

Acquisition of history taking, physical examination and communication skills through early clinical exposure among pre-clinical students

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Abstract

Introduction: Early Clinical Exposure (ECE) has been shown to be an effective method in teaching history-taking, physical examination and communication to pre-clinical students. Medical students in their preclinical years at IOM, MMC have been undergoing two year ECE course since 1978, but there is no provision of formative and summative assessment to check its effectiveness. This cross-sectional study was undertaken to fill this gap in evidence.

Methods: A 17-station Objective Structured Clinical Examination was administered to 17 pre-clinical students. Of the 17 stations, seven, six and four stations were designed to test their skills in history-taking, clinical-examination and communication domains respectively. Modified borderline regression method was used to calculate the pass-marks for each station. The pass-marks of all the stations were averaged to determine the pass-marks for the entire OSCE.

Results: One student passed the entire OSCE whereas four and eight students passed the history taking and communication skills domains; while none could pass the physical examination skills domain. Repeated measure one-way Analysis Of Variance (ANOVA) and post-hoc test using the Bonferroni correction showed that scores in history taking ($M = 44.36$, $SD = 11.09$) and communication skills ($M = 44.40$, $SD = 12.12$) were significantly better than in physical examination ($M = 29.35$, $SD = 10.50$), ($p < 0.001$ and $p = 0.007$, respectively).

Conclusions: Despite enormous teaching hours allocated to the ECE course, pre-clinical students' performance in an OSCE did not meet the expectation of the curriculum suggesting that the ECE course at MMC, IOM is not fulfilling its objectives.

Keywords: Communication; early clinical exposure; medical history taking; physical examination; medical education

Introduction

Early Clinical Exposure (ECE), exposure of medical students to real patients in clinical settings occurring before the main clinical rotations¹ is at the heart of innovative curriculum² that medical schools around the world are adopting these days as a replacement for traditional discipline-based and vertically oriented curriculum. Studies have shown that the ECE helps in better understanding of basic science, appreciation of

its relevance in clinical practice,^{2,3} leading to motivation in its study² and also overall satisfaction with the education.^{4,5} It also increased students' confidence in meeting patients,⁴ improved understanding of the doctor-patient relationship and provided insight for their future work as doctors.^{2,6} Studies also show that pre-clinical students can acquire history taking,⁶⁻⁸ physical examination,⁹⁻¹¹ and communication,^{2,4,8} skills despite

their limited basic science and clinical knowledge.

Institute of Medicine (IOM), the first medical institute of Nepal, has adopted the ECE course ever since it started the Bachelor in Medicine and Bachelor in Surgery (MBBS) program in 1978. The course has been given equal importance as other subjects of basic science in terms of teaching hour allocation (three hours per week). During the ECE course, “clinical history taking” and “physical examination” skills are taught to the first and second year pre-clinical students respectively (figure 1). For this, the students of each batch are divided into four groups, posted in one of the four departments (internal medicine, pediatrics, surgery and gynaecology-obstetrics) and rotated every three months.¹² After the third revision of the curriculum in 2008, “communication skills” module is being taught

in the first year in the first department in which the students are posted.¹³ The curriculum of ECE aims to complete entire (general and systemic) clinical history taking and physical examination during the two pre-clinical years, so that these may not have to be taught during the main clinical rotations in the third year.^{12,13}

There is no formal provision of formative or summative assessment in the curriculum to evaluate the students during or after the completion of ECE, so little is known about the effectiveness of the ECE curriculum.^{12, 13} This study was undertaken to determine whether or not the pre-clinical students participating in the ECE course were gaining “clinical history taking”, “physical examination” and communication skills as specified in the curriculum.

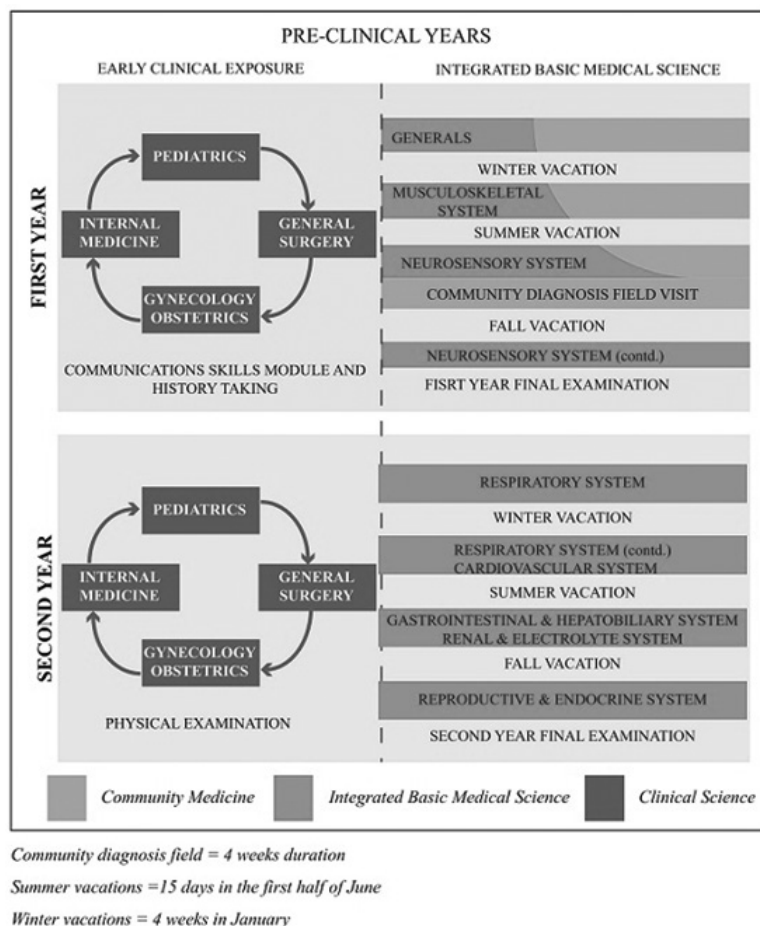


Figure 1. First year students learn communication skills in the first posting and history-taking skills in the remaining three postings while second year students learn physical examination skills throughout the year, concurrently with integrated basic medical science and community medicine.

Methods

A cross-sectional study, using Objective Structured Clinical Examination (OSCE) as a tool, was conducted to evaluate the history taking, clinical examination and communication skills (the three “domains”) of the pre-clinical students of Maharajgunj Medical College (MMC), IOM, who had completed their ECE during the two years of basic science.

Participants

To be eligible for the study, the participants had to pass two years of basic science (and, therefore, had completed the entire ECE course), but hadn't started the third year clinical postings (so that their performance wouldn't be influenced by what they had learnt in the clinical postings). At the time of the study, the MBBS batch of 2007, was on vacation after completing the pre-clinical studies and was yet to start the third year clinical postings. So, all the participants were selected from this batch. This batch was the last batch of the second revised curriculum, however communication skills module was implemented from this batch as a pilot program. Purposive sample was taken and twenty students (35.1% of the class) were randomly selected from a total of 57 who had passed the pre-clinical years. The selected students were informed about the study and asked for written consent. Two students who did not give consent were replaced by the next random students.

Research Design

Designing the OSCE

In order to ensure the validity, the entire process of the OSCE was designed and conducted in consultation with two faculties from each of the four departments in which the students rotated during the ECE. To further ensure the construct validity of the OSCE, a blueprint was designed to decide on the stations to be used in the OSCE. While designing the blueprint, attempts were made to balance the stations in terms of, (i) the three domains – history, clinical examination and communication skills – to be tested, (ii) the cases commonly seen in the four departments, and (iii) the organ-system involved. The stations were finalized based on the consensus of all the involved faculties. There were eight stations each in history taking and physical examination domains, and four stations in communication skills domain.

Designing the checklist

After finalizing the blueprint, case profiles for the history taking and communication skills stations were prepared.

Once the case profiles were ready, the evaluators' checklists were designed. The checklist for the history taking and clinical examination stations were designed in consultation with the faculties while the checklist for communication skills stations was adapted from Calgary-Cambridge rating scale.^{14,15} After numerous discussion and revisions, it was decided that in the checklist of each station, only the “must-know items” should be included and that every item should be given equal weightage. For each item in the checklist, the evaluator had to rate the performance of the examinee on a three-point scale: “Agree”, “Neither agree nor disagree” and “Disagree”. At the end of the checklist, the evaluator also had to give a global-rating to the overall performance of the examinee as either “Competent”, “Borderline” or “Needs improvement”.

Training of the standardized patients (SPs)

The study used 20 healthy volunteers as SPs. Since the institute didn't have its own SPs, volunteers were used for the purpose. The training of the SPs was started soon after the case profile for each stations was finalized. Each SP was trained until the SPs themselves and their trainers felt confident about their performance especially in terms of reproducibility of content, cooperation and emotions. The training sessions required by the SPs ranged from a maximum of six sessions to a minimum of 4 sessions, each session lasting one hour.

Training of the evaluators and the pilot study

To ensure the inter-rater reliability, 16 evaluators were given a two-hour training session on “Rating an OSCE checklist”. At the end of the training, a pilot study of two rounds of four-station OSCE was administered to 8 third year clinical students. The OSCE had two stations each for the history and clinical examination. The trained SPs were used for the “history-taking” and “physical examination” stations. The performance of each examinee was simultaneously evaluated by two evaluators. The analysis of the ratings of each pair of the evaluators in the pilot study showed that there was significant Pearson correlation (range 1.0 – 0.396) in 75% of the stations at 0.01 levels. After the pilot study, a discussion session was held to clarify various issues that the evaluators had to face while rating the OSCE and necessary changes were made accordingly.

Communication skills were evaluated using standardized scale by trained experts from the Communication Skills Unit of Institute of Medicine, so they were not given any training and no pre-testing was done.

One day before the OSCE, all the evaluators were sent a copy of the training material from the workshop and the final checklist of the stations that they would be evaluating.

The day of the OSCE

The OSCE was conducted on June 2010 in the premises of IOM. Since, 17 (seven female and ten males; 30% of the class) out of the 20 students appeared for the OSCE, three stations (one from history taking domain and two from clinical examination domain) had to be removed which was done in consultation with the faculties. During the OSCE, students rotated around the 17 stations spending five-minutes in each station. The evaluators rated the performance of the examinees using the pre-designed checklist.

Pass score calculation and analysis

The total marks obtained by each student in a given station was calculated by marking each item with "Agree" to 2 marks, "Neither agree nor disagree" to 1 marks and "Disagree" to 0 marks. Final score was calculated by adding the marks of all the items. In order to account for the difference in the total marks of each station and enable comparison across the stations, the

marks obtained by each student, and the pass marks were expressed in terms of percentage. Similarly, the 3-point global rating was converted as: 1- Needs improvement, 2- Borderline, and 3- Competent. The pass marks were then calculated using the borderline regression method.^{16,17} The students whose total marks in a station was equal to or greater than the pass marks were deemed competent in that station.

Pass-score for the entire OSCE was calculated by averaging the pass-score of all the stations.¹⁸ The pass-scores of the seven history taking stations were also averaged to get pass-score specific for history taking domain. Similarly, the pass scores for the physical examination and communication skills domains were also calculated, to perform domain-wise analysis.

Repeated measure one-way Analysis of Variance (ANOVA) and post-hoc test using the Bonferroni correction were used to calculate the difference in performance among the domains.

The ethical approval for the study was taken from the Institutional Review Board of the IOM. Informed written consent was taken from the simulated patients and the participating students. The analyses were done using Predictive Analytics Software (PASW) 18.

Results

The passing score for the entire OSCE was 51.0% and only one student could pass it. The median score for the entire OSCE was 40.0% (range 2.94% - 90.0%) (Table 1)

Table 1. Median marks (in percentage) obtained by students.

| Student ID | Median marks (percentage) | | | Total |
|------------|---------------------------|----------------------|----------------------|-------|
| | History taking | Physical examination | Communication skills | |
| 1 | 56.06 | 47.22 | 39.35 | 50.00 |
| 2 | 45.00 | 30.78 | 36.80 | 36.54 |
| 3 | 48.21 | 19.49 | 42.72 | 38.46 |
| 4 | 50.00 | 22.48 | 45.99 | 37.88 |
| 5 | 55.77 | 14.64 | 60.29 | 43.33 |
| 6 | 53.85 | 36.68 | 54.11 | 47.22 |
| 7 | 42.31 | 19.54 | 56.37 | 31.82 |
| 8 | 31.82 | 27.78 | 44.11 | 31.82 |
| 9 | 36.67 | 37.50 | 28.33 | 36.67 |
| 10 | 63.46 | 37.82 | 46.80 | 50.00 |
| 11 | 41.67 | 23.30 | 70.43 | 40.91 |
| 12 | 41.67 | 45.83 | 38.39 | 41.67 |
| 13 | 15.38 | 11.36 | 31.08 | 18.52 |
| 14 | 35.00 | 38.10 | 41.77 | 40.00 |
| 15 | 45.00 | 23.32 | 30.27 | 41.67 |
| 16 | 51.67 | 40.11 | 58.31 | 51.52 |
| 17 | 42.31 | 27.38 | 29.60 | 35.00 |

In domain-wise analysis, the passing score for the history taking domain was 52.21%, and for communication skills domain was 43.38%; and the with these thresholds only four and eight students could pass the history taking and communications skills domains, respectively. Meanwhile, for physical

examination domain the passing score was 54.05%, and no students could pass. The median score for the history taking domain was 45.00% (range 6.67% - 86.36%), for physical examination domain was 28.57% (range 2.94% - 90.00%) and for communication skills domain was 41.56% (range 9.26% - 85.29%) (Table 2)

Table 2. Domain-wise summary of median marks, pass marks and number of competent students

| Domain | Median marks | Pass marks | No. of competent students |
|----------------------|--------------|------------|---------------------------|
| History taking | 45.00% | 52.33% | 4 |
| Physical examination | 28.57% | 53.61% | 0 |
| Communication skills | 41.56% | 44.78% | 8 |
| Total | 40.00% | 51.00% | 1 |

A repeated measures ANOVA determined that students performance differed significantly in different domains ($F(2,32) = 12.36$, $p < 0.001$). Post-hoc tests using the Bonferroni correction revealed that students performed better in communication skill domains ($M = 44.40$, $SD = 12.12$) and history-taking domains ($M = 44.36$, $SD = 11.09$) compared to physical examination domains (M

$= 29.35$, $SD = 10.50$), which was statistically significant ($p = 0.007$ and $p < 0.001$, respectively). However, students' performance was only slightly better in communication skills domain compared to history taking domain, which was statistically insignificant ($p = 1.00$).

Discussion

In this study, only one student was able to pass the entire OSCE. In the domain-wise analysis, no student was able to pass the physical examination domain while even in history-taking and communication skills stations less than half could pass. Given the importance of the ECE course in terms of teaching hour allocation as well as the course content, the overall result of the study indicates that the students are failing to gain necessary skills as expected by the curriculum.

However, students have acquired several clinical history taking, physical examination and communication skills. But as the pre-ECE data is lacking, it is not possible to know how much of the skills have been acquired because of the ECE course and how significant is the acquisition. A study of communication skills of interns at our institute trained before the introduction of communication skills module is available, but because of variation in sample population and methods, its data cannot be used for comparison.¹⁹ Therefore, our study cannot refute the findings of the systemic review by Dornan et al²⁰ and its update by Yardley et al²¹ that students significantly gain skills through ECE.

There has never been any formative or summative

assessment or any other studies in the past to test the skills gained by students upon completion of the ECE course at our Institute. Therefore, we cannot tell whether the finding of our study is an isolated or a consistent occurrence across classes of different years. However, in the absence of any changes in the curriculum and its implementation, we would like to consider that the finding of our study can be generalized to other classes that underwent the same course.

Studies on ECE curriculum in medical schools across Europe as well as United Kingdom show that they had teaching of basic clinical skills and/or communications skills as their primary goals.^{1,22} Similarly, most of the studies reviewed by Dornan et al²⁰ and Yardley et al,²¹ showing positive outcomes and with curricular activity similar to ours, had an objective of teaching basic clinical^{2,6,9,23} or communication skills⁷ or both²⁴ and their results are valid only in that settings. These are in contrast with our curriculum, which envisions completing the teaching of entire history taking and clinical examination skills (both basic and systemic) in the pre-clinical phase without having to teach them again in the clinical phase.¹³ Such an overambitious

objective of the curriculum might not be possible to realize among pre-clinical students who have limited knowledge of basic science. This coupled with impracticality of posting all the students to a same department means that the content of the ECE sessions could be out-of-context of what is being taught in the theory classes (e.g., students get posted to Gynaecology and Obstetrics department before the completion of reproductive and endocrine system module, which takes place at the end of year two). As one study reports, such out-of-context teaching makes students feel overburdened and leads to decreased motivation.²⁵

However, the course content of communication skills has been designed according to contemporary practices across the globe, and the asynchrony with theory class is less of a problem as this skill is least, if at all, affected by prior medical knowledge. This could be the reason for better performance of students in this domain than other two.

Also there were faculty development trainings for communications skills, but not for history taking and physical examination. The training, apart from providing teaching skills, also improves the attitude of the faculties towards the ECE course,^{5,26} who themselves might not know the benefits of the course⁷ and consider it to be a “good to know” curricular activity.^{25,27} The absence of assessment also removes a very strong source of motivation for both the students and the faculties,^{24, 27-29} explaining the overall poor performance of the students.

A qualitative study of students’ and faculties’ perception of the ECE curriculum is needed to determine factors affecting the teaching-learning of history-taking, physical examination and communication skills through ECE.

Limitations:

A small sample size and inclusion of only one batch of students are the limitations of our study. Further quantitative studies to corroborate our findings with larger sample size and other batches of students is also recommended.

Conclusions

Despite enormous teaching hour allocated to the ECE course, pre-clinical students’ performance in an OSCE to test their skills in history taking, clinical examination

and communication, did not meet the expectation of the curriculum suggesting that the ECE course at MMC, IOM is not fulfilling its objectives. Further quantitative as well as qualitative study to explain our findings is warranted.

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Conflict of Interest: The authors discern that there is no conflict of interest.

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