

## Evaluating the effect of physical examination training on the competency of medical students

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### ABSTRACT

**Background:** The skill to perform physical exam (ph/ex) is a vital aspect of clinical skills needed by physicians. In traditional curricula of medical schools little attention is paid to students' practical skills and more emphasis is put on the cognitive domain of learning.

**Purpose:** To study the effect of training clinical skills as a part of reformed curricula on the medical students' practical competence.

**Methods:** In this cross sectional study of 150 medical students who had started their externship after passing the clinical skill course, 50 were randomly selected. A self-assessment questionnaire with Likerts' scale type items was distributed among the students. Data was analyzed by SPSS and measures of central value and dispersion were utilized for discussion.

**Results:** The mean for standardized score for the effect of training in the clinical skill course (CSC) on gaining the skill of ph/ex was 51.51 ( $\pm$  23.13) with a median of 50.69, and a range of 83.33-29.17. The value of 25<sup>th</sup> percentile for the score was 41.66 and the 75<sup>th</sup> percentile was 58.68.

**Conclusion:** Integrating the training in CSC with the current curricula in medical schools, will provide the students the opportunity to perform the ph/ex completely and gain an acceptable and high quality professional function which will end in improving the patient satisfaction and reducing the costs of health and treatment services for the individuals, the families and the community.

**Keywords:** CLINICAL SKILL, TEACHING PROCEDURE

*Journal of Medical Education Fall 2004 6(1); 113-116*

### Introduction

Numerous studies have revealed that many medical schools have failed in preparing the students for performing their professional medical tasks. Major shortcomings in training skills such as history taking, physical exam (ph/ex), diagnosis and treatment (clinical skills) are a challenge in many medical institutes and faculties all around the world and as a result a need for reassessing the current educational methods used in training clinical skills is emerging. Through this reassessment and by choosing appropriate methods, the efficacy of the educational process can be improved. Different studies have depicted so many shortcomings in the skills related to ph/ex in physicians who are practicing. For example, in Colombia University, USA, the skill of performing ph/ex was evaluated in the students studying in the 3<sup>rd</sup> year of medical school who had passed the training course on clinical diagnosis. The results revealed that the students were unable to perform 3-10 vital maneuvers while examining the patients

who were suffering from dyspnea and chest pain. The reason was the limited time of the training and the students' anxiety during the course. Moreover, the study clarified that the students had difficulty in measuring blood pressure, differentiating heart sounds in different parts of the chest and respiratory sound auscultation (1).

Another survey performed in Illinois Medical Faculty (USA), the educational activities during the internship was ineffective in teaching the medical students the skills related to ph/ex (2). In many medical faculties, bedside education is being neglected because of a variety of reasons such as limited access to patients, increasing number of the students, ethical issues and patients' rights and lack of appropriate conduction by the faculty. As a result, alternative training methods such as simulation and manikin are gaining increasing importance. In a study in medical department of Texas University (USA), the effect of employing simulation and manikin in teaching the students some ph/ex skills was evaluated. The evaluation was performed by OSCE method and it was discovered that after the training course 80% of the

students could measure systolic and diastolic pressure accurately, 60% could diagnose the heart sounds and 88% could differentiate the respiratory sounds correctly. According to the findings of this study, by passing a 6 hour training course in which simulation and manikins were employed, the medical students will be prepared to learn more effectively on the patient's bedside during the externship period. However it should be mentioned that the cost of providing simulation and manikins may be an obstacle in some medical faculties, yet reducing the cost of such facilities will remove it in future (3).

In another survey in Florida medical college simulation and manikin in the same size and shape as real humans were employed for performing ph/ex related to respiratory system. A training course was designed so that the students had the opportunity to face simulated situations such as hypoventilation induced by opioids, pneumothorax and pulmonary edema. The students could gain the necessary information in each case through ph/ex, chest x-ray reports and arterial blood gas(ABG). Based on the students' survey, this training method was really unique.(4).

In the past years one of the main issues expressed by medical students before entering clinical wards was that they were uncertain if they were equipped with the required clinical skills. In this respect a study was done in North Western University, USA. Before starting the clinical courses, medical students were trained by means of simulations to become aware of their weak points in accomplishing some clinical skills such as examining abdomen, cardiovascular and respiratory system and they were evaluated afterwards. The students considered these trainings very positive (5).

The efficacy of a training workshop on clinical skills related to breast examination was estimated in the students of University of South California. In this study the students who had started their externship in surgical ward were randomly divided into two groups. One group was trained in the traditional way and the other one attended a workshop. After training the students of both groups filled out a questionnaire to state the level of satisfaction and self-efficacy. In those who had attended the workshop the perceived self-efficacy in performing ph/ex was significantly higher and so was the level of satisfaction. Moreover these students enjoyed a greater level of self-confidence in performing breast exam (6).

In another study in New Found Land Medical Faculty, Canada, the efficacy of training digital rectal exam by means of simulations was compared to that of the traditional method. Although digital rectal exam is one of the main clinical skills in performing a thorough ph/ex, according to present data the students are not well trained in this skill. After passing the training courses, the two groups were evaluated for their satisfaction and also their practical skill by a questionnaire and performing the OSCE test. The results clarified that there was a significant difference in the skill ( $p=0.001$ ) and satisfaction ( $p=0.025$ ) between the two groups (7).

There are some other documents revealing that physicians are not confident about their own skills in examining musculoskeletal system(8,9) and many of them wish if they had been more trained in such skills(10,11).

## Material and Methods

In this cross sectional study, of 150 medical students who had passed the course on clinical skills and had then started their externship, 54 medical students were randomly selected. A questionnaire was designed based on Likerts' scale type items and was distributed among the students by self assessment method. This self-assessment questionnaire compared what students had learnt during the course on clinical skills about the methods of measurements and examining neurological system, ear, nose and throat, urogenital system, cardiovascular system and eye with the skills the students had really gained in bedside examination and their mental readiness in employing these skills to realize how much they match. The questionnaire had 14 questions of which 12 were dedicated to matching things learnt during the clinical skill course with the skills required in the wards, one question focused on the efficacy of the training in reducing the student's stress on facing the patients and one question was on overall matching of the subjects learnt with the skills required. The students' satisfaction level was analyzed based on the data gathered from the 12 questions. The questions reliability was confirmed by calculating Cronbach's  $\alpha$  coefficient ( $\alpha=0.86$ )The data was described by indicators of central tendency and dispersion. Paired t-test was utilized and correlation coefficient was computed. SPSS application was used for statistical calculations.

## Results

The matching degree of the learnt subjects related to basic skills required in ph/ex have been reckoned by calculating the standardized degree for each skill separately and also by using the mean of the standardized score for all of the skills as an indicator of the overall matching of all skills learnt by clinical training. The students devoted the lowest score to the skill of thyroid exam (45.92±29.74), the skill of determining hearing ability (46.29±30.30) and the skill of examining heart and pulses (47.77±31.66) respectively. The highest score for matching learnt clinical skills with required skills belonged to the skill of eye examination (74.44±16.21), measuring vital signs (72.96±23.03), examining ear, nose and throat (72.96±20.61) respectively. The mean score for overall matching of the learnt clinical skills with the clinical activities in the ward was (51.51±13.23). Around 74% gave an score higher than 41.66 (out of 100) to the overall matching of the clinical skills learnt in the CSC with clinical activities in the ward.

The correlation between the standardized score for matching learnt skills with the skills required on the patient's bedside and the mean of the calculated scores for overall skills under question is significant in a confidence interval of 95% ( $r = 0.67$ ). However the correlation between the standardized score related to matching learnt skills with performing the same skill on the patient 's bedside and the score of thyroid exam ( $r = 0.26$ ) and examining heart and pulses ( $r = 0.20$ ) was not significant in a confidence interval of 95%. When it comes to the correlation related to the score of matching issues learnt about determining hearing ability with the standardized score for overall matching of the all learnt skills with required skills, there is a significant relationship yet according to Pierson correlation coefficient the correlation is weak ( $r = 0.35$ )

## Discussion

Providing the students with the necessary skills for performing a correct and complete ph/ex on the patient 's bedside is one of the major tasks of medical faculties and educational institutes involved in supplying clinical services. Important issues such as reducing human mistakes in

**TABLE 1.** the mean for standardized scores devoted to matching learnt skills of ph/ex acquired through the CSC with the skills required in the wards.

Mean score acquired	skill
74.44 ± 16.21	eye exam
72.96±20.61	ear, nose and throat exam
72.96±23.03	vital sign measurement
69.25±20.81	obstetrics and gynecology exam
67.77±22.45	Anthropometric measurement in neonates
67.03±23.03	neurological exam
65.55±25.3	enthropometric measurement and body mass index in adults
57.77±25.37	abdomen and hernia exam
54.07±29.74	using goniometry and measuring extremity length

providing health and treatment services, decreasing the psychological stress in both those giving and those getting the service, cutting the expenses of these services and preventing the consequences of misdiagnosis are among the critical topics in medical education. The educational institutes are facing different limitations such as the number of the patients and different cases of diseases and this means that basing the clinical skill training on bedside education in the wards is irrational and in fact impractical in many occasions. Experiences achieved from studies performed in different educational institutes have revealed important shortcomings in the educational process related to inducing basic clinical skills in the students. As a case in point, the survey in Albert Einstein Medical Faculty in Yeshiva University (USA) has revealed this sad fact that medical students are not satisfied with the method of training skills of examining ear nose and throat ,eyes and urogenital system(12). The findings support the necessity of preparing medical students and students of other related majors for performing a correct ph/ex. Training these skills by providing imitated environments is expanding in educational institutes all around the world. In Tabriz University of Medical Sciences and Health Services, this experience and its effect on the level of the students ' mental readiness and quality of learning was evaluated. According to the students included in the study , this method of training before entering the wards is very effective in preparing them for performing ph/ex on real patients. Except for 3 skills of thyroid exam, determining hearing ability and heart and pulse exam, the students gave an score of over 50 (out of

100) to all other basic skills and 74% of them devoted an score of 41.66 to the efficacy of the overall skills trained. The mean score for efficacy of educational programs of CSC in reducing the stress upon facing the patient was  $71.85 \pm 18.84$  and 64.8% of the students gave a score of more than 45.83 to this alternative. Lack of correlation or a weak correlation of the scores of the 3 skills which achieved the lower scores (thyroid exam, determining hearing ability and heart and pulse exam) with the overall score devoted to all skills displays that the score of these 3 skills is inefficient in the scores related to overall matching of learnt skills and skills being trained in the CSC. There may be a few reasons responsible for this finding such as lack of facility in the wards in which the students are being trained for clinical skills, incomplete execution of the designed curricula and lack of exposure to patients who require the skills of thyroid exam, determining hearing ability and heart and pulse exam. An important point in the scores given by the students is that the quality of clinical educations affects the knowledge level and the level of their educational needs and so it in has a great influence on the final scores. To ensure the efficacy of learning in CSC and its good result on preparing the students for gaining basic clinical skills, the quality of educations on the patient bedside should be supervised because otherwise there may be a false negative error in the students' opinions. Moreover there is a need for comparative studies to evaluate the clinical skill level of the students and also standard tests based on attending CSC should be used to determine the efficacy of these educational methods.

### Acknowledgement

We would like to appreciate the efforts of all exports in CSC who helped us with this research.

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