Early Patient Contact: Exploring the horizons in Physiology

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ABSTRACT

Background: Principles in Physiology should be understood by the medical students to relate with context of disease, but the first year of medical career is taught mainly by didactic lectures and tutorials with little or no exposure to patients. **Objectives:** The aim is to find the effect of early patient contact in increasing the ability of students to correlate physiological principles with clinical scenario, in improvement of communication and clinical examination skills, and to explore perception of students regarding the effectiveness of early patient contact. **Materials and Methods:** This was a post-test only control group design with convenience sampling involving a batch with 26 participants in control group and study group (respiratory system [RS]) and after crossing over, 28 participants in study and control group (cardiovascular system [CVS]). The intervention group received the routine clinical teaching and early patient contact, whereas the control group received routine clinical teaching and revision. Feedback was collected using validated questionnaire followed by focus group discussion. **Results:** The difference in post-test scores in RS and CVS of control and study was statistically significant ($t = 10.99$, $P = 0.0001$; $t = 6.90$, $P = 0.0001$). The results were statistically significant when the knowledge, skill, and attitude were compared among study and control group in RS and CVS with the exception of attitude in CVS which was not statistically significant. **Conclusions:** Early patient contact was a method that helped students understand the principles and relevance of physiology; provided an early experience in terms of knowledge and skills and an enriching experience of a doctor–patient relationship indirectly.

KEY WORDS: Early Patient Contact; Focus Group Discussion; Communication Skills; Clinical Examination Skills

INTRODUCTION

In early curriculum years, what is important is the understanding of principles by the medical students instead of rote learning since concrete experience is important.[1,2] Physiology is a discipline where mechanisms need to be taught and learned effectively to improve comprehension, so as to be placed in the context of pathology or disease when medical students practice in the community. However, this core subject is mainly taught by means of didactic lectures, practical classes, and tutorials with little or no exposure to patients in the first year of medical career.[3]

The Medical Council of India vision document has recommended curricular reforms for undergraduate and postgraduate medical students which include early clinical exposure (ECE).[4]

Goals of early patient contact are to provide relevance to societal aspects and context to basic science teaching and learning, enhancement of medical knowledge, learning of few basic clinical skills, and acquire a wide range of attitudes.[5,6]

Early patient contact and the accompanying knowledge and skills development is not a replacement of basic and clinical sciences, but instead, it is a contextualization of the learning.[7]

Hence, this study was planned to expose the students to the patients so as to bridge the gap between Physiology and clinical practice with the following objectives:

1. To sensitize students about clinical relevance of physiological principles through early patient contact
2. To determine the effect of early patient contact in increasing the ability of students to correlate physiological principles with clinical scenario
3. To determine the effect of early patient contact in improvement of communication and clinical examination skills
4. To explore the perception of students regarding the effectiveness of early patient contact.

MATERIALS AND METHODS

The Institutional Ethics Committee approval was obtained before the start of the study. The study design was a post-test - only control group design. There were three batches A, B, and C. Batch C was selected by simple random sampling (lottery method) which included a planned study sample of 60 students, with 30 cases and 30 control. This batch was divided into odd and even roll numbers and these groups were randomly assigned to intervention and control group. However, due to absenteeism and not completing all the sessions, the number of students in the respiratory system (RS) groups was 26 each in study and control and the students in cardiovascular system (CVS) groups were 28 each in study and control. Site of the study was the Department of Physiology, Jawaharlal Nehru Medical College, and Acharya Vinoba Bhave Rural Hospital. Written Informed consent was obtained from the intervention group.

Inclusion Criteria

The students who had attended all the sessions of ECE.

Plan of work was as follows:

Intervention group

Routine clinical teaching + ECE. Modules of the topics for ECE were prepared. In the first clinical session of the week, in the span of 2 h, the students were taught the principles of the topic along with the routine clinical teaching regarding the examination of RS. In the next session, they were taken to the ward related to the topic and were asked to observe and perform the following:
a. The communication between the doctor and patient (observation)
b. Examination taught to them in the routine teaching imparted.

Majority of the students performed the clinical skills on the patients. The principles taught to them were reinforced during the clinical exposure.

Control group

The students in the control group in first clinical session received the routine clinical teaching of RS to match with the intervention group. They were just taught the clinical examination on a healthy participant as routinely carried out without any clinical exposure. On the second clinical session of the week, they received a revision of clinical examination of RS again without any clinical exposure. The Objective Structured Clinical Examination (OSCE) was conducted and feedback was taken from the students after which the students were crossed over and CVS was introduced.

Cross Over

In next week, after the assessment and feedback of 60 students in RS clinical session, the students in the batch were crossed over. The control group received the intervention, that is, principles + routine clinical teaching + ECE with a new system, for example, CVS. In CVS, they were shown echocardiography explaining them the principles and also the students were made to perform on the patients. The intervention group behaved as control group receiving only routine clinical teaching, that is, of CVS. At the end of the intervention, OSCE was conducted and feedback was taken from the students using a validated questionnaire. OSCE included procedural stations in which interpersonal relationship section was an integral component and a response station in which cognitive domain was assessed involving problem-solving multiple choice questions (MCQ's). The students who did not attend the sessions were also assessed by OSCE but their results were not analyzed.

Feedback Questionnaire

The questionnaire comprised four sections: Section A to section D. It comprised questions evoking quantitative and qualitative data. Section A-C involved questions evoking quantitative responses and Section D dealt with qualitative responses.

Focus Group Discussion (FGD)

At the end of the complete study, an FGD was conducted for in-depth perception from the students regarding the Early Patient Contact. 10 students were randomly selected for the FGD which included 5 females and 5 males. Written consent was obtained from each participant for participation. One facilitator having experience in conducting an FGD guided the session. One rapporteur noted verbal and non-verbal gestures (Table 1).

Statistical Analysis

Cognitive domain was assessed using post-test involving problem-solving MCQ's which was kept as a response station in OSCE. Psychomotor domain was assessed with OSCE (the students were oriented about OSCE before the assessment). Communication skills were assessed with OSCE with the section of communication and interpersonal relationship as an integral part of OSCE. Perception was gathered using a validated questionnaire. Statistical analysis was performed using descriptive and inferential statistics using Student's unpaired *t*-test and software used in the analysis were SPSS 21.0 version and EPI INFO 7.0 version and the $P < 0.05$ is considered as level of significance.

RESULTS

There was a statistically significant difference between the study and control groups for RS and CVSs ($P = 0.001$) (Table 2).

Table 1: FGD guide

Explanation of purpose of FGD:
Introduction of self and participants:
Themes:
   1. ECE was it needed and why?
   2. What were your expectations from ECE sessions?
   3. What were your experiences of these ECE sessions?
   4. What are your suggestions for improving ECE experience?
Thanks to the quorum.

ECE: Early clinical exposure, FGD: Focus group discussion

In RS, when knowledge, skills, and attitude were compared, there was a significant difference between the study and control groups (Table 3).

In CVS, when knowledge, skills, and attitude were compared between study and control groups, there was a significant difference in knowledge and skills but not in attitude (Table 4).

Feedback analysis showed positive comments in process of ECE and personal experience during ECE except that 18.51% reported that they did not get a chance to perform examination in patient also reflected in personal experience during ECE where 14.81% reported that their confidence level did not improve after examining the patients (Table 5).

The best points reported by students were ranging from understanding of the topic to enhancement of practical knowledge. The limiting points reported were language barrier and less time available (Table 6).

FGD was held on four themes in which the students reported positively and suggested that there should be multiple visits (Table 7).

DISCUSSION

In the present study, we assessed the effectiveness of early patient contact in correlating physiological principles clinically and effect on communication and clinical skills. Statistically significant difference was observed in the post-OSCE scores in study group and control group of RS ($t = 10.99$,

Table 2: Comparison of post-OSCE scores of RS and CVS

System	Group	N	Mean±standard deviation	Standard error mean	Mean difference	*t* value
RS	Control	26	4.65±2.13	0.41	5.46±0.49	10.99 P=0.0001, S
	Study	26	10.11±1.36	0.26		
CVS	Control	28	7.28±1.51	0.28	2.35±0.34	6.90 P=0.0001, S
	Study	28	9.64±0.98	0.18		

OSCE: Objective Structured Clinical Examination, CVS: Cardiovascular system, RS: Respiratory system

Table 3: Comparison of RS knowledge, skill, and attitude in two groups

Domain	Group	N	Mean±standard deviation	Standard error mean	Mean difference	*t* value
Knowledge	Control	26	0.80±0.69	0.13	1.73±0.23	6.90 P=0.0001, S
	Study	26	2.53±0.98	0.18		
Skill	Control	26	3.34±1.67	0.32	1.65±0.42	3.88 P=0.0001, S
	Study	26	5.00±1.38	0.27		
Attitude	Control	26	0.42±0.80	0.15	2.15±0.20	10.62 P=0.0001, S
	Study	26	2.57±0.64	0.12		

RS: Respiratory system

Table 4: Comparison of CVS knowledge, skill, and attitude in two groups

Domain	Group	N	Mean±standard deviation	Standard error mean	Mean difference	t value
Knowledge	Control	28	0.50±0.57	0.10	1.21±0.15	7.71 P=0.0001, S
	Study	28	1.71±0.59	0.11		
Skill	Control	28	4.17±1.24	0.23	0.78±0.28	2.72 P=0.009, S
	Study	28	4.96±0.88	0.16		
Attitude	Control	28	2.92±0.26	0.04	0.03±0.06	0.585 P=0.561, NS
	Study	28	2.96±0.18	0.03		

CVS: Cardiovascular system

Table 5: Feedback analysis of process of early patient contact and personal experience during early patient contact

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)
Process of ECE					
Time management was adequate	0 (0)	5 (9.25)	2 (3.70)	44 (81.48)	3 (5.55)
The physiological principles were explained clearly by the faculty	0 (0)	0 (0)	4 (7.40)	47 (87.03)	3 (5.55)
The cases were explained properly by the clinical faculty	0 (0)	0 (0)	5 (9.25)	44 (81.48)	5 (9.25)
I got a chance to perform examination on the patient	0 (0)	10 (18.51)	0 (0)	39 (72.22)	5 (9.25)
Doctor–patient relationship was shown during ECE	0 (0)	0 (0)	7 (12.96)	40 (74.07)	7 (12.96)
Such clinical exposures should be promoted	0 (0)	0 (0)	1 (1.85)	9 (16.66)	44 (81.48)
Personal experience during ECE					
I was apprehensive in dealing with patients	0 (0)	0 (0)	10 (18.51)	36 (66.56)	8 (14.81)
My confidence level improved after examining the patients	0 (0)	8 (14.81)	5 (9.25)	32 (59.25)	9 (16.66)
My knowledge improved about the topic	0 (0)	0 (0)	6 (11.11)	39 (72.22)	9 (16.66)
My concept about the relevance of physiology improved	0 (0)	0 (0)	4 (7.40)	40 (74.07)	10 (18.51)
This exposure motivated me to study physiology of other topics too	0 (0)	0 (0)	7 (12.96)	34 (62.96)	13 (24.07)

SD: Strongly disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly agree, ECE: Early clinical exposure

$P = 0.0001$) and CVS ($t = 6.90$, $P = 0.0001$) (Table 2). When knowledge, skills, and attitude were compared taken as an integral part of OSCE and then segregated in study and control groups involving RS, the difference was statistically significant (Table 3). In the present study, when knowledge, skills, and attitude in study and control group were analyzed for CVS, there was a significant difference in knowledge and skill domain, but there was no statistically significant difference in attitude (Table 4). This was because in CVS, the students in control group were initially the students who were in study group of RS and they were inducted to professional attitude during their study period in RS. Crucial to the success of medical students are especially the first 2 years not due to the knowledge gained, but the attitude and perceptions formed on the physician's role and medical knowledge status.[8,9]

Clinical experience being a key ingredient provides medical students with an experiential platform for learning basic science content and gives opportunities to experience the relevance between basic science knowledge and its clinical application.[10,11]

In our study also, early patient contact had a positive impact on all the domains and the students were not only able to correlate the physiological principles clinically but also developed skills and a better doctor–patient relationship.

Similar findings were observed in a study conducted by Tayade et al.[7] but with topic of breast cancer and with different tools such as knowledge was tested through problem-based MCQ's, skills through OSPE, and attitude through questionnaire and it revealed statistically significant difference in knowledge, skills, and attitude of students of ECE group and non-ECE group. These findings are also in alignment with the study conducted by Dhonde et al.,[12] in which there was a significant increase in performance of students in post-test than pre-test. In the feedback analysis and analysis of FGD, the findings of the present study and the study by other authors are tabulated in Table 8.

The strength of the study was the involvement of students in early patient contact sessions.

Table 6: Give best points, limiting points, and suggestions

Item	Responses
Best points regarding the experience of clinical exposure of patients	Related to subject: • Helps to understand the topic better • Clinical exposure was more such as an inspirational effort by clinicians and teachers. It is purely application based because of which we got to know more • It motivated me to take interest in physiology. It improved clinical ideas • Best point was to see the patients that I study in applied Physiology • There would be less struggle in the following years as the student is exposed to basics • Seeing the patients in reality, getting exposed to their pathological conditions makes me understand what we are learning • Helps to enhance practical knowledge • I got to understand the applied and clinical point of view of what has been taught in lectures • Understanding concepts better • It was good. It improved knowledge to a great extent. Related to patient exposure: • Helps to interact with patients at early stage of medical field • Became confident to a great extent to deal with patients • Doctors teaching on the patients were supportive • Clinical faculty's instructions were clear and useful • Practical knowledge would be helpful for upcoming future • Doctor–patient relationship was established • Learnt professional behavior, learnt to apply the knowledge.
Limiting points or hindrances in this clinical exposure	• "Some of the clinical exposure are difficult to understand and should be revised again and again" • "There was language barrier" • "Some of us were not able to perform examination on the patient" • "There was less time for this clinical exposure."
Suggestions/modifications required to improve clinical exposure to students	• "Clinical exposures should be revised again and again for more better results" • "More number of sessions" • "There should be more frequent visits to hospitals" • "Divide students in more smaller groups" • "There should be more time allotted to students for exposure" • "Time of clinical exposure should be increased by 1 h more"

Table 7: FGD

Themes	Responses
ECE was it needed and why?	"What is read when it is done also, it leads to better understanding" "Observing doctors interacting and examining patients serves as a source of inspiration" "Increases interest in subject"
What were your expectations from ECE?	"To get real scenario of the patients and how to interact with them" "Apply what is learnt in theory" "More exposure to patients"
How was your experience of this ECE?	"Experienced real examination of patients" "Experience while talking to patient was best" "We were asked questions, made to hear heart sounds in CVS, and rhonchi in RS. That was good" "It was good. The students in some colleges do not get to visit hospitals, but we got a chance to do so" "We learnt to apply the theory" "I got acquainted to the application of echocardiography" "The concepts learnt and the diagnosis was correlated through echocardiography" "Professional behavior was learnt" "Observed doctors, tried to copy how to talk and examine patients" "Due to language problem, communication was not easy"
Suggestions for improving ECE experience	"More exposure should be given with multiple patients" "There should be multiple visits to hospitals" "Every individual should get a chance to examine the patients" "Even after the ECE, there should be reinforcement"

ECE: Early clinical exposure, FGD: Focus group discussion

Table 8: Comparative analysis of feedback and FGD of present study with study by other authors

Author	Study population	Sample size	Objectives	Outcomes	Comparison with present study
Ebrahimi et al.[10]	Medical students of the second year	207	Investigate the impact of early patient contact program	19.5% of students found learning basic sciences interesting and motivating 11% identified the emphasis on basic sciences along with clinical teaching	24.07% strongly agreed and 62.96% agreed that this exposure motivated them to study physiology of other topics too 18.51% strongly agreed and 74.07% agreed that concept about relevance of physiology improved
Esfehani et al.[13]	Medical students of the second and fourth semester	45	Study attitudes of medical students	62.2% strongly agreed and 24.4% agreed that ECE lead to improvement in learning process	72.22% agreed and 16.66% strongly agreed that early patient contact lead to improved knowledge about the topic
Drybye et al.[14]	Medical students of the second year	76	To gain insight into how early clinical experiences contribute to medical student's professional development	In qualitative responses, the students stated that there was integration with learning in the entire curriculum due to early clinical experience Aspects of doctoring learned and also patient–physician relationship	In the open-ended responses, students stated that: There would be less struggle in the following years as they were exposed to basics They got to understand the applied and clinical point of view of what has been taught in lectures Early patient contact helped them to interact with patients at an early stage leading to increase in confidence, learning professional behavior
Dornan and Bundy[15]	Students, staff, and curriculum leaders from three universities in the UK	64	To provide rationale for integrating experience into early medical education	Saw contact with doctors as a highly motivating way of developing a professional identity	The students stated that they observed doctors, tried to copy how to talk and examine patients and experience while talking to patients was rated as best by the students

FGD: Focus group discussion, ECE: Early clinical exposure

The limitation of the study was the time limit of the practical due to which very few of the students could not get a chance of examination on the patient.

Early patient contact was a method that helped students understand the principles and relevance of Physiology and it can be utilized as a complementary method to routine clinical teaching to provide an early experience not only in terms of knowledge and skills but also provide a enriching experience of a doctor–patient relationship indirectly.

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