Comparative Analysis Between Objective Structured Clinical Examination (OSCE) and Conventional Examination (CE) As a Formative Evaluation Tool in Pediatrics in Semester Examination for Final MBBS Students

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ABSTRACT

Background

The use of objective structured clinical examination in pediatrics is not common in undergraduate evaluation process.

Objective

To evaluate the effectiveness of objective structured clinical examination as compare to conventional examination as formative assessment tool in Pediatrics.

Methods

We conducted a cross sectional comparative study in defined population of 9th semester MBBS students to evaluate the effectiveness of objective structured clinical examination as comparison to conventional examination as formative assessment tool in Pediatrics. We analyzed the perception of objective structured clinical examination among the students.

Results

Fifty-two students appeared for the objective structured clinical examination evaluation on the first day and 42 turned up for conventional examination on the next day. The 42 students who turned up for both examinations were asked to respond to the perception evaluation questionnaire. Comparison of the two examination styles showed that students fared better in objective structured clinical examination than in conventional examination both with respect to mean total score ($p < 0.001$) as well as mean percentage score. Out of the 42 subjects who appeared in both examinations, all passed in objective structured clinical examination and 35 passed in conventional examination – this difference was significant by McNemar's chi-square test ($p = 0.016$). 73.8% of the students opined in favor of objective structured clinical examination as a better formative assessment tool whereas 9.5% students preferred conventional examination.

Conclusions

Objective structured clinical examination a statistically significant better evaluation tool with comparison to conventional examination.

KEY WORD

Comparative Study, Evaluation, Medical students, Pediatrics

INTRODUCTION

OSCE (Objective structured clinical examination) was first described in 1975 in medical students. It is a multi-system examination using real or simulated patients in western countries which evaluates clinical skills, attitudes and cognitive abilities. The students are given about five minutes in each station and are observed evaluating or are queried about a diagnosis or management of a particular condition. Examination involves mainly student's interpersonal skills, history taking skills, physical skills and diagnostic skills. The diagnosis and management evaluates student's knowledge base and problem solving ability. Grading/evaluation are

performed at each station with a predetermined checklist made with the help of teaching faculties. It demonstrated reliability and validity for assessing clinical performance, though labor and time intensive and requires some expertise.[1-3] The first OSCE in pediatric was reported from Britain in 1980. It had 18 stations performed in Pediatrics ward and took 80 minutes for assessing 20 students .[1-3] Since then few other centers around the world have used it in the evaluation process in their medical examination.[1- 4]

The use of OSCE (Objective structured clinical examination) in pediatrics is not as common as in adult medicine.[4] Comparative studies between OSCE and conventional examination (CE) in undergraduate formative evaluation in pediatrics are rarely reported.[4]

METHODS

This was a cross sectional comparative study in defined population conducted in the department of Pediatric Medicine, Institute of Post Graduate Medical Education and Research, Kolkata. The study was carried out over two consecutive days after the completion of clinical teaching tenure. All the final year MBBS students of 9th semester batch posted for pediatric clinical teaching during that session were included. Those students who were not physically well during that time or did not turn up for the examination were excluded from this study.

Ethical permission was obtained from the institutional Ethics Committee. Fifty two final year (9th semester) MBBS students, defined as study population, were planned to be evaluated as part of their formative assessment in pediatrics. They were asked to appear in OSCE as well as conventional style practical and viva examination (CE), with the same syllabus, on two consecutive days. The maximum possible score in both evaluations was 100.

The OSCE comprised of 20 stations designed to evaluate interpersonal, history taking, clinical examination and diagnostic skills of the students. Valid tasks and checklists for the OSCE were prepared in consultation with other senior faculty of the department. Standard marking plans with model answers were also prepared. The conventional examination comprised of traditional long case and short case evaluation followed by a general viva voce. All departmental faculties participated as examiners in both types of examination.

A questionnaire was designed to assess students' perception regarding both examination styles. The questions and the potential responses were carefully framed, again through departmental consensus meeting, although the questionnaire was not formally validated. The questions were selected to assess rigidity, stress, fairness and potential bias with respect to both examination styles. Negative and positive perception scores were calculated on the basis of this questionnaire. An overall impression regarding the more preferred examination style was also sought from the students.

The scores obtained by the participants have been summarized by routine descriptive statistics. Key percentages have been expressed with their 95% confidence intervals. Scores obtained have been compared between the two types of examination by Student's paired t test. McNemar's chi-square test was used to compare pass proportions between the two. Association between OSCE and CE total scores have been assessed using the intraclass correlation coefficient and extent of agreement between the two depicted by a Bland-Altman plot. Analysis was two-tailed with $p < 0.05$ taken to be statistically significant. Statistical version 6 [Tulsa, Oklahoma: StatSoft Inc., 2001] software was used for the analysis and MedCalc version 9.6.2 [Frank Schoonjans, 2008] for producing the Bland-Altman plot.

RESULTS

Fifty-two students appeared for the OSCE evaluation on the first day and 42 turned up for conventional oral and practical examination on the next day. The 42 students who turned up for both examinations were asked to respond to the perception evaluation questionnaire on the second day and 40 returned the same.

The scores obtained by the students in the two examinations have been summarized in table 1.

Statistical analyses of scores in the two types of examination are compared in table 2.

Comparison of the two examination styles showed that students fared better in OSCE than in CE both with respect to mean total score ($p < 0.001$) as well as mean percentage score in the long case presentation section ($p = 0.012$).

Intraclass correlation coefficient of the two total scores was 0.39 (95% confidence interval [CI] + 0.13 to + 0.67], indicating that there was some association, albeit weak, between the two. The extent of agreement between the total scores has been depicted in figure 1.

Regarding examination success rates, 49 of the 51 subjects appearing in OSCE passed (96.08%; 95% CI 90.75 to 101.41%), while 35 of the 42 appearing in CE passed (83.33%; 95% CI 72.06% to 94.60%). Of the 42 subjects who appeared in both examinations, all passed in OSCE and 35 passed in conventional examination – this difference was significant by McNemar's chi-square test ($p = 0.016$).

Of the 42 students who participated in the perception evaluation, 21 (50%; 95% CI 34.88 to 65.12%) expressed strong positive perception about OSCE that is they had positive perception score > 75%. On the other hand 6 (14.29%; 95% CI 3.70 to 24.87%) expressed strong negative perception about OSCE, implying negative perception score > 75%. The overall impression about the two examination styles is summarized in table 3.

Table 1. Descriptive summary of scores in the two types of examination in pediatrics

Valid N	Mean	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std.Dev.	Standard Error
OSCE_Tot 51	63.48039	65.0000	36.00000	76.0000	59.0000	70.0000	8.03677	1.125372
OSCE_Tot 42	64.96429	65.0000	52.00000	76.0000	62.0000	70.0000	6.369126	0.982777
CE_Tot 42	58.88095	60.7500	37.00000	78.0000	52.0000	66.0000	9.62518	1.485197
OSCE_LongP 51	60.73529	62.5000	29.00000	76.5000	55.0000	69.5000	10.99516	1.539630
OSCE_LongP 42	63.32143	64.0000	29.00000	76.5000	59.0000	69.5000	8.953689	1.381584
CE_LongP 42	57.50000	60.0000	30.00000	85.0000	50.0000	65.0000	11.90665	1.837236
Per_Pos75 40	19.77500	19.5000	14.00000	27.0000	17.0000	23.0000	3.33964	0.528044
Per_Neg7540	14.07500	14.0000	5.00000	22.0000	12.5000	17.0000	4.14102	0.654753

Abbreviations: CE = conventional oral & practical examination, OSCE = objective structured clinical examination, OSCE_Tot=OSCE total score, CE_Tot=CE total score, OSCE_LongP=OSCE clinical case percentage, CE_LongP=CE long case percentage, Per_Pos75=Positive perception, Per_Neg75=Negative perception.

Table 2. Descriptive statistics of scores in the two types of examination in pediatrics

	Range	Mean ±SD	Median (IQR)
OSCE total score (n = 51)	36.0 – 76.0	30.0 ±85.0	65.0 (59.0 – 70.0)
CE total score (n = 42)	37.0 – 78.0	58.9 ± 9.63	60.8 (52.0 – 66.0)
OSCE clinical case percentage score (n = 51)	29.0 – 76.5	60.7 ± 10.99	62.50 (55.0 – 69.5)
CE long case percentage score (n = 42)	30.0 – 85.0	57.5 ± 11.91	60.0 (50.0 – 65.0)

Abbreviations: CE = conventional oral & practical examination, IQR = interquartile range, OSCE = objective structured clinical examination, SD = standard deviation.

Table 3. Overall impression about the two examination styles obtained through perception evaluation questionnaire

	Number	Percentage (95% confidence interval)
Objective structured clinical examination better	31 / 42	73.81% (60.51 to 87.11%)
Conventional oral & practical examination better	4 / 42	9.52% (0.65 to 18.40%)
No comments	5 / 42	----------
Did not return questionnaire	2 / 42	----------

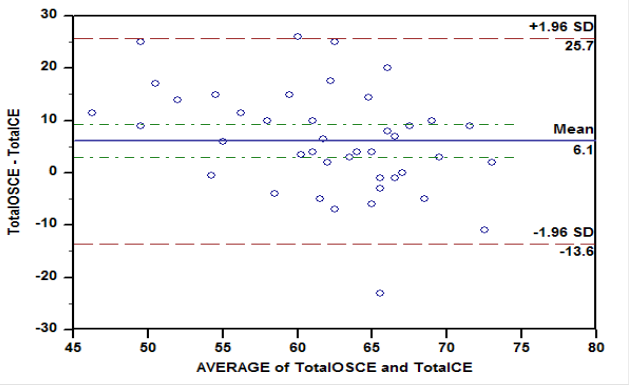

Figure 1. Bland-Altman plot depicting relatively weak agreement between total scores obtained in objective structured clinical examination (OSCE) and conventional oral & practical examination (CE) in pediatrics by forty-two 9th semester MBBS students.

Thus 73.8% of the students opined in favor of OSCE as a better formative assessment tool whereas 9.5% students preferred conventional examination.

DISCUSSION

OSCE has many advantages in comparison standard methods of evaluation. OSCE was first described in 1975 for evaluation of medical students. Some countries like Canada require satisfactory completion of OSCE as a licensing requirement. As an evaluation tool, it eliminates draw of luck, reduces inter-examiner marking variation and can accurately reflect real life task to be encountered by a doctor.[1-4]

Use of OSCE in Pediatrics is not as common as in adult medicine. The reasons for this are difficulty in procuring standardized patients and the need for well-informed parents to accompany the child patients. Still, many countries like US, UK, Canada, Turkey etc have effectively incorporated this evaluation tool in their medical examination system up to some extent.[1-4]

Only a few studies comparing OSCE with CE in undergraduate Pediatric examination are available in literature. Indian Academy of Pediatrics, in 2001, suggested that it should be given importance in post graduate examination, it did not comment on undergraduate evaluation process.[5] One study from Ludhiana in 1993 reported their experiences with OSCEs as a tool for formative evaluation. But they did not get a good correlation in comparison with clinical case presentation. They suggested that a comprehensive evaluation package containing both OSCE and conventional methods should be employed for clinical evaluation of medical students.[6] Another report of modified OSCEs to evaluate the 5th semester students is available from Kerala in 2004 which suggests its' usefulness.[7] One study

from KJ Somaiya Medical College, Mumbai presented in pediatric congress in 2010 concludes it as an effective tool in identifying lacunae in teaching methods.[8] Comparison of the two examination styles in our study showed that students fared better in OSCE than in CE. Significantly more number of students passed in OSCE than the conventional examination.

A study from University of Zaheden set out to see the acceptance of OSCE in students concluded that there was an overwhelming acceptance of OSCE as a tool for evaluation of medical students as regards comprehensiveness, transparency, fairness and authenticity. However, the students felt that it was a strong anxiety producing experience.[9] A study from Mumbai which was presented in Pediatric congress in 2010 also noted that the students had an overall positive perception towards OSCE.[8] As regards our study, proportionately more students opined in favour of OSCE (73.8% vs 9.5%). One of the limitations of the present study includes less in numbers of students included. It is an attempt to compare two different form of examination for formative evaluation in undergraduate medical examination in pediatrics. The exact role of OSCE versus CE in undergraduate evaluation process in pediatrics would require more number of large studies from different parts of the world.

However, we feel that OSCE should not be the only assessment tool but should be complimented by other evaluation methods as well. Previous workers have also given similar comments.[3, 9]

CONCLUSION

The study concludes that objective structured clinical examination (OSCE) is statistically significant better evaluation tool than conventional examination. Further studies are required before recommending OSCE as a formative evaluation tool in undergraduate pediatric training.

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