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Original Article

Students, faculty perceptions and effectiveness of the early introduction of clinical skills teaching in the medical curriculum

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الملخص

أهداف البحث: يساعد الإدخال المبكر للمهارات السريرية الطلاب على تطوير المهارات السريرية وتطبيقها بشكل مناسب خلال السنوات السريرية. من المهم تقييم تصورات طلاب الطب وأعضاء هيئة التدريس فيما يتعلق بالإدخال المبكر لتدريس المهارات السريرية وفعاليتها.

طريقة البحث: تم تصميم منهج المهارات السريرية بالتكامل مع المنهج القائم على حل المشكلات في العامين الاول و الثاني في كلية الطب ، جامعة الملك سعود ، من يناير 2019 إلى ديسمبر 2019. تم تصميم استبانة الطلاب وأعضاء هيئة التدريس. تم تقييم تأثير فعالية تدريس المهارات السريرية من خلال مقارنة نتائج الاختبارات السريرية المبنية موضوعيا لطلاب السنة الثالثة الذين تلقوا جلسات المهارات السريرية المبكرة مع أولئك الذين لم يفعلوا ذلك. بلغ إجمالي عدد الطلاب المستجيبين 598/461 ، منهم 259 (56.2٪) من الذكور و 202 (43.8٪) من الإناث. كانت الاستجابات في السنة الأولى 247 (53.6٪) والثانية 214 (46.4٪). بلغ عدد أعضاء هيئة التدريس المستجبين 43/35.

النتائج: كان غالبية الطلاب وأعضاء هيئة التدريس لديهم رضا عن أن الإدخال المبكر للمهارات السريرية أدى إلى زيادة ثقة الطلاب عند التعامل مع مرضى حقيقيين، ومنح الفرصة لإتقان المهارات، وتعزيز المعرفة النظرية والمهارات السريرية، والتعلم المحفز، وزيادة حماس الطلاب ليصبحوا أطباء. قام طلاب السنة الثالثة الذين درسوا المهارات السريرية في العامين الأكاديميين الأول والثاني خلال عامي 2017-2018 و 2018-2019 بزيادة كبيرة في متوسط الدرجات في الاختبارات السريرية المبنية موضوعيا خلال دوراتهم في منهج الجراحة (32.6 و 37.4 للإناث ؛ 35.2 و 35.7 للذكور) وفي منهج الطب (31.2 و 34.1 للإناث ؛ 34.3 و 37.7 للذكور) على التوالي مقارنة بالطلاب الذين لم يدرسوا المهارات السريرية خلال العام الدراسي 2016-2017 في منهج الجراحة ، (22.2 و 23.2)؛ وفي الطب (25.1 و 24.2) للإناث والذكور على التوالي.

الاستنتاجات: كان التعرض المبكر لطلاب الطب للمهارات السريرية تدخلا إيجابيا يسد الفجوة بين العلوم الأساسية والممارسة السريرية.

الكلمات المفتاحية: التصورات؛ الفعالية؛ الإدخال المبكر للمهارات السريرية

Abstract

Objective: We hypothesized that the early introduction of clinical skills (CS) would help students to develop and apply clinical skills appropriately during the clinical years. Evaluating the perceptions of medical students and faculty regarding the early introduction of CS teaching and its effectiveness are important.

Methods: The CS curriculum was designed by integration with the system-oriented problem-based curriculum in years 1 and 2 at the College of Medicine, KSU, from January 2019 to December 2019. Students and faculty questionnaires were also designed. The impact of CS teaching effectiveness was assessed by comparing OSCE results for year-3 students who received early CS sessions with those who did not. The total number of student respondents was 461/598; and 259 (56.2%) were male and 202 (43.8%) were female. The first- and second-year

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respondents were 247 (53.6%) and 214 (46.4%), respectively. The number of faculty respondents was 35/43.

Results: The majority of students and faculty were satisfied that the early introduction of CS increased student confidence when dealing with real patients, provided the opportunity to master skills, consolidated theoretical knowledge and clinical skills, motivated learning, and increased the enthusiasm of students to become doctors. The third-year students who received CS teaching in years 1 and 2 (during 2017–2018 and 2018–2019) showed a significant increase in mean grades (p value; 0.00) in OSCE tests during their courses in surgery (from 32.6 to 37.4 for females; 35.2 to 35.7 for males) and medicine (31.2–34.1 for females; 34.3 to 37.7 for males), respectively, when compared to students who did not receive CS teaching during the academic year 2016–2017 (in surgery, 22.2 and 23.2; in medicine 25.1 and 24.2) for females and males respectively.

Conclusion: Early exposure of medical students to CS is a positive intervention that bridges the gap between basic sciences and clinical practice.

Keywords: Early introduction of clinical skills; Effectiveness; Perceptions

Introduction

Worldwide, medical education is placing increased weighting on high quality, accountability and transparency for ultimate patient care. Therefore, there is extensive literature emphasizing the importance that medical school undergraduates master essential cognitive (knowledge), psychomotor (skills) and affective (attitude) domains that are required for competent medical graduates.[1,2]

Global guidelines on medical education also emphasize the integration of medical curricula. Integration bridges the traditional barrier between the basic sciences and clinical correlations.[3] The literature supports the introduction of clinical skills (CS) sessions into the preclinical years,[4] thus enriching medical education and contextualizing that learning is more meaningful when it involves clinical practice.[5]

The early introduction of clinical skills teaching has received increased levels of attention.[6] The acquisition of clinical skills is a fundamental aspect of medical education to produce proficient and competent physicians.[7] However, CS needs significant time to be developed and mastered. The early introduction of CS teaching sessions helps students systematically learn, develop and apply these skills appropriately when they move to their clinical practice.[8]

These clinical skills sessions facilitate the integration of basic sciences and clinical sciences, thus ensuring that all students acquire essential skills and techniques and are evaluated on these learned skills before starting their clinical years and practicing on real patients.[9] In addition, CS has a significant impact on improving a student's knowledge, competence and self-confidence in a safe environment that helps to bridge the gap between preclinical and clinical years.[10] Many students have perceived the transition to clinical years as a stressful shift.[11] The difference between feeling ill-prepared and actually being ill-prepared relates to an insufficiency in knowledge relating to CS.[11]

At our institute, the medical education department at the University of King Saud has developed new CS sessions that were integrated with lectures and problem-based leaning (PBL) sessions, as based on the SaudiMED competencies. These were developed in 2016 and adopted by all medical schools in the KSA. The clinical skills course was introduced by integration with lectures, PBL sessions and tutorials, and incorporated different learning competencies. The clinical skills course was introduced to years 1 and 2 of the curriculum in the 2017–2018 academic year. The strategy of clinical skill teaching involved student interaction and communication with simulated patients, taking histories, performing appropriate physical examinations, and becoming familiar with basic procedural skills that were performed on mannequins and simulated patients who were related to the block content. The students are formatively assessed by direct observation and receive feedback during the sessions and by summative assessment through the Objective Structured Clinical Examination (OSCE) using structured checklists.

Over the past two decades, undergraduate medical education in the KSA has also undergone significant curriculum reforms by the application of a system-oriented, PBL method that has replaced the traditional approach. In our medical school setup, students are taught theory and practical classes involving the basic sciences in the first two years (preclinical). Clinical exposure starts at the beginning of the third year. In the preclinical years (years 1 and 2), the most prominent aspect in our reform at King Saud University (KSU), Riyadh, was the use of PBL; this is one of the most effective pedagogical approaches in medical education.

The faculty development program in the Department of Medical Education, College of Medicine offers workshops to improve faculty skills in the learning, teaching, and student assessment, for the implementation of the integrated reformed curriculum. Such programs have been proven to be effective for the faculty.[12]

This study aimed to investigate the perceptions of preclinical medical students and faculty regarding their satisfaction with the early-introduced CS curriculum. We also investigated the impact of the CS course on the student OSCE performance in year 3 (clinical) during the Surgery and Medicine courses (the longest courses in the year 3 curriculum; 18 weeks/each) through a comparison between OSCE results of students who did not receive the CS course (2016–2017) with those who did receive the CS course (2017–2018 and 2018–2019).

Material and Methods

We conducted a cross-sectional questionnaire-based descriptive study at the College of Medicine, KSU, Riyadh, KSA, between January 2019 and December 2019.

The study was approved by Institutional Review Board (Reference number: 20/0315/IRB), College of Medicine at King Saud University, Riyadh. Written informed consent was received from the participants for the publication of this manuscript.

The study included all students who had experienced the modified reform curriculum (where the early introduction of clinical teaching occurred). Any student who had not gone through the modified reform curriculum was excluded from the study. In order to acquire the perceptions of faculty, we also included the clinical teaching instructors who dealt with the students included in this study.

To acquire the student perceptions, a closed-ended quantitative self-administered questionnaire was designed that features two main categories. First, eight questions with a five-point Likert scale to assess the attitude and perceptions of students about the early introduction of CS and the new formative objective structured clinical examination (Table 1). Second, we assessed the student's perception of the CS program, which was subdivided into communication skills (2 questions), history-taking skills (10 questions), clinical reasoning skills (2 questions), physical examination skills (10 questions), procedural skills (5 questions) and 23 questions on self-confidence (Table 2).

The questionnaire was distributed to all preclinical students (years 1 and 2); 598 students were involved.

To acquire faculty perceptions, a quantitative closed-ended self-administered questionnaire was sent to all clinical teaching instructors (43 instructors); this contained 18 questions and was designed to assess the usefulness of the early introduction of teaching clinical skills, and whether the basic skills and confidence of the students were improved in the areas of history-taking, performing basic clinical skills, communication with patients and relatives, clinical reasoning, problem-solving, the ability to work collaboratively with other members of the team; being courteous and have a cooperative attitude, and motivation (Table 3).

The questionnaire was distributed to the clinical teaching faculty. Both students and faculty participants were informed about the voluntary nature of the study and were assured of the confidentiality of their responses.

For the effectiveness of CS teaching, the OSCE results of year 3 students in surgery and medicine courses were compared before (2016–2017) and after (2017–2018; 2018–2019) the curriculum change that introduced early CS teaching in the preclinical years as a descriptive study.

Statistical analysis

The reliability of the instrument was determined through internal consistency by applying Cronbach's alpha test. The alpha value was set at 0.05 for significance. The questionnaires were designed after an extensive literature review to achieve the study's objectives and were reviewed by multiple revisions and editing by all authors. Furthermore, to test the validity of the questionnaires to test the perceptions of students and faculty, a pilot study was carried on 14 medical students and 8 faculties who reviewed and ensured clarity and relatedness of the items to their educational clinical experience during their clinical teaching. Some suggested changes were incorporated at this stage.

Data were analysed using IBM Statistical Package of Social Science (SPSS) version 22 statistical Software. Descriptive statistics for continuous variables were computed by means ± SD or means ± SEM, whereas frequency and percentage were computed for categorical variables. The response rate was calculated in terms of percentage and mean ± SD.

The difference between various levels of agreement (perceptions) on the questions and the OSCE results were compared by using ANOVA. The data are presented as tables and graphs.

The response of the items was measured on a five-point Likert scale that was coded as 1, 2, 3, 4 and 5 for strongly disagree, disagree, neutral, agree and strongly agree, respectively. The satisfaction of the students and faculty was measured on a scale of one to five. It was considered that ≥ 3.5 = satisfied, 3 to ≤ 3.5 = fairly satisfied and <3 = unsatisfied.

Results

With regards to student perceptions, the total number of student respondents was 461 out of 598 (77% response rate);

Table 1: First- and second-year students' perceptions towards objective structured clinical examination.

Attitudes and perceptions toward OSCE	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean ± SD	p value for ANOVA
My level of anxiety before this exam was detrimental to my performance	16 (3.5%)	38 (8.2%)	150 (32.5%)	175 (38.0%)	82 (17.8%)	3.60 ± 0.9	<0.001
The exam tested my progress	9 (2.0%)	42 (9.1%)	120 (26.0%)	225 (48.8%)	65 (14.1%)	3.61 ± 0.7	<0.001
The exam was a worthwhile exercise	14 (3.0%)	29 (6.3%)	111 (24.1%)	195 (42.3%)	112 (24.3%)	3.8 ± 0.7	<0.001
The exam gave me a good chance to demonstrate my knowledge/ ability	15 (3.3%)	49 (10.6%)	110 (23.9%)	179 (38.8%)	108 (23.4%)	3.82 ± 0.8	<0.001
This type of exam is enjoyable	28 (6.1%)	62 (13.4%)	115 (24.9%)	136 (29.5%)	120 (26.0%)	3.63 ± 0.9	<0.001
This type of exam is appropriate for this stage of training	14 (3.0%)	27 (5.9%)	113 (24.5%)	190 (41.2%)	117 (25.4%)	3.72 ± 0.7	<0.001
This exam was acceptable to me	12 (2.6%)	24 (5.2%)	116 (25.2%)	202 (43.8%)	107 (23.2%)	3.73 ± 0.9	<0.001
The exam balanced integration of clinical skills with basic science	15 (3.3%)	51 (11.1%)	130 (28.2%)	168 (36.4%)	97 (21.0%)	3.59 ± 0.8	<0.001

Table 2: First and second year students' perception towards introducing the professional skills program.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean ± SD	p value for ANOVA
Communication skills							
Training was enough	52 (11.3%)	81 (17.6%)	128 (27.8%)	132 (28.6%)	68 (14.8%)	3.2 ± 0.9	<0.001
Training should be repeated before clerkship	15 (3.3%)	25 (5.4%)	101 (21.9%)	140 (30.4%)	180 (39.0%)	3.99 ± 0.8	<0.001
History-taking skills							
It was sufficient	14 (3.0%)	34 (7.4%)	155 (33.6%)	175 (38.0%)	83 (18.0%)	3.61 ± 0.8	<0.001
It helped in developing analytical skills	15 (3.3%)	28 (6.1%)	129 (28.0%)	207 (44.9%)	82 (17.8%)	3.70 ± 0.7	<0.001
It helped in applying theoretical knowledge	19 (4.1%)	39 (8.5%)	145 (31.5%)	181 (39.3%)	77 (16.7%)	3.63 ± 0.6	<0.001
No need for training on real patient	86 (18.7%)	120 (26.0%)	116 (25.2%)	89 (19.3%)	50 (10.8%)	2.77 ± 0.7	<0.001
It helped in collecting relevant information	9 (2.0%)	32 (6.9%)	151 (32.8%)	198 (43.0%)	71 (15.4%)	3.71 ± 0.9	<0.001
Consolidates theoretical knowledge	11 (2.4%)	35 (7.6%)	184 (39.9%)	166 (36.0%)	65 (14.1%)	3.54 ± 0.9	<0.001
Learning skills on simulated patients increased confidence when dealing with real patients	9 (2.0%)	18 (3.9%)	127 (27.5%)	155 (33.6%)	152 (33.0%)	3.99 ± 0.8	<0.001
Simulated patients gave the chance to master the skills	13 (2.8%)	28 (6.1%)	139 (30.%)	172 (37.3%)	109 (23.6%)	3.72 ± 0.7	<0.001
The training enhanced oral presentation skills	10 (2.2%)	29 (6.3%)	135 (29.3%)	174 (37.7%)	113 (24.5%)	4.01 ± 0.9	<0.001
The training on history scenario was helpful	15 (3.3%)	25 (5.4%)	123 (26.7%)	190 (41.2%)	108 (23.4%)	3.84 ± 0.7	<0.001
Clinical reasoning skills							
Able to ask relevant questions when interviewing a patient	9 (2.0%)	31 (6.7%)	140 (30.4%)	195 (42.3%)	86 (18.7%)	3.62 ± 0.8	<0.001
It helped to develop a plan of investigation for a given patient problem	10 (2.2%)	45 (9.8%)	146 (31.7%)	170 (36.9%)	90 (19.5%)	3.66 ± 0.8	<0.001
Physical examination skills							
Simulated patients helped to detect deviation	16 (3.5%)	36 (7.8%)	181 (39.3%)	162 (35.1%)	66 (14.3%)	3.5 ± 0.6	<0.001
Training does not need basic theoretical knowledge	75 (16.3%)	146 (31.7%)	135 (29.3%)	72 (15.6%)	33 (7.2%)	2.61 ± 0.7	<0.001
No need for training on real patients	104 (22.6%)	112 (24.3%)	130 (28.2%)	72 (15.6%)	43 (9.3%)	2.60 ± 0.7	<0.001
No need for learning abnormal physical signs before clerkship	107 (23.2%)	141 (30.6%)	112 (24.3%)	64 (13.9%)	37 (8.0%)	2.53 ± 0.8	<0.001
Training consolidated theoretical knowledge	14 (3.0%)	35 (7.6%)	195 (42.3%)	149 (32.3%)	68 (14.8%)	3.51 ± 0.7	<0.001
Learning theory with skills was motivating	7 (1.5%)	22 (4.8%)	163 (35.4%)	184 (39.9%)	85 (18.4%)	3.55 ± 0.7	<0.001
Training helped to present data from physical findings	8 (1.7%)	27 (5.9%)	167 (36.2%)	189 (41.0%)	70 (15.2%)	3.65 ± 0.9	<0.001
Consolidated the learning of theoretical knowledge	6 (1.3%)	29 (6.3%)	196 (42.5%)	168 (36.4%)	62 (13.4%)	3.60 ± 0.7	<0.001
Incorporated training on real patients with simulated patients was helpful	10 (2.2%)	30 (6.5%)	176 (38.2%)	163 (35.4%)	82 (17.8%)	3.67 ± 0.7	<0.001
Procedural skills							
Need more procedural skills	15 (3.3%)	46 (10.0%)	159 (34.5%)	156 (33.8%)	85 (18.4%)	3.52 ± 0.8	<0.001
Enjoyable experience	16 (3.5%)	27 (5.9%)	126 (27.3%)	10 (34.7%)	132 (28.6%)	3.82 ± 0.6	<0.001
It helped to practice on real patients	15 (3.3%)	27 (5.9%)	142 (30.8%)	165 (35.8%)	112 (24.3%)	3.7 ± 0.8	<0.001
Self-confidence							
Training increased my motivation for becoming a doctor	14 (3.0%)	18 (3.9%)	19 (25.8%)	152 (33.0%)	158 (34.3%)	4.0 ± 0.8	<0.001
Training increased my motivation for learning clinical subjects	11 (2.4%)	18 (3.9%)	120 (26.0%)	161 (34.9%)	151 (32.8%)	4.0 ± 0.9	<0.001
I have benefitted from the training of skills	18 (3.9%)	37 (8.0%)	148 (32.1%)	163 (35.4%)	95 (20.6%)	3.6 ± 0.8	<0.001

(*continued on next page*)

Table 2 (*continued*)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean ± SD	p value for ANOVA
I did not have to be afraid that I would do something wrong	39 (8.5%)	68 (14.8%)	159 (34.5%)	122 (26.5%)	73 (15.8%)	3.26 ± 0.8	<0.001
I did not have to be afraid that I would hurt the patient	25 (5.4%)	77 (16.7%)	175 (38.0%)	128 (27.8%)	56 (12.1%)	3.25 ± 0.7	<0.001
Skills learned on a manikin can be directly transferred to patients	32 (6.9%)	71 (15.4%)	210 (45.6%)	100 (21.7%)	48 (10.4%)	3.14 ± 0.8	<0.001
There is no difference in learning skills on a manikin and on a patient	70 (15.2%)	107 (23.2%)	151 (32.8%)	85 (18.4%)	48 (10.4%)	2.85 ± 0.7	<0.001
Skills laboratory training has increased my confidence	11 (2.4%)	34 (7.4%)	156 (33.8%)	157 (34.1%)	103 (22.3%)	3.72 ± 0.8	<0.001
Confidence is important for me when I perform clinical skills	14 (3.0%)	20 (4.3%)	134 (29.1%)	154 (33.4%)	139 (30.2%)	3.88 ± 0.9	<0.001

Table 3: Instructors' perception towards early introduction of clinical skills.

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean ± SD	p value for ANOVA
Early introduction of clinical skills (CS) is a useful module for first and second year students	0	0	1 (2.86%)	20 (57.14%)	14 (40%)	4.3 ± 0.9	<0.001
Early introduction of CS is a useful foundation for the clinical years	0	0	2 (5.71%)	18 (51.43%)	15 (42.86%)	4.3 ± 0.9	<0.001
Early introduction of CS helps students in adapting to the clinical learning environment	0	4 (11.43%)	0	15 (42.86%)	16 (45.71%)	4.2 ± 0.6	<0.001
Early introduction of CS provides the students with the confidence to approach the clinical supervisors	0	0	1 (2.86%)	19 (54.29%)	15 (42.86%)	4.4 ± 0.9	<0.001
Early introduction of CS prepares the students to approach patients	0	0	2 (5.71%)	16 (45.71%)	17 (48.57%)	4.4 ± 0.8	<0.001
Early introduction of CS makes the students' confident to perform history-taking and examination alone		1 (2.86%)	1 (2.86%)	18 (51.43%)	15 (42.86%)	4.3 ± 0.7	<0.001
Early introduction of CS makes the students confident to perform history-taking and examination in a group	0	0	2 (5.71%)	19 (54.29%)	14 (40%)	4.3 ± 0.7	<0.001
Early introduction of CS increases the ability to identify patient's major/ minor problems. Utilization of time, laboratory, other services in solving problems	0	3 (8.57%)	0	17 (48.57%)	15 (42.86%)	4.3 ± 0.8	<0.001
Early introduction of CS improved basic skills of history-taking and physical examination appropriate to clerkship level	0	2 (5.71%)	0	17 (48.57%)	16 (45.71%)	4.3 ± 0.6	<0.001
Early introduction of CS improved completeness, logic, and accuracy of communications regarding patient's problems	0	2 (5.71%)	1 (2.86%)	17 (48.57%)	15 (42.86%)	4.3 ± 0.7	<0.001
Early introduction of CS improved performance of tests or procedures. Regard for patient's comfort and dignity during procedure	0	2 (5.71%)	0	20 (57.14%)	13 (37.14%)	4.3 ± 0.7	<0.001
Early introduction of CS improved communications with patients, families, and colleagues	0	0	0	21 (60%)	14 (40%)	4.4 ± 0.8	<0.001

Table 3 (*continued*)

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Mean ± SD	p value for ANOVA
Early introduction of CS improved courtesy, empathy, and respect afforded all patients		3 (8.57%)	1 (2.86%)	17 (48.57%)	14 (40%)	4.2 ± 0.8	<0.001
Early introduction of CS improved the ability to work collaboratively with other members of the team; courteous and cooperative attitude	0	0	0	19 (54.29%)	16 (45.71%)	4.6 ± 0.9	<0.001
Early introduction of CS improved participation, eagerness to learn and responsiveness to evaluation stimulation of the learning process	0	3 (8.57%)	1 (2.86%)	16 (45.71%)	15 (42.86%)	4.2 ± 0.7	<0.001
Early introduction of CS increased the motivation and interest in the subject and skills of the clerkship	0	1 (2.86%)	1 (2.86%)	18 (51.43%)	15 (42.86%)	4.3 ± 0.8	<0.001
Early introduction of CS increased the promptness and preparation for scheduled activities	0	1 (2.86%)	2 (5.71%)	19 (54.29%)	13 (37.14%)	4.3 ± 0.7	<0.001
Early introduction of CS improved the willingness to undertake and complete responsibilities for patient care	0	0	0	22 (62.86%)	13 (37.14%)	4.3 ± 0.9	<0.001

259 (56.2%) were male and 202 (43.8%) were female. There were 247 (53.6%) first-year respondents and 214 (46.4%) second-year respondents.

The student perception results revealed that they were satisfied in all domains of the study by the early introduction of the CS (Figure 1; the student perception in different domains of the early introduction of clinical skills).

In the attitudes and perceptions domain, the student perception results showed overall satisfaction (3.68 ± 0.03) (Figure 1) and the results of each of the individual components of that domain are presented in Table 1. The male and female student perception results showed that they were satisfied that the early introduction of the CS tested their progress (3.58 ± 0.90 and 3.72 ± 0.89, respectively); that it was a worthwhile exercise (3.70 ± 1.02 and 3.90 ± 0.93, respectively); and that it provided a good opportunity to demonstrate knowledge/ability (3.50 ± 1.09 and 3.93 ± 0.93, respectively). Furthermore, the CS was enjoyable (3.41 ± 1.17 and 3.76 ± 1.17, respectively), appropriate for this stage of teaching (3.63 ± 1.06 and

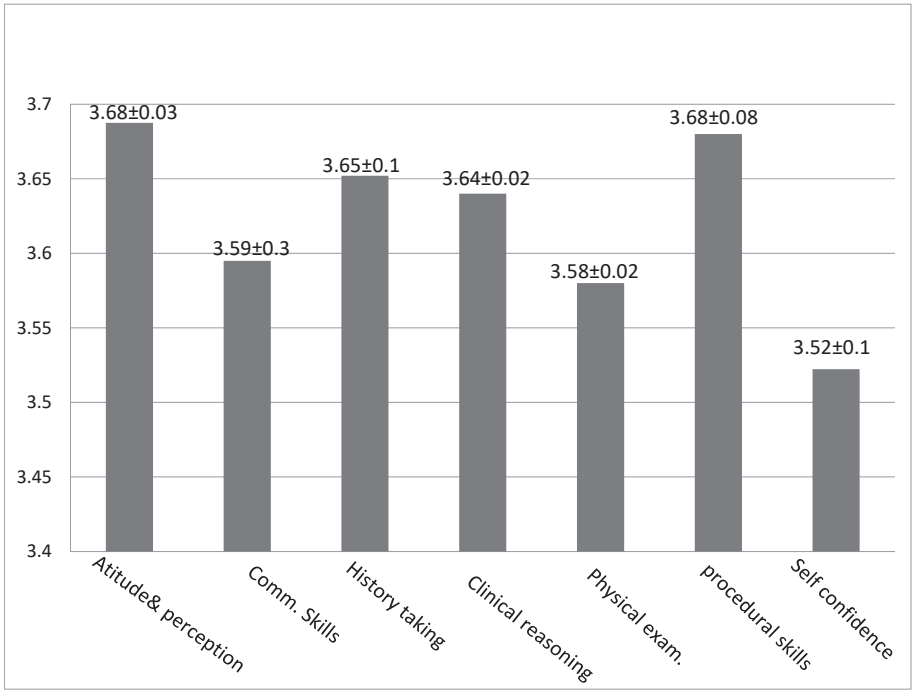

Figure 1: The students' perception (mean ± SEM) in different domains of early introduction of clinical skills.

4.02 ± 0.83, respectively), acceptable (3.64 ± 0.99 and 4.0 0.83, respectively) and achieved a balanced integration with basic sciences (3.51 ± 1.09 and 3.73 ± 0.96, respectively).

In the professional skills program domain, the student perception results showed overall satisfaction (3.59 ± 0.3) (Figure 1). The male and female student perception results showed a fair level of satisfaction with the communication skills (3.06 ± 1.23 and 3.33 ± 1.17, respectively); students expressed the opinion that the communication domain needed to be repeated before the internship (3.75 ± 1.13 and 4.24 ± 0.89, respectively).

In history-taking skills, the student perception results showed overall satisfaction (3.65 ± 0.1) (Figure 1) and the results of each of the individual components of that domain are presented in Table 2. Analysis showed that male and female students were fairly satisfied that the teaching was sufficient (3.39 ± 0.99 and 3.88 ± 0.85, respectively; $p < 0.001$). However, both male and female students were satisfied that the early introduction of the CS helped in developing their analytical skills (3.54 ± 0.96 and 3.86 ± 0.89), applying theoretical knowledge (3.44 ± 1.00 and 3.72 ± 0.98) and collecting relevant information (3.50 ± 0.89 and 3.80 ± 0.87). Learning skills with simulated patients increased their confidence when dealing with real patients (3.81 ± 0.99 and 4.05 ± 0.92) and gave them the opportunity to master key skills (3.59 ± 1.04 and 3.90 ± 0.88). Teaching enhanced their oral presentation skills (3.59 ± 0.97 and 3.99 ± 0.91) and teaching on the history scenario was helpful (3.60 ± 0.99 and 3.97 ± 0.93). However, results from the male student showed a fair level of satisfaction with the early introduction of the CS for consolidating theoretical knowledge when compared to the female group (3.41 ± 0.92 and 3.66 ± 0.88, $p = 0.002$).

Male students showed greater satisfaction than female students with the learning skills developed through working on simulated patients for increasing confidence when dealing with real patients (3.81 ± 0.99; 4.05 ± 0.92; $p = 0.007$), giving them the chance to master skills (3.59 ± 1.04; 3.90 ± 0.88; $p = 0.001$), enhancing oral presentation skills (3.59 ± 0.97; 3.99 ± 0.91; $p = 0.001$) and that the history scenario was helpful (3.60 ± 0.99; 3.97 ± 0.93; $p = 0.001$).

Analysis of student perceptions of clinical reasoning skills revealed overall satisfaction (3.64 ± 0.02) (Figure 1); the results arising from each of the individual components of this domain are presented in Table 2. Female students were more satisfied in that they were able to ask relevant questions when interviewing a patient (3.56 ± 0.94; 3.85 ± 0.86; $p = 0.001$) and to develop a plan of investigations for a given patient problem (3.53 ± 1.01; 3.73 ± 0.93; $p = 0.033$).

Analysis of the student perceptions of physical examination skills revealed overall satisfaction (3.58 ± 0.02) (Figure 1); the results of each individual component of this domain are presented in Table 2. Male and female students were only a little satisfied that simulated patients helped to detect mistakes (3.45 ± 1.01; 3.54 ± 0.87). Neither male or female students were satisfied that teaching did not need basic theoretical knowledge (2.74 ± 1.14; 2.55 ± 1.14), that there was no need for both teaching real patients (2.74 ± 1.27; 2.53 ± 1.21) and learning about abnormal physical conditions signs before the internship (2.59 ± 1.19; 2.45 ± 1.23) (Table 2).

Compared to males, the female students were more satisfied that the teaching consolidated theoretical knowledge (3.36 ± 0.95; 3.63 ± 0.91; $p = 0.002$), that learning theory with skills was motivating (3.57 ± 0.91; 3.84 ± 0.82; $p = 0.001$), that the teaching helped present data from physical findings (3.53 ± 0.90; 3.74 ± 0.82; $p = 0.008$), that the teaching consolidated learning theoretical knowledge (3.42 ± 0.89; 3.70 ± 0.77; $p = 0.001$), that incorporating teaching on real patients with simulated patients was helpful (3.44 ± 0.95; 3.80 ± 0.86; $p = 0.001$) and that the environment was supportive (3.33 ± 1.06; 3.61 ± 1.09; $p = 0.005$).

Analysis of the student perceptions of procedural skills results revealed overall satisfaction (3.68 ± 0.08) (Figure 1); the results of each of the individual components of this domain are presented in Table 2. Both male and female students were satisfied that the teaching was an enjoyable experience (3.63 ± 1.03; 4.00 ± 0.99; $p = 0.001$) and that it helped them practice on real patients (3.59 ± 0.98; 3.89 ± 1.01; $p = 0.002$); however, compared to females, the male students showed little satisfaction that they needed more procedural skills at this stage (3.45 ± 0.99; 3.66 ± 1.01; $p = 0.022$). Furthermore, males were less satisfied that the time was enough to practice (2.96 ± 1.18; 3.19 ± 1.20; $p = 0.039$).

Analysis of the student perceptions in the self-confidence domain revealed overall satisfaction (3.52 ± 0.1) (Figure 1); the results of each of the individual components of this domain are presented in Table 2. Both male and female students were satisfied that the teaching increased their motivation for becoming a doctor; this was significantly higher for female students (3.69 ± 1.03; 4.20 ± 0.91; $p = 0.001$); that the teaching increased motivation for learning clinical subjects (3.70 ± 0.98; 4.20 ± 0.90; $p = 0.001$); that teachers in the skills laboratory were committed to teaching (3.65 ± 1.01; 4.13 ± 0.91; $p = 0.001$); that teachers demonstrated the skills needed to understood what to do (3.63 ± 0.97; 4.00 ± 1.02; $p = 0.001$); that they have benefitted from the teaching of skills (3.51 ± 1.00; 3.74 ± 1.04; $p = 0.01$); that teachers went through the procedure with me before I had to perform it myself (3.51 ± 1.01; 3.79 ± 1.04; $p = 0.01$); that the skills laboratory teaching increased their confidence (3.54 ± 0.90; 3.83 ± 1.05; $p = 0.01$); and that confidence is important for performing CS (3.72 ± 0.99; 3.98 ± 1.01; $p = 0.007$).

Compared to the female students, the male students showed a fair level of satisfaction with the following affirmations: Teachers observed whether I learned what I was supposed to learn (3.46 ± 1.07; 3.82 ± 1.08; $p = 0.001$); I had to participate actively in class (3.39 ± 1.04; 3.74 ± 1.02; $p = 0.001$); I tried all stations in the skill laboratory that I participated in (3.41 ± 1.13; 3.63 ± 1.09; $p = 0.032$); I have developed a professional approach in the skills laboratory (3.40 ± 0.99; 3.61 ± 0.99; $p = 0.021$); and the skills laboratory teaching has increased my residency outcomes (3.35 ± 0.90; 3.64 ± 0.92; $p = 0.001$). However, both males and females were fairly satisfied that the residency provides a better opportunity to learn CS than the skills laboratory (3.24 ± 1.03; 3.04 ± 1.16; $p = 0.047$). They showed a fair level of satisfaction with the following affirmations: I did not have to be afraid that I would do something wrong (3.25 ± 1.11; 3.29 ± 1.19; $p = 0.711$); I did not have to be afraid that I

Table 4: The year 3 students' OSCE results (mean ± SD) in surgery and medicine before and after conducting early clinical skills teaching.

Subject	Gender	2016–2017	2017–2018	2018–2019	ANOVA
Surgery	Females	22.2 ± 5.5	32.6 ± 3.5	37.4 ± 2.8	p = 0.0000
	Males	23.2 ± 4.3	35.2 ± 3.1	35.7 ± 7.8	p = 0.0000
Medicine	Females	25.1 ± 3.4	31.2 ± 4.1	34.1 ± 3.5	p = 0.0003
	Males	24.2 ± 3.3	34.3 ± 3.4	37.7 ± 3.6	p = 0.0001

would hurt the patient (3.29 ± 0.98; 3.19 ± 1.12; p = 0.345); skills learned on a manikin can be directly transferred to patients (3.15 ± 1.01; 3.11 ± 1.05; p = 0.733); and there is no difference in learning skills on a manikin and on a patient (2.82 ± 1.16; 2.91 ± 1.23; p = 0.43) (Table 2).

Neither male nor female students found that there was too much noise in the skills laboratory (2.88 ± 1.16; 2.74 ± 1.14; p = 0.19); that there were too many students in the skills laboratory at the same time (3.30 ± 1.14; 3.04 ± 1.23; p = 0.02); that is was hard to concentrate in the skills laboratory (3.05 ± 1.06; 3.04 ± 1.12; p = 0.887); or that they were not under pressure any time when performing CS (3.05 ± 1.15; 3.17 ± 1.15; p = 0.2).

Regarding faculty perceptions, the total number of faculty respondents was 35 out of 43 (80% response rate). Analysis showed that almost all of the faculty were satisfied that the early introduction of CS was a useful module for first and second year students (4.1 ± 0.99); a useful foundation for the clinical years (4.2 ± 0.87); helped students in adapting to the clinical learning environment (4.1 ± 1.01); provided the students with the confidence to approach their clinical supervisors (3.99 ± 1); prepared the students to approach patients (4.5 ± 1.02); made the students confident about performing history-taking and examination alone (3.77 ± 0.89); made the students confident about performing history-taking and examination in a group (4.1 ± 0.8); increased the ability to identify patient's major/minor problems and utilisation of time, laboratory, other services in solving problems (3.66 ± 0.68); improved basic skills of history-taking and physical examination appropriate to internship level (3.87 ± 0.77); improved completeness, logic, and accuracy of communications regarding patient problems (3.88 ± 0.7); improved performance of tests or procedures regarding patient's comfort and dignity during procedures (3.8 ± 0.7); improved communications with patients, families, and colleagues (3.77 ± 0.99); improved courtesy, empathy, and respect afforded all patients (3.78 ± 1.01); improved the ability to work collaboratively with other members of the team and developed courteous and cooperative attitudes (3.77 ± 0.98); improved participation, eagerness to learn and responsiveness to evaluation stimulation of the learning process (3.76 ± 0.99); increased the motivation and interest in the subject and skills of the clerkship (3.76 ± 0.89); increased the promptness and preparation for scheduled activities (3.68 ± 0.7); and improved the willingness to undertake and complete responsibilities for patient care (3.8 ± 0.78) (Table 3).

Regarding the effectiveness of the early introduction of CS teaching, the results showed that the year-3 students who received the clinical teaching in years 1 and 2 (during academic years 2017–2018 and 2018–2019) achieved significantly increased scores on the OSCE for surgery and medicine courses compared to those students who did not receive the course (during the 2016–2017 academic year) (Table 4).

Discussion

This study investigated the perceptions of medical students and faculty with regards to the early introduction of CS and its impact on the OSCE results of students in the medicine and surgery courses. The results revealed student and faculty satisfaction on most points of the questionnaire.

In the 'attitudes and perceptions domain', the students reported that the early introduction of the CS was useful in monitoring their progress, was a worthwhile exercise, provided a good opportunity to demonstrate their ability, provided enjoyable sessions, was appropriate for this stage of teaching and provided a balanced integration of CS with basic sciences. The results of this study are in alignment with other studies, in which nearly all students acknowledged through online surveys that the CS alleviated anxiety and improved student confidence in transitioning to clinical practice.[13]

In the 'professional skills program domain', analysis of student perceptions revealed a fair level of satisfaction that the communication skills teaching was sufficient but found that it needed to be repeated before the internship. In addition, with regards to the sufficiency of teaching, the male students had a fair level of satisfaction when compared to the female group. However, both male and female students were satisfied that the early introduction of CS helped them to apply their theoretical knowledge, collect relevant information, and develop their analytical skills, as learning skills on simulated patients increased confidence when dealing with real patients.

Simulated patients gave students the opportunity to master the CS, and teaching history scenarios were very helpful; this also enhanced oral presentation skills. However, the perceptions of male students with regards to the early introduction of CS showed less satisfaction with the course's ability to consolidate their theoretical knowledge than the female group.

The student perception of clinical reasoning skills results showed that students were more satisfied in that they were able to ask relevant questions when interviewing a patient and to develop a plan of investigations for a given patient's problem.

Analysis of the student perceptions of physical examination skills showed that the male and female students were slightly satisfied in that simulated patients helped in detecting mistakes. However, both male and female students were unsatisfied because the teaching did not need basic theoretical knowledge and that there was neither a need for teaching

real patients nor learning abnormal physical signs before the internship. However, females were more satisfied that the teaching consolidated theoretical knowledge and that the learning theory with skills was more motivating.

In addition, the early introduction of CS helped to present data from physical findings, the teaching consolidated theoretical knowledge and the teaching with simulated patients was helpful and the environment was supportive, all of which would assist in teaching on real patients.

The students reported that this was an enjoyable experience and that it was helpful for examining real patients. However, compared to females, males showed little satisfaction; at this stage, they needed more procedural skills. The male group reported less satisfaction that sufficient time was provided for practice.

The students were satisfied that the teaching increased their inspiration to become a doctor and increased their stimulus and motivation for learning clinical subjects. However, the students were unsatisfied that there was no difference in learning skills on a manikin and on a patient.

Our results in the professional skills program domain were in alignment with another study that showed that students were positive about the role of their clinical skills training in preparing them for their clerkship in relation to three levels of Kirkpatrick outcome measures. This was particularly true for the domains of physical examination and procedural skills. However, analysis indicated some areas in need of program development, particularly in the history-taking domain14.

Almost the entire faculty was satisfied that the early introduction of CS was useful for preclinical students and that it was a building block for the clinical years. CS helped students to adapt to the clinical learning environment and provided them with the confidence to easily approach the clinical supervisors. CS teaching prepared the students to approach patients, made the students more confident in performing history-taking and examinations appropriate for the intern level either on their own or in a group. Furthermore, CS training increased their ability to identify major/minor problems in their patients and improved time management and the utilisation of laboratories and other services in solving problems. CS teaching has been shown to improve the completeness, logic and accuracy of communications regarding patient problems and communications with the relatives of patients and colleagues. CS teaching also improved the procedural performance with regards to the patient's comfort and dignity during procedures that required empathy and respect. CS teaching was shown to enhance participation and the ability to work collaboratively with other members of the team, being courteous and adopting a cooperative attitude. CS teaching also enriched eagerness to learn and being responsive to evaluating the learning process; it also increased motivation and interest in the subject matter and the skills of clerkship; finally, it was found to increase the promptness and preparation for scheduled activities and improved the willingness to undertake and complete full responsibilities for patient care. Our results were in congruence with another study in which CS facilitators completed a survey and reported their satisfaction in early CS exposure as a valuable introduction to the professional role of the physician in clinical practice, and that it improves interpersonal skills, ethics, learning, teacher preparation, social environment and overall stratification.[15]

The results of this study are supported by other studies which revealed that early clinical exposure led to a significant gain in skills,[5,16,17] as evidenced by a significant increase in the year 3 OSCE scores in medicine and surgery of those students who received the clinical teaching in years 1 and 2 when compared to those who did not. Furthermore, the majority of students were very positive regarding the early introduction of CS in the curriculum because it created interest and a better understanding of learning. Our results concurred with other studies which used questionnaires and focus groups to report student support and the positive impact of technical skills training on the perceived preparedness of students to perform the techniques advocated in addition to the first year of the undergraduate medical curriculum. Students also identified the specific components considered to be fundamental in the effective teaching of technical skills, thus providing guidance for the design of future undergraduate clinical skills training.[5,18,19]

The results of this study are supported by another report which showed that the majority of respondents agreed or strongly agreed with the usefulness of introducing CS in the early years.[20] Moreover, the majority of students agreed or strongly agreed (through quantitative and qualitative studies) that they enjoyed the CS sessions and agreed or strongly agreed that they found the CS teaching sessions useful.[15,20,21] Furthermore, conducting CS early in the curriculum enhanced the learning interest of almost all students. It also increased the satisfaction of students with their studies, making them feel more like medical students. The enhancement of learning interest was due to the practical nature of the CS component which allows students to be exposed to practical knowledge that would be useful in their future studies and careers, especially when the CS component is well integrated with lectures, PBL sessions and tutorials.[17,20]

Our results are in accordance with other studies which reported that the early introduction of clinical skills teaching increased student enthusiasm,[18,19] understanding and knowledge integration.[14,22–24] These quantitative and qualitative studies showed that despite their young age, many students believed that they were psychologically prepared for this exposure. For many, it was the highlight of their academic year, often reinforcing their original desire to study medicine and allowing them to experience the real world of medicine. In addition, the original desire of students to study medicine was reinforced, thus allowing them to experience the real world of medicine. The students also considered hands-on training to be their most rewarding experience.[25]

Moreover, previous systematic reviews concluded that new early experiences helped medical students to learn and develop appropriate attitudes towards their studies, made their learning more relevant, influenced career options[26,27] and increased their comfort level at the start of their internship phase.[28] Several other studies have also reported improved interpersonal and communication skills following CS teaching.[29,30]

Our findings are also in accordance with other studies in which the students were positive about the early introduction of

learning skills and were full of enthusiasm.[18] This practice increases the motivation of students,[19] reduces anxiety, provides greater confidence in the transition to clinical education, and improves preparation for clinical rotations by immersing students in the reality of the clinical environment.

Conclusion

The early implementation of CS teaching in the undergraduate medical curriculum improves different skills domains, such as attitudes, communication skills, history-taking, clinical reasoning, physical examinations, procedural skills and self-confidence, which are essential for patient care.

Limitations

A possible limitation of this study is that the participants were from one medical college and that the study was quantitative and depended on a closed-ended questionnaire and did not involve qualitative analysis of the perceptions of students and faculty opinions with regards to early CS teaching. Future research needs to demonstrate whether our findings are applicable to other medical schools that adopt different types of teaching methods. Future research needs to focus on the qualitative analysis of student and faculty perceptions.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

The study was approved by The Institutional Review Board (Reference: 18/0315/IRB), College of Medicine at King Saud University, Riyadh.

Authors contributions

KMS conceived and designed the work, interpreted the and reviewed the final draft. RNA conducted the study and gathered the data. FJ conducted the study and gathered the data. NL analysed the data and wrote the first draft. AHM reviewed and analysed the data and reviewed the final draft. FKN reviewed and analysed the data reviewing the manuscript and provided logistic support. DSF reviewed and analysed the data, reviewed the manuscript and provided logistic support. SM analysed the data, reviewed the first and final draft and provided logistic support. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

References

1. Tayade MC, Latti RG. Impact of early clinical exposure on psychomotor skills of medical students in Indian medical education set up. **Indian J Public Health Res Dev 2020**; 11: 1–7.
2. Lofaso DP, DeBlieux PM, DiCarlo RP, Hilton C, Yang T, Chauvin S. Design and effectiveness of a required pre-clinical simulation-based curriculum for fundamental clinical skills and procedures. **Med Educ Online 2011**; 16: 7132–7140.
3. Aggarwal N, Bansal N, Mahajan R, Verma N, Gupta M. Perception analysis of an early clinical exposure module in anatomy for first year undergraduate medical students in a North Indian medical college. **J Educ Technol Health Sci 2021**; 8: 26–32.
4. Bugai TG, Nikendei C. Practical clinical training in skills labs: theory and practice. **GMS J Med Educ 2016**; 33(4).
5. Rawekar A, Jagzape A, Srivastava T, Gotarkar S. Skill learning through early clinical exposure: an experience of Indian medical school. **J Clin Diagn Res 2016**; 10. JC1–4.
6. Wenrich M, Jackson MB, Scherpbier AJ, Wolfhagen IH, Ramsey PG, Goldstein EA. Ready or not? Expectations of faculty and medical students for clinical skills preparation for clerkships. **Med Educ Online 2010**; 15: 5295.
7. Gowda S, Kumar A, Sabane H, Dhumale A, Heming T. Physical diagnosis and clinical integration module for nurturing medical students during their pre-clerkship education. **Educ Méd J 2015**; 7: 180–1932.
8. O'Brien B, Cooke M, Irby DM. Perceptions and attributions of third-year student struggles in clerkships: do students and clerkship directors agree? **Acad Med 2007**; 82: 970–978.
9. Hashim R, Qamar K, Khan MA, Rehman S. Role of skill laboratory training in medical education-students' perspective. **Learning 2016**; 1: 3.
10. Swamy M, Bloomfield TC, Thomas RH, Singh H, Searle RF. Role of SimMan in teaching clinical skills to preclinical medical students. **BMC Med Educ 2013**; 13: 20.
11. van Hell EA, Kuks JB, Schönrock-Adema J, van Lohuizen MT, Cohen-Schotanus J. Transition to clinical training: influence of pre-clinical knowledge and skills, and consequences for clinical performance. **Med Educ 2008**; 42: 830–837.
12. El-Ashkar AM, Miskeen EI, Alghamdi M, Amin HA, Hassanien M. Evaluating the effectiveness of faculty development program at the college of medicine, University of Bisha. **MedEdPublish 2021**; 10: 137.
13. Imus FS, Burns SM, Fisher R, Ranalli L. Students perceptions on pre-clinical experience in a front-loaded nurse anesthesia program. **J Nurs Educ Pract 2015**; 5: 22–27.
14. Al-Jishi, Khalek NA, Hamdy HM. *A licence to publish this material has been given to Education for Health*. 222; 2009. p. 2., http://www.educationforhealth.net.
15. Nimkuntod P, Kaewpitoon S, Uengarporn N, Ratanakeereepun K. Tongdee perceptions of medical students and facilitators of an early clinical exposure instructional program. **J Med Assoc Thail 2015**; 4: S64–S70.
16. Shah C. Early clinical exposure-why and how? **J Educ Technol Health Sci 2018**; 5: 2–7.
17. Seale J, Knoetze M, Phung A, Prior D, Butchers C. Commencing technical clinical skills training in the early stages of medical education: exploring student views. **Med Sci Educ 2019**; 29: 173–179.
18. Chari S, Gupta M, Gade S. The early clinical exposure experience motivates first year MBBS students: a study. **Int J Educ Sci 2015**; 8: 403–405.
19. Baheti SN, Maheshgauri D. Early clinical microexposure (Ecmix) (a path from early clinical micro exposure to early clinical macro exposure (Ecmax)). **Glob J Res Anal 2015**; 4: 1–2.

20. Lam TP, Irwin M, Chow LWC, Chan P. Early introduction of clinical skills teaching in a medical curriculum—factors affecting students' learning. **Med Educ 2002**; 36: 233—240.
21. Basak O, Yaphe J, Spiegel W, Wilm S, Carelli F, Metsemakers JFM. Early clinical exposure in medical curricula across Europe: an overview. **Eur J Gen Pract 2009**; 15: 4—10.
22. Sathishkumar S, Thomas N, Tharion E, Neelakantan N, Vyas R. Attitude of medical students towards early clinical exposure in learning endocrine physiology. **BMC Med Educ 2007**; 7: 30.
23. Vyas R, Jacob M, Faith M, Isaac B, Rabi S, Sathishkumar S, et al. An effective integrated learning programme in the first year of the medical course. **Natl Med J India 2008**; 21: 21—26.
24. Vyas R, Sathishkumar S. Recent trends in teaching and learning in physiology education early clinical exposure and integration. **Int J Basic Appl Physiol 2012**; 1: 175—181.
25. McLean M. Sometimes we do get it right! Early clinical contact is a rewarding experience. **Educ Health 2004**; 17: 42—52.
26. Dornan T, Littlewood S, Margolis SA, Scherpbier AJJA, Spencer J, Ypinazar V. How can experience in clinical and community settings contribute to early medical education? A BEME systematic review. **Med Teach 2006**; 28: 3—18.
27. Littlewood S, Ypinazar V, Margolis SA, Scherpbier A, Spencer J, Dornan T. Early practical experience and the social responsiveness of clinical education: systematic review. **BMJ 2005**; 331: 387—391.
28. Whipple ME, Barlow CB, Smith S, Goldstein EA. Early introduction of clinical skills improves medical student comfort at the start of third-year clerkships. **Acad Med 2006**; 81: S40—S43.
29. Kossoff EH, Hubbard TW, Gowen CW. Early clinical experience enhances third-year pediatrics clerkship performance. **Acad Med 1999**; 74: 1238—1241.
30. Hook KM, Pfeiffer CA. Impact of a new curriculum on medical students' interpersonal and interviewing skills. **Med Educ 2007**; 41: 154—159.

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