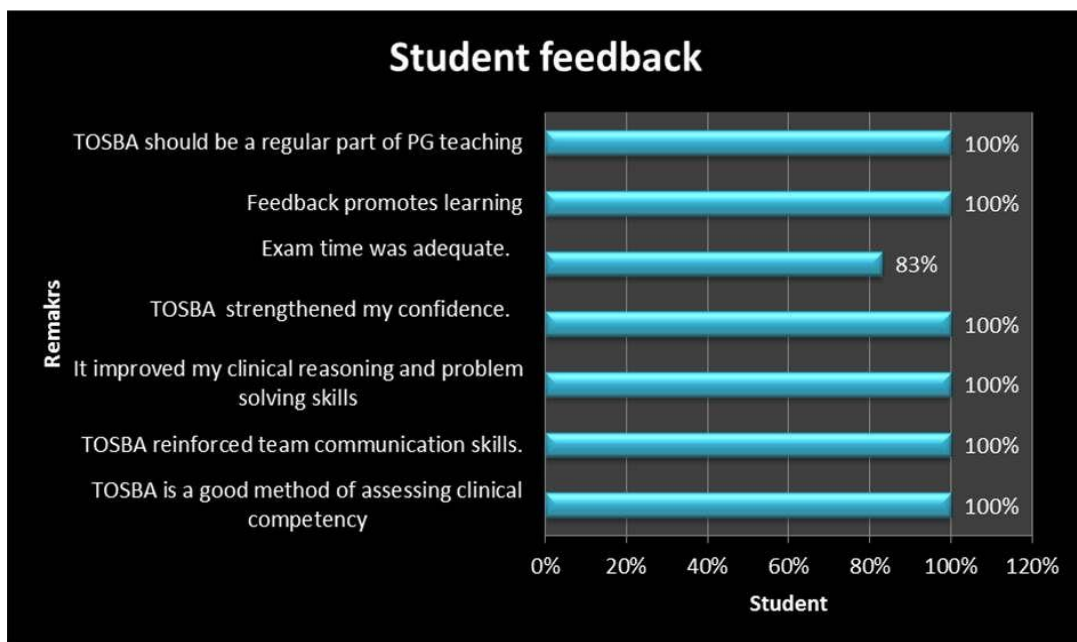


Figure 2: Student Feedback

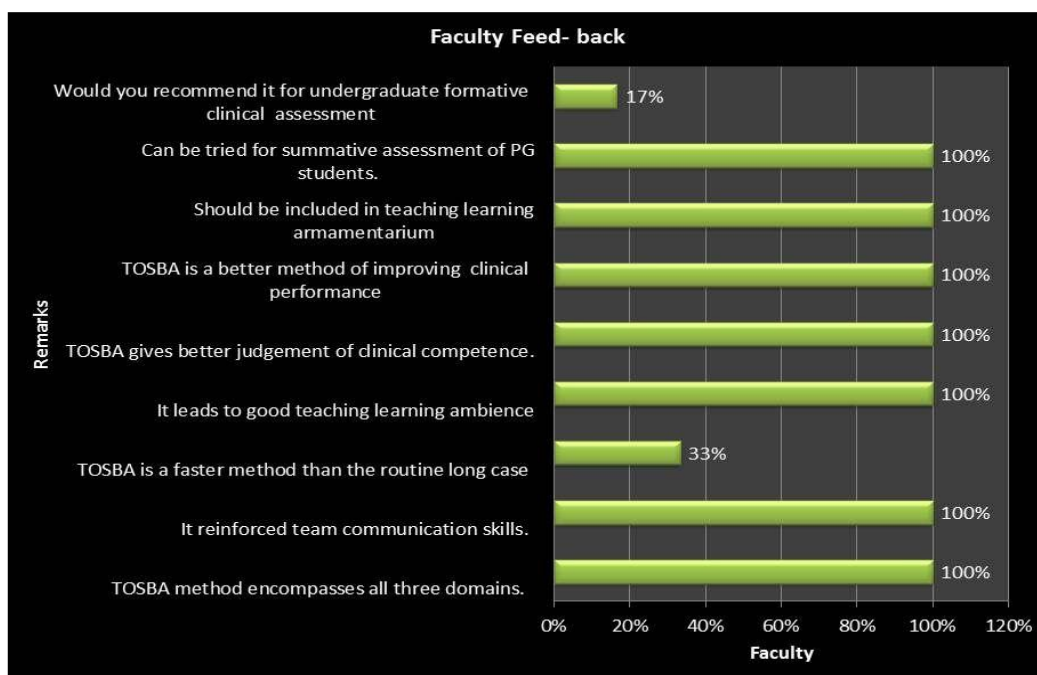


Figure 3: Faculty Feedback

Table 3: Comparison of pre-test and post-test results of TOSBA

| | Pre-test score (mean±SD) SD– Standard Deviation | Post-test score (mean±SD) | P value |
|---|--|---------------------------|---|
| Group A (Study groups of Otolaryngology and Medicine residents) N = 18 | 4.76 ± 0.87 | 7.51 ± 0.67 | <0.0001 (t = 10.6251, df = 34, standard error of difference = 0.259) |
| Group B (Control groups of Otolaryngology and Medicine residents) N= 18 | 4.11 ± 0.32 | 6.34 ± 0.12 | <0.0001 (t = 27.6834, df = 34, standard error of difference = 0.081) |

P value and statistical significance: (Between post –test values of study and control group) - The two-tailed P value is < 0.0001 (t = 7.2927, df = 34, standard error of difference = 0.160), considered to be extremely statistically significant.

DISCUSSION

Competence has been defined in various ways by different authors. The various components include strong foundation of basic clinical skills, scientific knowledge, and moral development. It encompasses several different domains namely, cognitive, integrative, relational, affective and moral function [11,12]. A formative assessment tool which tests all these domains would be best in making a competent doctor. TOSBA method of assessment is an attempt towards achieving this goal.

We found positive impact of TOSBA as a formative assessment tool in improving the clinical competence of otolaryngology residents. There was a statistically significant improvement in the post –test grade of all the students who participated (100%) and more so, in those who received feedback, that is the “study group” at the end of 3 TOSBA sessions.

A previous study has evaluated TOSBA as a formative assessment tool for improving final year students’ clinical competence [4]. The TOSBA

grades in their study showed an ordered relationship with performance in the final medical examination and were found to be superior to that when OSLE was used as a method of formative assessment. The clustering of the TOSBA with other assessments of clinical skills underlined its validity in their study. However, they did not compare the pre –test scores in all domains of learning with the post-test scores, ie the impact of TOSBA as a “learning strategy” on each aspect of learning. The summative assessments in India, focus mainly on knowledge acquisition rather than clinical competence. Hence, in order to find out the impact of TOSBA and feedback in improving clinical competence, we compared the post-test grades of the ‘study’ and ‘control’ group in the same TOSBA format with pre-test scores, instead of comparing the grades with summative assessment, which in the present format does not test all domains of learning.

Our study also explored students’ and faculty perceptions of the benefits of this type of assessment strategy on improvement in clinical competence. All students readily appreciated the learning value of TOSBA as formative assessment tool, in particular, the informative,

advisory and motivational role of feedback in guiding them about their own level of competence with special emphasis on personal learning needs. Knowledge of one's own competence may be a key mechanism by which feedback has impact on learning. They agreed that the deficiencies in the history taking, examination and communication skills are immediately noticed and rectified by feedback. Thus it improves the cognitive, psychomotor and affective domains of the learner by a single means of assessment. The vast majority also attributed an improvement in clinical reasoning and problem solving skills. It re-enforced their team communication skills and strengthened their confidence. The students also reported an increase in preparatory reading for TOSBA sessions. All the students agreed that TOSBA is a good way of assessing clinical competence and should form a regular part of post-graduate teaching.

All clinician educators participating in this study strongly acknowledged the educational value of TOSBA and the excellent teaching learning ambience with enhancement in team communication skills. They endorsed its use as a valid way of monitoring student progress during residency as it gives a better judgement of clinical competence of residents than conventional long case method. Most felt that it could be effectively used as a summative assessment tool for post-graduate students but were not convinced about its feasibility for formative undergraduate assessment due to large number of student groups.

A major concern regarding this study was of considerable bedside teaching time requirement for this "learning strategy" as it took more than one hour for each TOSBA session. 66.6% staff members believed that it is more time consuming than the conventional long case assessment method as the entire process is observed and followed by feedback. Considering the fact that at the same sitting, three students are being assessed, the individual time spent on each student for this "learning strategy" is in fact less. Focused history taking and examination can further help limit the time of each TOSBA session. 83.3% students found the examination time to be adequate. No additional staff resources were required.

We found the TOSBA method of formative assessment equally beneficial in the settings of Otolaryngology and Medicine department in terms of statistically significant improvement in the grades in all domains of learning. Both the department faculty and residents had a highly positive feedback response of this method of assessment. So we propose that this method of assessment can be applied effectively to all the clinical department's resident training program. Our students need to be empowered in team activities in order to improve clinical performance and TOSBA seems to be useful for achieving this goal.

Strengths of our study- Ours is probably the first study of TOSBA in post-graduate residents and comprising of each year resident. The group composition in our study makes assessment and improvement possible at each stage of residency programme. "Group clinical problem solving" assessment is possible. Comparison of impact of feedback on all domains of learning has been done in our study, by pre-test and post-test scores, which may not be possible by comparison with scores of summative setting, as in the present form, it has the bias of assessing only the cognitive aspect.

Limitations of the study and areas of further research- Some Bias could arise from involvement of researcher in the study. Due to small sample

size, further evidence is required on TOSBA effectiveness as a method for group clinical problem solving. Further research is also required to evaluate TOSBA as a summative assessment tool and to establish its ability in predicting and improving future clinical performance in practical setting after residency training.

CONCLUSION

TOSBA method of formative assessment has a positive role in improving the overall clinical competence of the post-graduate students as it improves all the three domains of learning, more so, when feedback is given for improvement. It provides excellent teaching learning ambience and re-enforces team communication skills of the residents. Hence, we propose that it should be incorporated into all the clinical departments' resident training program.

Conflict of interest: Nil.

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