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Teaching Undergraduates Beyond the Classroom: Use of WhatsApp

WhatsApp is a popular platform for social interaction. We used it as an e-learning platform for medical education. We discussed five clinical cases on a WhatsApp group with undergraduates; it increased their knowledge in the subject significantly ($P<0.001$). Participants accepted it well and perceived that it has improved their problem solving skill and stimulated them for self-study.

Keywords: *E-Learning, Medical education, Social media*.

With the easy availability of smartphones and internet facility, medical students are spending significant time on it. E-learning can be imparted by these smartphones through various mechanisms which have potential to increase collaboration, problem-solving and networking among students. It allows them to share images, data and participate in blogs or video-conferencing [1]. WhatsApp, a social media app is being used frequently for communication and sharing resources in medical field [2]. It can be a useful tool to develop a virtual learning community when meeting face-to-face is not possible [3]. Medical Council of India (MCI) has emphasized on the use of technology in the new competency-based undergraduate curriculum for the Indian medical graduate [4].

This study was done to determine the acceptability and efficacy of WhatsApp as teaching-learning media in promoting problem-solving skills and self-study among medical undergraduates.

We conducted this educational intervention study on ninth semester undergraduate medical students over a period of three months (December 2015 - February 2016) after Institutional Ethics Committee's approval and informed consent from participants. Out of 124 students, 40 students who were already using WhatsApp with their own data pack volunteered to participate, in response to an announcement in the classroom. A WhatsApp group was created by two participating students including two faculties as administrator. Case scenarios from cardio-vascular system (valvular heart disease, arrhythmia, hypertension, heart failure, coronary artery disease) were written, reviewed and revised by co-faculty before being posted on WhatsApp for discussion.

Each case was discussed over 5-7 days by posting a case scenario followed by some trigger questions (***Box* 1**) for making and analyzing differential diagnosis, interpretation of relevant investigations and management plan with reasoning. Laboratory reports, *X*-rays and ECGs were shared maintaining anonymity of patients. Students were advised to go through books and other resources, if needed. They responded to questions with reasoning, sometimes backed by relevant resources and/ or raised their doubts. Right answers were appreciated; cues, feedback and correct answers were provided to address doubts and wrong answers. Discussion was done during evening and night time on working days and throughout the day on holidays. 'Active participation' was considered if participants responded to questions or asked queries on WhatsApp. Feedback was taken using a structured paper proforma, filled individually by each

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Box 1 EXAMPLES OF QUESTIONS ASKED TO PROMOTE REASONING / PROBLEM SOLVING SKILLS*

- What are the possible differential diagnoses?
- Give points in favour and against each diagnosis at this point of time.
- Out of all differential diagnoses, which one is most likely and why?
- What more information will you like to know about history and examination to reach the final diagnosis?
- What investigation will you like to order at this point of time? And why?
- Based on this new information, what could be the cause of deterioration in this patient? What do you think about this new development in the case?

In addition, relevant questions were asked to elicit the 'Why' and 'How' during the discussion as per the need.

TABLE I FREQUENCY AND CONTENT OF RESPONSES BY STUDENTS AND FACULTY

Content of the messages	No.(%)
Student messages (N = 363)	
Answered questions without reasoning	139 (38.3)
Answered questions with reasoning	154 (42.4)
Raised queries	43 (11.8)
Shared resource material	17 (4.7)
Posted agreement	10 (2.8)
Faculty messages (N = 266)	
Case scenarios posted	5 (1.9)
X-rays and ECGs shared (5 each)	10 (3.8)
Questions asked	119 (44.7)
Cues given to address doubts	58 (21.8)
Provided feedback / answers	74 (27.8)

participant, regarding their perception on use of WhatsApp and their overall satisfaction with this experience.

Gain in knowledge was assessed by pre-post test scores using same set of 15 Multiple Choice Questions (MCQs) on paper before and 2 weeks after the end of WhatsApp discussion. Each MCQ carried one mark with no negative marking. After confirming normal distribution of data by Kolmogorov-Smirnov Test, pre- and post-test scores were compared using paired *t*-test. All messages from students and faculty were extracted from the WhatsApp group and analyzed for frequency and content.

Three students did not complete the post-test, hence data analysis was done for 37 participants (M:F = 1.6:1). Difference between mean (SD) score of pre-test and post-test [5.05 (1.9) *vs.* 7.92 (2.6)] was statistically significant ($P<0.001$). Range of marks improved from 1-11 (pre-test) to 3-13 (post-test). Out of total 629 messages, faculty posted 266 messages. Only 19 (51.3%) students, participated in the discussion and posted 363 messages ranging from 8-74 per student (***Table* I**). Overall satisfaction reported to this experience was - Very good (32.4%), Good (43.3%) and Satisfactory (24.3%).

Analysis of participants' feedback on Likert scale showed that whole discussion was read by 94.6% students. They felt that they got sensitized for their mistakes during interpretation of clinical findings (89.2%); felt discussion helped them to analyze the case and make differential diagnosis with appropriate reasoning (81.1%). Learning was fun by the new method (86.5%), though 18.7% had difficulty in finding time to go through the discussion.

In response to open-ended questions on this experience, they commented *"approach to cases was made easy; discussion full of brainstorming and excitement; different viewpoints improved thought process; it worked on curiosity quotient; discussions can be followed up anytime, anywhere as per convenience and can also be revised anytime; learning not bound to classroom teaching; mindful learning experience; good for introverts."* They also reported about time constraints, fast-paced discussion during night hours, and a compulsion to check the messages again and again till their query was solved.

Utility and feasibility of WhatsApp in teaching-learning for medical graduates and post-graduate students has also been reported earlier [5,6]. Students enjoyed and liked anytime, anywhere learning using WhatsApp and it helped them to clear doubts with improvement in knowledge [5]. WhatsApp has also been used by clinicians for exchange of patients' condition and reports, therefore saving time in decision making and executing treatment [7,8]. It helped nursing students also for integrating theory and clinical practice [9]. However, it failed to enhance academic performance of Saudi medical students [10].

Limitations of present study include small number of participants and case scenarios limited only to one medical specialty.

To conclude, WhatsApp was well-accepted as teaching-learning media by undergraduates. There is a need for larger studies exploring the various components of the learning domains which may be learned through this modality.

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