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The effect of IMB model on CPR self-efficacy in high school students

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Abstract:

BACKGROUND: Cardiopulmonary resuscitation (CPR) is one of the health needs in school age using various new educational methods. Therefore, the present study was conducted with the aim of determining the effect of information-motivation-behavioral skills (IMB) model on CPR self-efficacy in high school students.

MATERIALS AND METHODS: This was a semi-experimental study in which 56 high school students in Isfahan were randomly divided into two groups (28 students in each group): e-learning method and IMB model. The self-efficacy of high school students in CPR was evaluated using a CPR self-efficacy (18 items) before and two weeks after training in both groups. Data were analyzed by the Statistical Package for the Social Sciences (SPSS) version 22 software using descriptive and analytical tests such as independent *t*-test and paired *t*-test.

RESULTS: Independent *t*-test showed that there was no significant difference between the mean score of CPR self-efficacy in the two educational groups ($P = 0.341$). However, after intervention, there was a significant difference between the mean CPR self-efficacy scores between the two groups ($P = 0.001$).

CONCLUSION: According to the findings of the present study, the use of educational method based on the information-motivation-behavioral skills model has improved the self-efficacy of high school students.

Keywords:

CPR, e-learning, information-motivation-behavioral skills model, self-efficacy

Introduction

Adolescence is mainly determined by a mixture of vague physical, psychological, social, and cognitive changes and reaches far into early adulthood. Adolescence represents a transitional period during which adult behavioral patterns and capabilities are acquired and refined, and the specific onset and offset of this period are therefore difficult to characterize.^[1] According to the World Health Organization (WHO), adolescents are people between 10 and 19 years of age; they constitute 20% of the world's population, out of which 85% live in developing countries.^[2] Therefore, it is

critical for countries to engage with this significant portion of the population and be able to address their health needs.^[3] Basic life support including cardiopulmonary resuscitation (CPR) is one of the health needs that consist of a set of interventions aimed at restoring and maintaining vital organ functions in victims of cardiac arrest and respiratory arrest.^[4] Adequate resuscitation is an important factor in determining survival from an episode of cardiopulmonary cerebral stroke.^[5] In the last few decades, students' knowledge and practical performance were a part of many research projects. However, an analysis of the "competency perception" and "associated thought on consequences" following Bandura's (1997) "self-efficacy theory" is missing. Self-efficacy beliefs are

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predictors for behavioral change.^[6] In fact, self-efficacy also mediates between knowledge and behavior and is associated with professional competence.^[7]

Education is fundamental for culture, knowledge, and self-efficacy promotion. E-learning and information-motivation-behavioral skills (IMB) model are two methods for behavioral changes.

In e-learning, the teacher and the learner are physically far from each other, and the learner can learn the educational material without face-to-face education. This type of education is the most important application of information technology, which is presented in the form of online learning in different modes such as computer-based learning (web-based learning) and offline learning.^[8] The results of a study by Dehghan *et al.*^[9] showed that new educational techniques such as non-interactive multimedia learning and workshops could improve knowledge of nurses about cerebrovascular accident (CVA) nursing care in the emergency department.

Another educational method is the IMB model. According to the IMB model, adherence-related information, motivation (personal and social), and behavioral skills all determine adherence behavior.^[10] The IMB model theorizes that each component may have a direct effect on adherence but that adherence-related information and motivation primarily act through adherence behavioral skills to influence behavior.^[11] A study has not been done based on the perceived needs of individuals so we decided to investigate this research.

Material and Methods

Study design and setting

This was a two-stage experimental study that was conducted in Khayyam student research center in Isfahan, Iran in 2022.

Study participants and sampling

Participants comprised of 56 high school students (28 in the IMB group and 28 in the e-learning group) by using two-stage sampling (random-accessible). They were selected by random sampling method using a table of random numbers from a list of three classes in high school.

The sample size, considering the variable of awareness based on the study of Bakhshani *et al.*^[12] considering the power of 95%, and 95% confidence, using the following formula and taking into account the 20% probability of sample loss, was estimated as 28 people in each group.

Data collection tool and technique

Data were collected through a questionnaire including demographic characteristics (individual and family

factors) and CPR self-efficacy (18 question with 18–90 range score). This questionnaire was completed in a study by Bakhshi *et al.*^[12]

Ethical consideration

The first page of the questionnaire was a consent form that had to be approved before starting and detailed information about the study. Therefore, all high school students were informed of the study's goals and procedures. The study was approved at the Khayyam student research center.

Intervention

After obtaining permission from the Khayyam Research Center in Isfahan and the high school in the second district of Isfahan and obtaining the necessary coordination regarding the time and place of the trainings, the researcher conducted the study. Sampling was done in three steps. First, from the three tenth experimental classes of high school, two classes were selected based on lottery and then in each class, the samples were entered into one of two educational groups (IMB model and e-learning). In the first phase of the study, a 10-item questionnaire relating to the educational needs of students' emergency care was prepared, which was graded on a five-point Likert scale from "very high" to "very low". After determining the highest score, the research student, based on the content determined and approved by the professor of the University of Medical Sciences, became ready to teach to his peers. In the first group, e-learning was done through multimedia (using videos, photos, and text) using the following link: <https://survey.porsline.ir/s/IVo75OA>.

The educational content was such that students could go back and understand the material with pictures if they did not understand it the first time. In the second group, all trainings were conducted by the tenth grade student (peer) in the form of a workshop based on the case and practical implementation using the IMB model.

In this model, in order to increase the knowledge and awareness of individuals, information is provided to students using different teaching methods (case-based, lecture), and then by practical implementation of CPR operations on mannequins, their behavioral skills are also affected.

Data analysis method

Data analysis was performed using paired *t*-test and student's *t*-test using Statistical Package for the Social Sciences (SPSS) software version 22.

Results

The results of the first phase of the study showed that according to the highest mean (standard deviation)

score of educational priorities, care of patients with seizures (4.22 ± 0.95) and CPR (4.14 ± 0.88) were identified as the first two educational priorities [Table 1]. In addition to this, the results showed that the mean age of the students was 15.07 ± 0.25 years and both groups were homogeneous before intervention.

The results of student's *t*-test in the above table show that there was no statistically significant difference between the mean score of CPR self-efficacy before the intervention in the two educational groups ($P = 0.341$), indicating the homogeneity of the two groups in the self-efficacy score [Table 2].

The results of the student's *t*-test in the above table show that there was a statistically significant difference between the mean scores of CPR self-efficacy two weeks after the intervention in the two educational groups ($P = 0.001$) [Table 3].

Discussion

The results of the present study show that the mean score of CPR self-efficacy significantly increased in the IMB model group compared to the e-learning group two weeks after intervention. In the e-learning group, the mean score of self-efficacy in both areas did not increase significantly two weeks after the intervention compared to before the intervention. The results of studies on self-efficacy in CPR operations have shown

Table 1: Mean, standard deviation, minimum and maximum amount of emergency care educational needs in students

Educational needs	Mean	SD	Minimum	Maximum
Stroke	2.95	1.21	1	5
Heart attack	4.0	0.95	2	5
Caring for seizure patients	4.22	0.95	2	5
Bleeding	2.96	1.08	1	5
CPR	4.14	0.88	2	5
Limb fracture	2.25	1.42	1	5
Airway obstruction	2.11	1.34	1	5

Table 2: Comparison of the mean score of CPR self-efficacy before training in the two groups

Educational Groups	E-learning			IMB model			<i>t</i> -Test <i>P</i>
	Mean	SD	Range score	Mean	SD	Range score	
CPR self-efficacy	36.5	10.0	24-52	38.6	9.6	18-58	0.341

Table 3: Comparison between the mean score of CPR self-efficacy two weeks after training in the two groups

Educational Groups	E-learning		IMB model		<i>t</i> -Test <i>P</i>
	Mean	SD	Mean	SD	
CPR self-efficacy	36.5	10.09	49.5	11.6	0.001

that the use of new and diverse training methods can increase the self-efficacy score of research units. In this regard, the results of a study by Heidarzadeh *et al.*^[13] showed that the average score of students' perception of self-efficacy after training (by simulation and mannequin method) increased in both groups. But no significant difference was observed between the two groups ($P = 0.41$). Findings of Heidari-Beni *et al.*^[14] also showed that the mean score of self-efficacy before the intervention was not significantly different in both peer education and individual education groups, and peer education had an effect on self-efficacy of heart failure patients and improved patient self-efficacy. Inconsistent with the results of the present study, the results of a study by Creutzfeldt *et al.*^[15] in Sweden showed that the use of e-learning compared to lecture education not only increased students' satisfaction and motivation, but also increased the average self-efficacy score for cardiac resuscitation. Additionally, the results of a study by de Sena *et al.*^[16] showed that the use of a tutorial method using an online game on a mobile platform resulted in poor performance of students compared to the video-based tutorial method in CPR. The results of a study by Wingen *et al.*^[17] showed that holding a 90-minute CPR training session improved students' awareness and self-confidence immediately and six months after intervention ($P < 0.001$). Regarding the use of the IMB model, the findings of a study by Zhu *et al.*^[18] showed that the IMB model provided a good understanding of predictors of smoking and suggested that future interventions among high school students should focus on improving motivation and behavioral skills. Furthermore, the results of a study by Ndebele *et al.*^[19] on an adolescent student showed that the use of the IMB model not only increased awareness, but also improved their attitudes and behavioral skills related to unhealthy sexual behaviors.

It should be noted that in all the studies mentioned, the use of educational methods has been with the use of experts in this field, whereas in the present study, the research student began training based on the IMB model after completing the training courses related to the care of patients with seizures and CPR operations.

Meanwhile, medical students complete the required specialization in at least four semesters, and after passing theoretical and practical courses, they can learn CPR operations and other basic measures related to their field. Therefore, providing education by the student to his peers is one of the strengths of the current study.

Limitation and recommendation

The limitation of the present study was the acquisition of information by participants through other ways such as the internet or other sources that could affect the results

and could not be controlled. In general, due to the fact that few studies have been conducted in various fields of the IMB model and multimedia in high school, it is recommended that these methods be performed on variables such as performance and satisfaction.

Conclusion

The results of this study show the positive effects of the IMB model on high school students' self-efficacy about CPR, and this method can be used as an effective method ifor high school students.

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Conflicts of interest

There are no conflicts of interest.

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