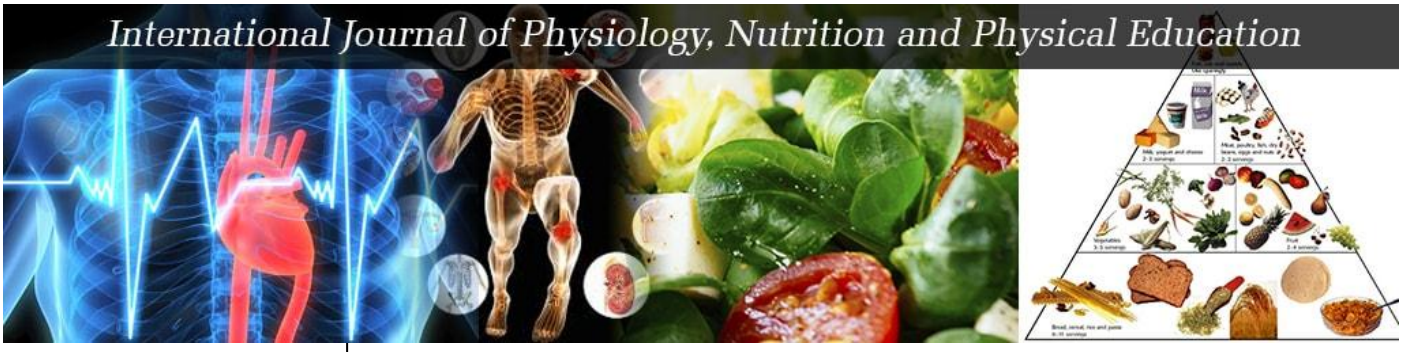

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Early clinical exposure for first-year MBBS students on vitamin deficiency diseases

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Abstract
This comparative before-and-after type of study was conducted on 60 first-year MBBS students (31 females: 51.66% and 29 males: 48.34%). After explaining the purpose of the study, written informed consent was obtained from willing participants. The pre-test, conducted after traditional didactic lectures on vitamins and vitamin deficiency diseases, was followed by integrated teaching with clinical exposure and a post-test was administered using a questionnaire that was identical to that of the pre-test. The mean overall pre-test and post-test scores were 16.18 +/- 2.00 and 17.50 +/- 1.73, respectively and the paired t-test value was highly significant (t-value=3.866; p=0.0002). Amongst females, mean pre-test and post-test scores were 15.81 +/- 1.78 and 17.52 +/- 1.84, respectively and the difference was highly significant (t-value=3.658; p=0.0005). However, amongst males, the mean pre-test and post-test scores were 16.59 +/- 2.16 and 17.48 +/- 1.64, respectively and the difference was not significant (t-value=1.788; p=0.079).

Keywords: Early clinical exposure, First year MBBS, Vitamin deficiency diseases

1. Introduction
Early Clinical Exposure (ECE) has been defined as an ‘‘authentic human contact in a social or clinical context that enhances learning of health, illness and/ or disease, and the role of the health professional’’, occurring in the early or preclinical years of undergraduate education [1]. ECE is a teaching and learning methodology which encourages human contact in a social or clinical context during the pre-clinical medical years [2], before the students are posted for official clerkship and internship training programs [3, 4]. Besides providing the clinical relevance of concepts in basic medical sciences to first-year MBBS students and its relevance to medical practice [5], ECE can contribute to better understanding of the relevance of basic science and hence, improved satisfaction among medical students [6]. The ECE experience provides positive motivation toward medical education, improves students’ performance in examinations [7, 8], facilitates development of communication skills and the desired attitudes and acts as foundation for the procedure of professional socialization and the development of mentoring relationships; and also provides opportunities to inculcate professional behaviour at an early stage [9, 10]. The learning process is social and collaborative, because besides experiential learning during ECE, medical students also engage in situational learning while adhering to the community viewpoint [11]. ECE programs should sustain students’ learning cycle based on Kolb’s experiential learning, highlight the active role of students and provide timely supervision and feedback [2].
ECE training can be conducted in primary care settings, outpatient clinics, hospital wards and in the community [4]. In a classroom setting, an ambulatory patient is brought to the classroom and both the basic science and clinical science teachers discuss the patient’s ailment with the students. In the hospital setting, students would have an added advantage of being exposed to the environment in the wards and outpatient departments. In the community setting, students visit communities to learn about the living conditions of under-privileged groups and the influence of their living conditions on their health and consequently, students would have the opportunity to start thinking in terms of disease prevention and health promotion [3, 4]. Successful implementation of ECE requires “vertical integration” with inter-disciplinary contribution and teamwork [3, 12]. If the basic science and clinical science teachers assume the role of facilitators in the teaching-learning process, students feel a sense of responsibility to

undertake self-directed learning [3].

A Europe-based survey [4] found that observation, small group teaching, clinical bedside teaching, supervision and feedback, reflective journal writing, self-learning, case-based learning, lectures, and shadowing were the frequent teaching and learning activities in ECE programs. ECE has been successfully imparted by using the Internet [13], computer assisted visual aids [14] and other web-based instructional materials [15]. Computer-assisted learning packages are reportedly most beneficial to the low achievers while high achievers were less affected by the method of instruction [16].

The present study was conducted to determine the effect of ECE for first-year MBBS students.

2. Materials and Methods

This comparative before-and-after type of study was conducted at a medical college in Western India. The participants included all first-year MBBS students, aged 18 years and above, of either sex, who gave written informed consent. Students who did not give written informed consent or those who were absent during the traditional didactic lectures (TDLs) or integrated teaching (IT) with early clinical exposure (ECE) or pre-test or post-test were excluded. After explaining the purpose of the study to first-year MBBS students, written informed consent was obtained from those willing to participate in the study. TDLs were delivered on vitamins and vitamin deficiency diseases, as per syllabus for the first-year MBBS course, and a pre-test was conducted after TDLs. The pre-test comprised ten questions (two marks per question; total 20 marks). After the pre-test, IT with ECE was conducted. Using a questionnaire that was identical to that of the pre-test, the post-test was conducted after IT plus ECE. The outcome studied was the difference in scores obtained by the students after TDLs (by a pre-test) and IT plus ECE (by a post-test). The data were entered in Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS statistical software Windows Version 25.0 (IBM Corporation, Armonk, NY, USA). The standard error of difference between two means and paired t-test values were calculated. 95% Confidence interval (CI) was stated as: [Mean-(1.96)*Standard Error)] - [Mean+(1.96)* Standard Error)]. The statistical significance was determined at $p<0.05$.

3. Results and Discussion

There were a total of 60 students (31 females: 51.66% and 29 males: 48.34%).

3.1 Pre-test versus post-test scores: The mean pre-test score was 16.18 +/- 2.00 (95% CI: 15.68 – 16.69), while the mean post-test score was 17.50 +/- 1.73 (95% CI: 17.06 – 17.94), as depicted in Table-1. The paired t-test value was highly significant (t-value=3.866; p=0.0002).

Table 1: Pre-test and post-test scores (n=60)

	Pre-test	Post-test
Mean	16.18	17.50
SD	2.00	1.73
95% CI	15.68 – 16.69	17.06 – 17.94
Paired t-test value	3.866	
'p' value	0.0002 *	

SD = Standard deviation, CI = Class interval, *Significant

The mean pre-test score for females was 15.81 +/- 1.78 (95% CI: 15.18 – 16.43), while the mean post-test score was 17.52 +/- 1.84 (95% CI: 16.87 – 18.16) and the paired t-test value was highly significant (t-value=3.658; p=0.0005). The mean pre-test score for males was 16.59 +/- 2.16 (95% CI: 15.80 – 17.37), while the mean post-test score was 17.48 +/- 1.64 (95% CI: 16.89 – 18.08) and the paired t-test value was not significant (t-value=1.788; p=0.079). Significant improvement in post-test scores has been reported by other studies on ECE [17-20]. However, a study from Kerala [21] has reported that implementation of ECE did not result in improved better scores for clinical anatomy questions, though it promoted better clinical correlation.

3.2 Gender differences in scores: The mean pre-test score for females was 15.81 +/- 1.78 (95% CI: 15.18 – 16.43), while that for males was 16.59 +/- 2.16 (95% CI: 15.80 – 17.37). The gender difference in pre-test scores was not significant (Z=1.520; p=0.128). The mean post-test score was 17.52 +/- 1.84 (95% CI: 16.87 – 18.16) and 17.48 +/- 1.64 (95% CI: 16.89 – 18.08) for females and males, respectively, without significant gender difference (Z=0.089; p=0.929). In the pre-test, the first quartile was identical for students of both genders, but the median score, third quartile and maximum score was higher for male students. The minimum score in pre-test was also obtained by a male student. In the post-test, the minimum score, first quartile, median score, third quartile and maximum scores were identical for both females and males. (Fig-1).

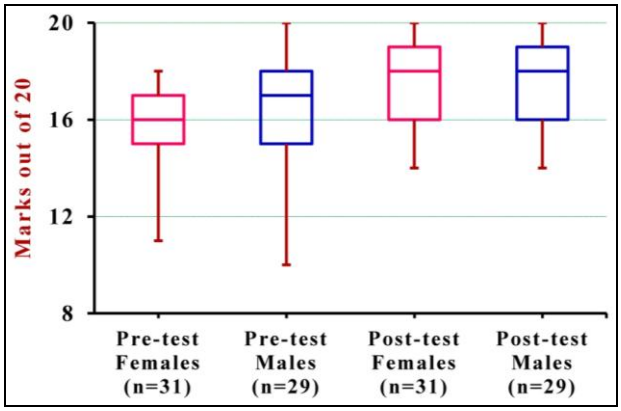

Fig 1: Box plot of marks scored in pre- and post-tests

The study habits and study methods of medical students have been found to exhibit gender-based differences, which have significant impact on performance outcomes of learners; [22] but some researchers [23] found no significant gender-based difference in scores of medical students. The academic score is influenced by social conditioning and gender biased environments [24] and the gender differences in academic scores cease to exist in more gender-equal societies. [25] Though students of both genders prefer multi-modal learning, the learning styles of female students may be more diverse. [26, 27] As a consequence of socialization in conformity with the existing social norms of masculinity and femininity since their childhood, [28] students of either gender maintain their gender-specific behaviours, attitudes and values. [29] It has been theorized that in educational institutions, males' educational accomplishment is hampered by their "male" behaviour, values and attitudes. [30]

4. Conclusion

Integrated teaching with early clinical exposure was found to significantly increase students' scores, though this study was conducted on only one batch of first-year MBBS students and

was restricted to one topic. The gender difference in mean scores was significant in the pre-test but not in the post-test. Students with low scores in the post-test may need remedial teaching. From the perspective of teachers, the implementation of ECE requires coordination with clinical departments, more manpower, time and efforts. Training of teachers in ECE, video demonstration of clinical cases, use of the Internet and computer-assisted visual aids can improve ECE.

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