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A study assessing the impact of different teaching modalities for pharmacy students in a Cardio-Pulmonary Resuscitation (CPR) course



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Abstract The current study aims to assess the effectiveness of different teaching methods adopted for the practical session of Cardio-Pulmonary Resuscitation (CPR). CPR training is one of the compulsory modules of the Public Health Pharmacy (PHP) course at Universiti Sains Malaysia. CPR training comprises of 10% of total marks of the PHP course. To test the effectiveness of the different teaching strategies, three groups were defined using a two-stage cohort distribution—i.e. based on grade point average (GPA) and different teaching modalities. Group One was instructed using images and PowerPoint lecture slides. Group Two was instructed using videos and PowerPoint lecture slides. Group Three was instructed using PowerPoint slides with white boards and videos. Students in Group Three were not provided with a hard/soft copy of the PowerPoint slides and were encouraged to write down all the information on their personal notebooks. A 20-item questionnaire was used to assess the students' understanding toward the CPR session. Data were analyzed using the Statistical Package for Social Science Students, SPSS version 13®. Based on the response attained, the comparison of the final score among the groups was undertaken using one way ANOVA. Twenty-seven students have participated in this study. Final evaluation using the questionnaire revealed that student's in Group Three had a better understanding of CPR (18.1 ± 1.5 , $p < 0.001$) than the other two. Students' note taking during the lecture and use of traditional chalkboard teaching were found significant to improve the students' understanding and learning in the CPR session.

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1. Background

Advances in medical and pharmaceutical sciences have vastly changed the concept of clinical practice and teaching methodologies. In the past, medicine and allied health science students gained theoretical knowledge in classroom-based lectures and developed their clinical skills in hospital rotations. It would

not be wrong to state that classroom teaching enables the demonstrator to present the factual material in a logical manner to stimulate critical thinking among the students (Bjork, 1991; David and Dianne, 2009). However, certain issues like one-way communication, a passive audience, and difficulty in assessing the learning may act as limitations during classroom-based teaching (David and Dianne, 2009). These limitations have led to the concept of Problem/Case-Based Learning (PBL/CBL). In PBL/CBL, students are led to appreciate clinical/practical aspects of medicine before joining the professional life (McCarthy, 1992). In addition, PBL/CBL helps to develop a long-lasting concept in the student's mind, which improves decision-making in practical settings. Despite these developments, one cannot neglect the importance of classroom-based learning (CRBL). In addition to traditional teaching measures, computer-assisted multimedia lectures have been added to replace chalkboard methods. The incorporation of this electronic information has further decreased the utility of exclusive use of CRBL. However, electronic teaching materials such as PowerPoint may contribute toward passive learning and students can only retain the information in *short-term memory* (STM) (Hossein and Abdus, 2005).

Earlier in the 19th century, traditional chalk and board provided an opportunity for the students to note down all the information presented by the teacher using audio and visual approaches (Paivio, 1986). As students listen, understand the concepts, and then take notes, the brain processes the core concepts into memory. However, in current practice, there is a massive use of PowerPoint and slides are made available to the students at the end of the lecture. Thus, many students do not take notes during class. This attitude and environment promote passive learning that limits the student's ability to store the freshly delivered concepts.

Nowadays, in many pharmacy schools, PBL is practiced as a preferred method of teaching. However, it has not completely replaced the didactic teaching. In addition, PowerPoint slides are generally preferred over the traditional chalk/board method, as these do not require the teacher's deeper involvement in the class; this practice also appears to be less time-consuming. In terms of certain medical procedures, effective outcomes can be ensured through appropriate teacher's involvement and teaching strategies. One of the best examples in this regard is Cardio-Pulmonary Resuscitation (CPR) teaching, which is essential for medical practitioners around the globe. In Universiti Sains Malaysia, CPR is one of the essential contents of the Public Health Pharmacy course that was introduced during the 2006–2007 academic year. It is a 2-credit hour (1 + 1) course offered during the first semester for first-year students enrolled in the Bachelor of Pharmacy (B. Pharm.) degree program. The course is composed of 24 contact hours (Hassali et al., 2009). CPR training is one of the essential practical elements of the Public health Pharmacy course. It carries about 10% marks, and the students must attend this course to pass this subject. Island College of Technology, Penang Island, Malaysia was one of the franchised units of the School of Pharmaceutical Sciences, Universiti Sains Malaysia. Keeping in mind the concept of effective teaching strategies, the current study aimed to evaluate the effectiveness of various teaching methods on the students' ability to retain information on CPR. This study helps to identify the ideal teaching strategy to increase student learning and understanding toward the concept of CPR.

2. Method

A cohort study was designed using different teaching strategies. The study sample comprised of Bachelor of Pharmacy (B. Pharm.) second-year students enrolled at the Island College of Technology, Penang Island, Malaysia. The assessment of the teaching method was based on CPR sessions conducted for the B. Pharm. students.

2.1. Study design

This was an interventional study involving 27 students. Student evaluation was based on their learning from the CPR sessions. The students had attended a CPR training session in their previous semester conducted by a qualified medical doctor using dummy models. The main aim was to evaluate the level of student's learning of CPR using different teaching/demonstration approaches.

2.2. Distribution/selection of students for cohorts

A two-stage cohort selection process was adopted:

2.2.1. Stage one

[Cohort selection based on grade point average (GPA)]

In stage one, students were divided into three groups based on their grades in the last semester. The classification based on GPA is as follows.

1. (Low GPA) with GPA 2.80–2.89 [12 students fell in this group].
2. (Good GPA) with GPA 2.90–2.99 [nine students fell in this group].
3. (High GPA) with GPA 3.00 and over [six students fell in this group].

2.2.2. Stage two

In this stage, three groups were defined based on the teaching methodologies adopted. Every group comprised of nine students. Each group had an equal number of students from the GPA groups defined in stage one in order to decrease the chance of sampling bias. Details are shown in Table 1.

2.3. Teaching strategies adopted

The following are the three teaching strategies adopted to demonstrate CPR to the students:

1. Demonstration through a detailed PowerPoint slide series that focused on the reasons for CPR, and the images that demonstrate the steps in CPR. [PowerPoint slides provided to students] [Group One].

Table 1 Distribution of student groups according to the GPA scores.

GPA	Group One	Group Two	Group Three
2.80–2.89 [<i>n</i> = 12]	S1, S4, S7, S10	S2, S5, S8, S11	S3, S6, S9, S12
2.90–2.99 [<i>n</i> = 9]	S1, S4, S7	S2, S5, S8	S3, S6, S9
3.0–3.30 [<i>n</i> = 6]	S1, S4	S2, S5	S3, S6

S = students.

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