



## Physical Diagnosis and Clinical Integration Module for Nurturing Medical Students during their Pre-clerkship Education

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### ABSTRACT

**Objective:** The purpose of this study was to gain insight into the perceptions of medical students for physical diagnosis and clinical integration (PDCI) courses during their preclerkship education. **Method:** The study was conducted at Oman Medical College, Sohar with senior medical students in clinical clerkships, who had taken PDCI courses as part of their preclerkship education. A total of 35 senior students consented to participate in the questionnaire-based study. The questionnaire was a pre-tested, self-administered tool with a 5-point Likert scale. The data were collected, tabulated, and statistically analyzed. **Result:** The clerkship students had consistently positive perceptions about the value and utility of the preclerkship PDCI courses. **Conclusion:** The PDCI course curriculum appears to be an effective method for enhancing student performance in the clinical clerkships.

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### Introduction

Physical examination skills traditionally have been viewed among the most valuable skills taught during medical education (1-4). They serve to provide medical students with the excitement and satisfaction of making a diagnosis using their knowledge and skills (1-4). It is often noticed that medical students struggle in their major clinical year because of the striking shift in expectations for how students learn between the preclinical (pre-clerkship) and clinical (clerkship) years (5-8). Clinical skills are imparted to students after completion of their first professional exam in the traditional medical curriculum (9). However, earlier introduction of clinical skills can be beneficial since these skills may take significant time to develop. Moreover,

early introduction of these skills would likely facilitate the integration of clinical and basic science knowledge. The undergraduate medical program in our college includes early clinical exposure and training of clinical skills through physical diagnosis and clinical integration (PDCI) courses in the pre-clerkship phase of the program. The objective of the PDCI courses is to develop competency in communication, history taking, as well as procurement of vital signs and basic systemic examinations.

Mastering clinical skills is fundamental to becoming a physician. The preclerkship phase is also a critical time for providing students with a solid introduction to and foundation in core clinical skills (10). Despite the widespread importance cited for preclerkship skills

preparation and increased calls for integration between the pre-clerkship and clerkship phase of education, few schools vertically integrate their clinical skills curriculum by establishing, coordinating, and communicating expectations for breadth and depth of skills training across the pre-clerkship and clerkship phase (11).

While no dominant methods have emerged for pre-clerkship skills training, a successful curriculum will use a variety of formats and settings, with clearly defined learning objectives for each activity and learning opportunities based on the ability to help students achieve objectives (12). Pre-clerkship contact with real patients enhances integration of theory and practice, knowledge construction and clinical reasoning, increases student motivation, and provides acclimation to clinical environments (13-15). Ideally, early patient contact occurs in the context of a series of educational experiences that build on one another (16).

As early clinical-skills training programs emerge nationally and internationally, it is important to assess the extent to which pre-clerkship and clerkship faculty share common expectations and understanding about the ideal depth of clinical skills appropriate for the start of clinical clerkships (17). Development of common expectations for clinical-skills preparation between students and faculty is one pathway to reduce student anxiety, ease the transition, and maximize efficient skill improvement. In response to the above circumstances, the Oman Medical College along with its' academic partner West Virginia University, School of Medicine focused on efforts for bedside teaching and clinical skills development for medical students. Thus, Oman Medical College implemented PDCI courses, a competency-based curriculum designed to teach fundamental clinical skills to pre-clerkship students.

The courses for physical diagnosis and clinical integration encourage students to actively participate in clinical examination practice. These experiences will enhance the students' clinical competency. Data regarding the merits of PDCI are minimal from the region and hence the

present study was proposed. The objective of the study was to assess student perceptions of PDCI among the senior clerkship students of Oman Medical College. The result of this study would be the basis for similar future comparative studies worldwide and to formulate suggestions to incorporate a wider application of PDCI in practice.

## **Method**

Physical Diagnosis and Clinical Integration consists of two full-year courses (PDCI-1 and PDCI-2) designed to introduce the pre-clerkship students to clinical medicine, as well as strengthen history-taking skills and physical examination techniques during their clerkship phase. The courses have two components, didactic lectures and small group clinical teaching. The entire class meets for didactic lecture as noted in the schedule. These lectures serve to introduce basic concepts to the entire class. Topics are generally presented and organized by organ system. After the didactic lecture of each system, students in small groups have clinical teaching. Here, they learn the basics of the clinical approach to the patient, history-taking and physical examination based on the organ system. The clinical teaching for students of PDCI-1 (students in their first year of basic biomedical sciences) is done in a clinical skills laboratory (CSL). The clinical teaching for students of PDCI-2 (students in their second year of basic biomedical sciences) is done in the college's teaching hospital. The college faculties meet the students throughout the pre-clerkship phase in small clinical learning groups (CLG). The first several sessions are conducted in a conventional curricular setting using observation, practice with peers, and standardized patients/volunteers to teach history and physical exam skills in the clinical skill laboratory. Subsequently, the faculty mentors take the students to the hospital wards for bedside teaching sessions interspersed with monthly organ-system-specific advanced-exam teaching sessions. At each bedside teaching session, students interview and examine hospitalized patients under their mentor's supervision at the bedside. Faculty mentors provide additional

teaching and skills modelling for the group at the bedside. The emphasis on focused teaching of clinical skills at the bedside with direct observation and feedback by faculty physicians enables role modelling, careful monitoring of skills development, and personalized feedback. Specific skills targeted by the curriculum include patient communication, history-taking, physical examination, patient write-ups, professional values, and introduction to clinical reasoning. At the end of each course, the students undertake theory examinations which consist of Type A (single best answer) Multiple Choice Questions (MCQ) and an Objective Structured Clinical Examination (OSCE). The students are assessed for their knowledge, correct sequence of performing the physical examination, communication skills, and attitude. Role play was used in the assessment where basic history taking skills and process of recording of vital signs were assessed. Systemic examination was also assessed for recall of the sequence of performing the examination on volunteers/standardized patients.

The present study was conducted at Oman Medical College with senior clerkship students who had finished their PDCI courses during the pre-clerkship phase, three years earlier (in the case of PDCI-1) and two years earlier (in the case of PDCI-2). The study was approved by the Institution Review Board. It involved voluntarily participation of the students to fill the questionnaire-based survey. Statistical analysis of the data was done to determine the strength of PDCI. In the survey, a total of 35 students consented to participate in the study. The questionnaire was a pre-tested, self-administered tool with a 5-point Likerts scale. The evaluation was performed ranging from 1 being strongly disagree, to 5 being strongly agree. All the attributes were assessed in the same manner. The data were collected, tabulated, and statistically analyzed.

## Result

The majority of students studying in Oman Medical College are Omanis (approximately 85% of the student population). The other

students are from different parts of the world, including Saudi Arabia, Egypt, Sudan, Bahrain, India, and Pakistan. Table 1 considers the frequency distribution of the responses that the students gave to the attitudinal items of the questionnaire.

Higher scores indicate a higher satisfaction towards a particular attitudinal item. For the first item on the list of enjoying the skills lab, 19 (54%) of the students said that they strongly agree with the statement. 19 (54%) of the students said that they agree that the skills taught were adequate for early clinical exposure whereas 19 (54%) said that they strongly agree with the clinical sessions being informative.

PDCI-1 and PDCI-2 are the first courses which introduce the students to an environment which most closely mimics their expectations of a real life patient interaction. Hence, it is expected that the sessions should reinforce the student's decision to become a medical doctor. 14 (40%) students agreed while an equal number strongly agreed to this expectation.

21 (60%) students said that the facilitators were competent and dedicated. Only 8 (23%) strongly agreed that the venue was adequate for conducting the sessions. 16 (46%) students agreed that the sessions were tailored for the pre-clerkship phase of the medical school. An overwhelming majority of 27 (77%) said that they would strongly agree to continue the clinical skills session in these pre-clerkship years.

The senior students now in their final year of study have an overall very good impression about the PDCI courses. This goes hand-in-hand with the fact that the average students' evaluation of the PDCI courses when the students were actually taking the courses were also good. The senior clerkship students, when studying PDCI-1 during the first year of basic biomedical sciences gave an average score of 3.5 to the course. When the same students were taking the PDCI-2 course during their second year of basic biomedical sciences, they rated the course as 3.8. The average of the scores on the present questionnaire was 4.0 (standard deviation

of 0.78). It seems that the students' impression about the course has bettered over time and its utility become clearer.

Figure 1 shows the component bar diagram for the scores given to the attitudinal items by the students. The graph demonstrates a clustering of

the responses on the positive end of the response spectrum towards strongly agree and agree options. No one from the batch has given a score of 1 (i.e., strongly disagree) with any of the questions asked. These results serve to indicate the overall satisfaction of the students towards the conducted course.

Table 1: Response to the attitudinal items by the senior clerkship students

Attitudinal Item	Student Responses No. (%)				
	1	2	3	4	5
I enjoyed the clinical skills lab.	0(0)	2(6)	0(0)	14(40)	19(54)
The skills taught were adequate for early clinical exposure.	0(0)	1(3)	3(9)	19(54)	12(34)
The clinical examination sessions were informative.	0(0)	0(0)	3(9)	13(37)	19(54)
The sessions reinforced my decision to become a medical doctor.	0(0)	0(0)	7(20)	14(40)	14(40)
The facilitators were competent and dedicated.	0(0)	1(3)	0(0)	13(37)	21(60)
The venue was adequate for conducting the sessions.	0(0)	3(9)	5(14)	19(54)	8(23)
The role play sessions taught me good communications skills.	0(0)	1(3)	11(31)	13(37)	10(29)
The sessions were tailored to preclinical students.	0(0)	2(6)	4(11)	16(46)	12(34)
I would recommend the clinical skills sessions to continue in preclinical years.	0(0)	1(3)	0(0)	7(20)	27(77)

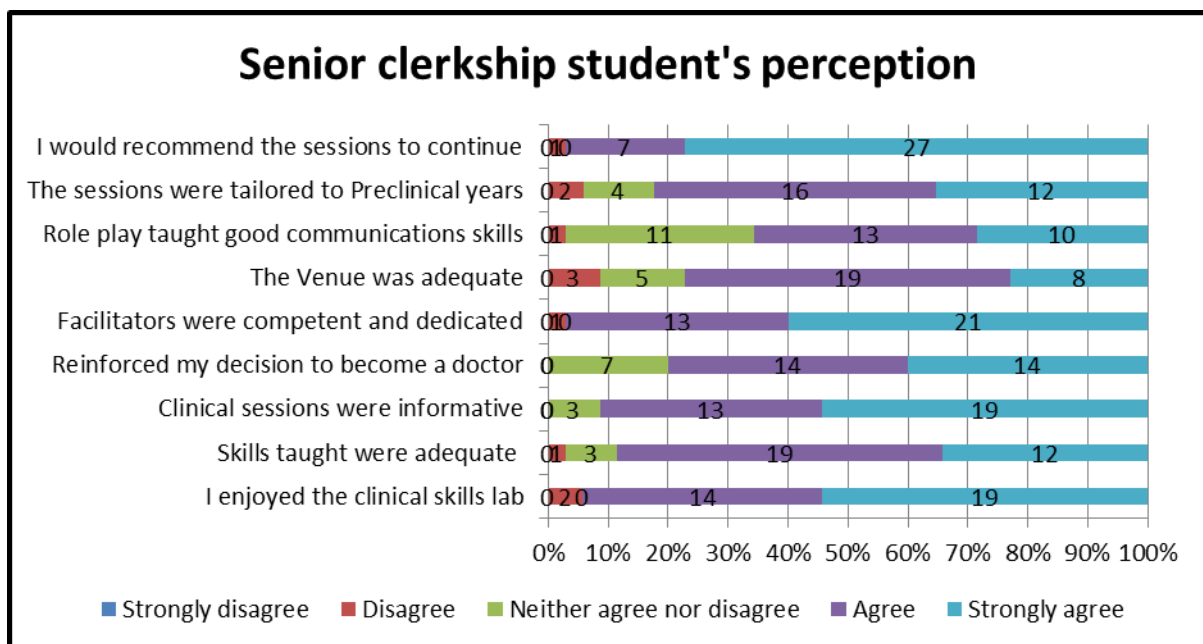


Figure 1: Frequency distribution graph showing the response to the attitudinal items by the senior clerkship students

Table 2: Median scores on each of the attitudinal item of the questionnaire

Attitudinal items	Median (Mean ± SD)
I enjoyed the clinical skills lab	5(4.4±0.7)
The skills taught were adequate for early clinical exposure	4(4.2±0.7)
The clinical examination sessions were informative	5(4.4±0.6)
The sessions reinforced my decision to become a medical doctor	4(4.2±0.7)
The facilitators were competent and dedicated	5(4.5±0.6)
The Venue was adequate for conducting the sessions	4(3.9±0.8)
The role play sessions taught me good communications skills	4(3.9±0.8)
The sessions were tailored to preclinical years	4(4.1±0.8)
I would recommend the clinical skills sessions to continue in preclinical years	5(4.7±0.6)

Table 2 shows the median value obtained on each of the attitudinal item of the questionnaire along with the mean and standard deviation in parenthesis. As discussed earlier, the most common median is 4 which occur on 5 items. All the other option for the rest of the items is 5 indicating a high level of satisfaction with the PDCI course and its teaching

## Discussion

This study examined the perception of PDCI and its implementation by the students in clinical years of the MD program. On a positive note, senior clerkship students enjoyed the training sessions. They felt that the early introduction of basic bedside techniques and examination of various systems is helpful in basic medical science curriculum (graph 1). The result showed that almost half (54%) of the senior students enjoyed the PDCI skill lab and were able to implement their clinical skill to the professional bedside manners.

A majority of the senior students agreed that the early introduction of clinical skills and the clinical examination sessions reinforced their decision to be a medical doctor. Further, a study from University of Washington, School of Medicine suggests that early introduction of clinical skills increases student comfort on the wards at the start of the clerkship phase (18). Several other studies of similar models have shown improved interpersonal and communication skills (19, 20). These findings suggest that PDCI has definitely proved to be effective in delivering the foundation on which the instruction of the art of medicine is built.

Hesketh et al (21) states that “the tutor is one of the most powerful variables in the educational setting”. Similarly, another article shows that while subject expertise is important, alone it is not sufficient to make a good teacher (22). Considering these factors and looking into the role of tutor, we found very interesting results with respect to facilitators. 60% of the senior students highly valued tutors’ demonstrations of these elements. Further work by Calvin et al (23)

on workplace learning through peer groups support our module and strengthen the course.

Role models, such as clinical tutors as described by Brown et al (24), are experts in the cognitive and psychosocial aspects of the medical profession. Further, they play an important part in exemplifying professional identity in medicine. Considering the present questionnaire regarding the role play, it was an exemplary display by the faculties for the clerkship period. This is very much evident in the results. Thus, this defines the strength of PDCI where there is no scope for any lacunae in the academic training of making the best medical profession in the country.

Oman Medical College has a fully functional clinical skill lab. 23% of the senior students were happy with the clinical skill lab. The clerkship students now in their final year of study have an overall very good impression about the preclerkship courses. The fact about the limitations of this study is that the survey involved small sized students of Oman Medical College and may not be generalizable.

As shown by the Jha et al (25) that seven themes are important in shaping up the students mainly into compliance to values, patient access, doctor-patient relationship, demeanour, professional management, personal awareness and motivation. This was observed in one of the study by Anna et al (26). The objective of this work was to determine student perception of professionalism, the professionalism curriculum, the current learning environment and suggestions for improvement. PDCI is another such important module which performs in similar line in building up the professionalism in the students.

## Conclusion

This study concludes that implementation of the physical diagnosis and clinical integration course during the pre-clerkship phase appears to be associated with increased confidence and improved student performance in clerkships, especially in the students’ final year. The PDCI curriculum, featuring guided bedside teaching on



the wards with a dedicated faculty mentor during the pre-clerkship phase of medical school, appears to be an effective method for improving student performance in the clinical clerkship. Further studies will be needed to investigate the clinical utility of PDCI program during basic medical science courses.

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