Effect of Communication Skills Virtual Module Based on the Calgary-Cambridge Model on the Attitude and Performance of Medical Students

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Abstract

Background: Good physician-patient communication improves health outcomes. However, many medical students lack effective communication skills.

Objectives: This study was done to evaluate a virtual education module for teaching communication skills to medical students in Iran.

Methods: The pre-test-post-test experimental design was conducted with simple random sampling using random number generation software to compare the virtual module of communication skills. Iran University of Medical Sciences students' attitudes were assessed with the Communication Skills Attitude Scale (CSAS) and clinical performance was assessed with the Calgary Cambridge checklist. A total of 50 students in each group have completed the course. The virtual module was designed and developed with the steps of the Calgary Cambridge model and was taught using PowerPoint, posters, pamphlets, and podcasts. Independent t-test samples, and analysis of covariance (ANCOVA) were utilized for data analysis using SPSS software.

Results: The mean age of participants in the Conventional group was 23.92±3.27, and in the virtual module group was 24.02±3.16. The mean difference in attitude toward communication between the two groups was 25.62±5.45, and performance was 6.23±1.61, which was statistically significant. The statistical analysis revealed a statistically significant difference in the mean attitude and performance of students before and after the virtual module ($P<0.05$).

Conclusion: The virtual module significantly improved students' communication skills, attitude, and performance compared to conventional education. The implementation of virtual education modules can effectively enhance the teaching of communication skills in medical schools. Further studies are needed to assess the long-term impacts on physician-patient communication.

Keywords: Education, Physician-Patient Relations, Medical, Student

Background

Medicine is a combination of art and science. A good doctor should have the art of communicating with the patient and awareness of the medical sciences. Establishing a good relationship between physician and patient also leads to positive therapeutic outcomes. In the recent two decades, major changes have occurred in the physician-patient relationship, shifting the focus of medical decisions towards the patients and their values. In patient-centered care, physicians treat patients as human beings and consider their attitudes, beliefs, and concerns in addition to the clinical diagnosis. Professors have always been concerned about the need to pay attention to the clinical practice and the attitude of medical students. At this stage, students should practice what they have learned independently. Also, considering the importance of their attitudes and their impact on academic progress and clinical performance, it is more necessary than ever to address these two categories among medical students (1). The practice of

medical students and physicians and the skill and ability of a medical student or resident are reflected in communicating and interacting with patients and their families, health care staff, and nurses. To obtain these communication skills, the medical student or resident should effectively establish a strong information exchange with patients and their companions, coworkers, and professors. It is expected to know effective listening skills, information analysis, non-verbal interpretations, writing skills, and cooperation with attending physicians or health managers. Professional and communication skills are vital for establishing an effective relationship, particularly with patients, since it improves their health outcomes and satisfaction; conversely, unprofessional behaviors and poor communication skills lead to wrong therapeutic approaches (2). Appropriate communication with the patient requires understanding the patient not just as a collection of symptoms and impaired organs; rather, the physician should consider the patient with their concerns and aspirations who has approached the physician with confidence and reassurance in search of help and recovery (3). Learning and teaching communication skills are vital. There are serious issues in the physician-patient relationship, which may be solved in two ways: learning the skills, or the skills taught. Teaching medical students communication skills lets them communicate more effectively with their patients. Role models are important to maintain or enhance the skills since many professors have not received communication skills training. Thus, more professors must support "effective" communication with the patients and present good role models for medical students. Observing the live communication of the professors and patients in the patient interview scene is very useful for the medical student (4). Several studies have shown that the inability of health care workers, particularly physicians and nurses, to establish an appropriate relationship with patients not only results in high costs but also leads to patient's dissatisfaction with the treatment process, non-adherence to the physician's treatment instructions, deciding to change the physicians, and having a negative attitude towards treatment and health care organizations in general (5). Studies have demonstrated that examinations below 10 minutes avoid proper communication, compassionate examination, and patient satisfaction. Many physicians have a positive attitude towards communicating with patients, though they don't have the proper communication skills. Communication is one of the human skills and is an integral part of the clinical skills of physicians; thus, communication skills courses should be included in educational courses or communication skills workshops should be held for health care professionals, especially physicians, and nurses, to assist rapid and successful treatment of patients (6). Studies have shown that 60-80% of disease diagnosis and treatment decisions are based on information obtained from medical interviews (7), in which communication skills play a key role. Several studies have demonstrated that a good physician-patient relationship positively affects the patient's health status prognosis. Also, the patient's satisfaction with health services highly depends on the effective physician-patient relationship (8). Proper communication positively affects patients, e.g., improving their vital signs, reducing their pain and anxiety, increasing their satisfaction, enhancing treatment outcomes, and improving their participation in treatment programs. Effective communication in the healthcare care sector is vital for patient safety, interpersonal relationships of the members of the treatment teams, and the satisfaction of patients and their families (9). Therefore, according to the importance of communication skills, various educational methods are used to teach communication skills to medical students, including the longitudinal theme of communication skills and its inclusion in the educational curriculum of medicine, holding workshops (10), using a trained simulated patient, recording video and its representation, role-playing, using checklists and computer training, for teaching this skill in different clinical situations, continuous education (11), etc. Effective physician-patient communication is critical for quality healthcare, yet many studies have shown doctors' communication skills deficiencies. While various educational interventions have been tried, there is limited research on innovative virtual training methods. Based on the Calgary-Cambridge model, an evidence-based framework, we hypothesize the module will improve students' communication skills. Demonstrating the efficacy of virtual training could provide an important new tool for communication skills education in undergraduate medical curricula. This has the potential to enhance physician-patient relationships and improve healthcare delivery ultimately. The objective of this study was to evaluate the effectiveness of a virtual education module based on the Calgary-Cambridge model for improving communication skills, knowledge, attitudes, and practices among medical students in Iran in 2021.

Objectives

This study was done to evaluate a virtual education module for teaching communication skills to medical students in Iran.

Methods

The present experimental study used the pre and –post-test design. The independent variable was communication skills training using two methods: Virtual module and conventional method, and the dependent variable was the attitude and performance of medical students.

Sampling Method: Sampling was done based on the complete census. The sample size was estimated to be 100 people placed in two groups of 50 people by simple random method. The informed consent form was obtained from all participants.

Inclusion criteria: obtaining informed consent from the sample, fourth-year students, and willingness to participate in the study.

Exclusion criteria: non-cooperation, unwillingness to participate in the study, or due to defects in completing the questionnaire and guest students and first to third-year students.

Study Setting: According to the Calgary-Cambridge model, the intervention group's virtual training method (educational module) was designed in pamphlets, posters, PowerPoint slides, and podcasts. This content was prepared according to the Calgary-Cambridge guide with the approval of 4 expert faculty members in physician-patient communication skills; on the other hand, the conventional course was in the control group. The conventional course in Iran is the normal course where medical students learn how to communicate with patients from medical teachers during the seven years of the course, and do not have formal and academic training to communicate with patients effectively. After the final proposal approval and obtaining the ethics code for this study, the researcher accessed the number of 4th-year medical students by referring to the education office of the faculty, and the students were selected by census and were randomly divided into two groups of 50. (For randomization, students were randomly selected and placed in two different groups, and each had an equal chance) (Simple random Sampling Using random number generation software). First, participants of both groups filled out the online valid and reliable CSAS questionnaire (electronic form in Porsline) as a pre-test, and their communication practice was assessed by two trained observers, one of

whom was their classmate, and the other was an anonymous person. The Calgary-Cambridge checklist was completed only once for the participating students by attending the hospital through observation for students in the clinical setting in the electronic form (e-form). In examining the clinical performance, the evaluator was completely anonymous among the students and entered the names and observations of each person in different clinical situations with several patients in the mobile software. No student has noticed the evaluation.

Simultaneously, the participants in the first group entered the hospital based on the conventional method and communicated with the patients. In this method, medical students enter the hospital after passing the basic science course and communicate with the patients by observing the attending physicians. The intervention in the second group was communication skills training based on the virtual training based on the Calgary-Cambridge model by virtual training method (training module). The training module included two podcasts prepared by the researcher, and the guiding professor posted in a virtual group. The researcher also prepared posters and PowerPoints and sent them to a virtual group. Therefore, participants of both groups filled out the online valid reliable CSAS questionnaire (electronic form in Porsline) as post-test. Their communication practice was assessed by two trained observers, one of whom was their classmate, and the other was anonymous. The time between pre-test and post-test was 3 to 6 months.

The following three tools were used in the present study for data collection:

1. The first part included questions related to demographic and educational information, including gender and age.

2. The second part included the Student's Attitudes towards Learning Communication Skills (CSAS), which Rees, Sheard designed, and Davies in 2002 to assess students' attitudes toward learning communication skills in medical school. This scale consists of 26 items in two parts. The first part, is the Positive Attitude Scale (PAS), referring to students' appreciation of communication skills as a scientific subject and their belief in respecting patients' rights and the significance of communication with patients. It includes 13 items (4, 5, 7, 9, 10, 12, 14, 16, 18, 21, 22, 23, and 25). The second part was the Negative Attitude Scale (NAS), which assesses the negative aspects of communication skills training,

which also consists of 13 items (1, 2, 3, 6, 8, 11, 13, 15, 17, 19, 20, 24, and 26). Answers were given on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) [12]. The possible scores varied from 13 to 65; a higher score indicated a stronger attitude. The psychometric properties of the CSAS questionnaire were assessed with the participation of 410 medical students. The reliability (100 & 0.82 & 0.91) and validity (face, content (0.79) and structural validity) of this tool have been proven in several studies in Iran [13].

3. The third part of the Calgary-Cambridge Guide [13] is the physician communication practical skills. Karimi Monghi checked the validity and reliability of the Calgary-Cambridge checklist in 2013 [14]. The checklist consists of 13 items, 10 of which have three options: "complete skill performance, incomplete skill performance, and lack of skill performance." The remaining three items have only two options (complete skill performance and lack of skill performance). The three options mentioned were assigned scores of 1, 0.5, and zero in the first 10 items, respectively, and 1 or zero in the later 3 items. The maximum score of the checklist was 13, which was calculated from 20 as the maximum final score of the country's educational system (so the maximum final score was 20). A higher score indicated better communication skills for the students. Content validity was used to define the communication skills checklist's validity. Therefore, the checklist was given to 10 experienced expert professors in communication skills to confirm its validity. Also, to determine its reliability, an experimental study was performed on 10 medical students with two observers other than the research samples. The correlation coefficient of the scores of the two observers was 0.89, showing the acceptable reliability of the checklist. This checklist is derived from the Calgary-Cambridge checklist, the reliability of which has been confirmed; on the other hand, all parts of this questionnaire are objective. Thus, it can be stated that the reliability of the questionnaire is confirmed by the reliability of its items and overall reliability; though, due to the reliability of the reliability and documentation, its reliability was determined by the retesting method, which showed a coefficient of 0.85, which is acceptable.

To evaluate the research results, the data obtained from the research units were coded and analyzed by the SPSS 16 statistical software, using descriptive statistics methods (frequency distribution tables, mean, standard deviation) and analytical statistics methods. Normality, Paired t-tests, independent t-tests, and covariance tests were used.

Declarations ethics approval and consent to participate: This study was approved by the Ethical Board of Iran Medical Sciences University. Verbal informed consent was obtained from all participants. All methods were carried out according to relevant guidelines and regulations. The privacy of the participants was well protected. Participants were voluntary, with consent at the beginning of the questionnaires. Only participants who signed the informed consent document could complete the questionnaires. The questionnaires did not include names and personal identification information. In the present study, all sample subjects answered the informed consent form.

Results

This study has shown that the mean age of participants in the conventional group was 23.92 ± 3.27 and in the virtual module group was 24.02 ± 3.16. Most participants in the two groups were female and lived with their parents. There is no significant difference between the two groups in demographic variables (Table 1).

Table 1. Mean and Standard Deviation of Age in Two Groups and Gender Frequency of the Study Participants

Variable	Group			
	Intervention Mean (SD)		Control Mean (SD)	
Age	23.99 (3.27)		24.04 (3.16)	
	Frequency	**%**	**Frequency**	**%**
Gender				
Male	22	44.0	20	40.0
Female	28	56.0	30	60.0
Total	50	100.0	50	100.0

Also, in both groups mainly reside in their houses, reaching nearly 80%.

The results showed that in the Female group, the attitude and performance level was better than that of the Male (p-value=0.01) (Table 2).

Table 2. Comparison of Mean (SD) Attitude and Performance

Scale	Variables	Mean (SD)	P-value
Attitude	Male	2.89 (1.17)	<0.01
	Female	3.92 (2.64)	
Performance	Male	2.59 (1.19)	<0.01
	Female	3.77 ()	

Table 3. Comparison of Before and After Mean Scores of Attitude and Performance Between both Groups Using Independent Sample T-Test

Scale	Variables	Group	Mean (SD)	t	P-value
Attitude	Before	Conventional	26.08(6.04)	1.31	0.364
		virtual module	25.62(5.45)		
	After	Conventional	29.14(7.23)	4.57	<0.0001
		virtual module	44.59(7.36)		
Performance	Before	Conventional	6.59(1.12)	1.29	0.472
		virtual module	6.23(1.61)		
	After	Conventional	8.21(1.91)	5.23	<0.0001
		virtual module	13.82(1.61)		

Before the intervention, the mean score of students' attitudes toward communication in the virtual module group was 25.62±5.45, and in the conventional group was 26.08±6.04. Students' performance mean score in the virtual module group was 6.23±1.61, and in the conventional group was 6.59±1.12, which wasn't statistically significant.

According to the results of the obtained significance level of the research variables (>0.05), the data of all the variables are normal, and parametric tests can be used to test each of the variables.

After the intervention, the mean score in the virtual module group was 44.59±7.36, and in the conventional group raised to 29.14±7.23. The mean score of student's performance in the virtual module group was 13.82±1.61, and in the conventional group, it was 8.21±1.91 which was statistically significant (Table 3).

There was a significant statistical relationship between mean scores of pre-test and post-test in attitude and performance of students about communication in the virtual module group, while in the conventional group was not significant (Table 4).

Table 4. Comparison of Before and After Mean Scores of Attitudes and Performance Within both Groups Using Paired T-Test

Scale	Group	Variables	Mean (SD)	t	P-value
Attitude	Conventional	Before	26.08(6.04)	1.26	0.536
		After	29.14(7.23)		
	virtual module	Before	25.62(5.45)	6.93	<0.0001
		After	44.59(7.36)		
Performance	Conventional	Before	6.59(1.12)	1.39	0.158
		After	8.21(1.91)		
	virtual module	Before	6.23(1.61)	4.82	0.001
		After	13.82(1.61)		

Results of the analysis of covariance in Table 5 demonstrate a significant difference between the attitude of medical students towards communication with patients in the intervention and control groups (P<0.01, F 25.77). The effect size is 0.59, indicating that 59% of the attitude of medical students towards communication with patients belongs to the virtual education of the Calgary-Cambridge model. In other

words, physician-patient communication skills education based on the Calgary-Cambridge model affects medical students' attitudes. In comparison, only the effect size for the routine course is 0.09, indicating that only 9% of the changes in the mean scores of medical students' attitudes toward communication with patients belong to the routine courses.

Table 5. Results of the Analysis of Covariance in the Intervention and Control Groups in Terms of Medical Students' Attitudes

Students' attitudes	Sum of Squares	Degree of freedom	Mean of squares	F value	Sig	Effect size	Statistical power
Post-test (intervention group)	18.30	1	48.50	25.77	0.001	0.59	0.05
Post-test (control group)	12.95	98	28.35	10.31	0.1	0.09	-
Group	8.316	1	6.429	28.11	0.000	-	0.01
Error	26.92	40	34.08	-	-	-	-
Total	255.99	86	-	-	-	-	-

Table 6 shows that the interaction between pre-test and group scores is significant, because the significance value is smaller than 0.05. There is a significant difference between the performance of medical students in terms of communicating with patients in the intervention and comparison groups (P < 0.01) and F (28.98), its square is equal to 0.61; that is, 61% of the performance of medical students in communicating with the patient is related to the implementation of virtual education based on the Calgary-Cambridge model. In other words, it can be said that teaching doctor-patient communication skills based on the Calgary-Cambridge model is effective in the performance of general medical students.

Table 6. Results of the Analysis of Covariance in the Intervention and Control Groups in Terms of Medical Students' Performance

Students' attitudes	Sum of Squares	Degree of freedom	Mean of squares	F value	Sig	Effect size	Statistical power
Post-test (intervention group)	28.98	1	28.98	23.64	0.001	0.61	0.05
Post-test (control group)	12.95	96	28.35	10.31	0.1	0.09	-
Group	6.353	1	7.902	9.34	0.000	-	0.01
Error	18.39	2	24.58	-	-	-	-
Total	35.333	97	-	-	-	-	-

Discussion

The mean scores of medical students' attitudes toward communication with the patient in the pre-test and post-test showed significant differences between the two groups. However, the two groups had nearly identical mean scores in the pre-test, indicating no statistically significant difference.

After the routine course, the mean score of medical students' attitudes toward communication with patients in the case group slightly improved, but this difference was not statistically significant. On the other hand, the comparison of medical students' attitudes towards communication with the patient before and after the virtual training intervention based on the Calgary-Cambridge model showed a statistically significant difference. Similarly, the difference in mean scores of medical students' practice in communication with the patient in the post-test was statistically significant between the two groups. In contrast, there was no statistically significant difference between the groups in the pre-test. Furthermore, comparing medical students' performance in communicating with the patient in the control group before and after the conventional course showed a slight difference, but the mean difference was not statistically significant.

A comparison of medical students' performance in communicating with the patient before and after the intervention by virtual training according to the Calgary- Cambridge model showed a statistically significant difference. There was a significant difference between the attitude of medical students towards communication with the patient in the intervention group and the control group. In other words, it may be stated that teaching communication skills according to the Calgary-Cambridge model affects the attitude of medical students. Moreover, for conventional courses, the impact equals 9%, indicating that 9% of the changes in the mean scores of medical students in the control group occurred due to conventional courses. Moreover, a significant difference was found between the practice of medical students in communicating with the patient in the intervention group and the control group. In other words, it may be stated that teaching communication skills according to the Calgary-Cambridge model affects the clinical practice of medical students.

Moreover, for conventional courses, the impact equals 16%, indicating that 16% of the changes in the mean scores of medical students in the control group occurred due to conventional courses. Using communication skills by physicians is directly associated with patients' satisfaction and treatment adherence; on the other hand, it increases the physician's acceptance by the patient. Instructors often act as the main role models for their students in professional communication and ethical behavior. Patients often complain regarding the quality of communication in health care. Communication skills training should improve before graduation and graduate education both from the perspective of instructors and trainees. The clinical environment is considered ideal for obtaining and teaching clinical communication skills. The findings of the mentioned studies are consistent with the present study's results. Soltani Arabshahi conducted a study entitled "Physician-Patient Communication Skills." It was stated that serious problems exist in physician-patient communication, which may be solved differently; skills that should be learned while teaching them are also quite possible. Teaching communication skills to medical

students lets them communicate with patients more effectively to maintain or improve their skills. Thus, more professors must support using "effective" communication skills with the patient and act as good role models for the medical students.

Communication between physicians and patients is beneficial and lets physicians remember many facts and realize that they work together to solve problems, accept the disease's natural consequences, and, on the other hand, improve the satisfaction of the patients and the physician and the mistakes that are found (15). Their studies' findings align with the present study's results.

Bakker et al.'s study showed that a considerable part of patients' complaints to the physician and the treatment instructions misuse occurred due to communication problems rather than physician inadequacy issues (16). Their studies' findings align with the present study's results.

In another study, patients' satisfaction regarding their relationship with physicians was investigated; accordingly, although the overall patient satisfaction was relatively high (62%), major dissatisfaction was found in some components, including the allocation of sufficient and appropriate time for communication with the patients, physicians treatment planning skills, considering the feelings of the patients and their participation, and feeling of insecurity of the confidentiality with the simultaneous visit of several patients (17). Their studies' findings align with the present study's results. Shakerinia conducted a study entitled Physician-Patient Relationship and its Role in Patient Satisfaction with the Treatment Process, in which it was concluded that most physicians have a positive attitude toward communication with patients. However, they don't have the appropriate communication skills. Communication is one of the human skills and is an integral part of the clinical skills of physicians; thus, communication skills courses should be included in educational courses, or communication skills workshops should be held for health care professionals, especially physicians, and nurses, to assist rapid and successful treatment of patients (18). The findings of these studies are consistent with the results of this study. Attari Moghadam et al. (19) conducted a study entitled Teaching Physician-Patient Communication Skills to Medical Students: Evaluation of Students' Awareness and Satisfaction, in which they concluded that 85% of participants were satisfied with the workshop. The difference in the mean

test scores before and after the intervention was statistically significant. Also, after training, the test subscales' scores significantly differed from those before training. Physician-patient communication skills workshops for medical students effectively improve their communication skills awareness (20). Their studies' findings align with the present study's results. Emadzadeh et al. conducted a study entitled Communication Skills of Dentistry Residents and its Effect on Patient Satisfaction at Mashhad University of Medical Sciences (21). Their studies' findings align with the present study's results.

In Yakhforosh et al.'s study, the Communication Skills Attitude Scale (CSAS) psychometric properties were measured in a sample of Iranian medical students. Communication skills (CS) are critical for medical students and other healthcare professionals. CS is an important feature of health care providers, leading to improved patient care and health outcomes. Therefore, CS is one of the essential factors in providing high-quality medical services. The Communication Skills Attitude Scale (CSAS) is the most authoritative and widely used assessment tool for measuring physicians' attitudes toward learning CS (22). Regarding the effectiveness of the training intervention, it is reported that CS training focuses on cognitive, behavioral, and emotional features, which likely have stronger effects on developing and transmitting the mentioned skills. The study confirmed the reliability and validity of CSAS to investigate the attitudes toward communication skills in an Iranian context. Their studies' findings align with the present study's results.

To explain these findings, it can be stated that the training method using podcasts reduces not only the transportation costs of learners but also that they do not need to leave their workplace, and it is more compatible with the ever-changing training needs of health centers (23-28). The learners' satisfaction in this group was higher than the participants in the conventional courses. Considering medical students' occupational and personal activities and the interference of face-to-face training courses with their working or free hours, using the e-learning method as an alternative or complement to the conventional courses can be an appropriate alternative for retraining health care professionals. In general, studies show that establishing an appropriate relationship between physician and patient is vital in the patient and (even physician) satisfaction and attracting patient cooperation to adhere to the treatment

instructions and patient's participation in the treatment process and treatment plans. Establishing a dynamic and mutual relationship between physician and patient leads to accurate information collection, diagnosis, treatment, and treatment adherence. Patient communication skills should be trained, though teaching this skill at the bedside of the patients is challenging. Crowded hospitals, insufficient time, patient conditions, and lack of knowledge of clinical professors avoid the golden opportunity for students' education (29-33). As inferred, the basis of all these capabilities is proper communication with the patient. Professional relationship training with the patient should be conducted in a hidden curriculum, and students learn from the faculty's daily communications with patients, it is a misconception and will not lead to useful results. Training in physician-patient communication should be integrated into the educational curriculum of medical students.

Limitations: Students' non-cooperation and the involvement of disturbing variables beyond the researcher's control during the study, such as students' mental-psychological conditions; the outbreak of coronavirus disease reduced communication between students in clinical departments.

Conclusion

According to the Calgary-Cambridge model, the study showed that physician-patient communication skills training via virtual education significantly affects the attitude and practice of medical students at the Iran University of Medical Sciences. The student's need to learn medical ethics and communication skills and communicate with patients is not fulfilled by only the theoretical medical ethics course. Practical training is vital for medical students, interns, and residents in the presence of professors and in an atmosphere where ethics is institutionalized. Moreover, skill workshops and simulated training sessions may be used for communication skills training. Before giving a working certificate, these training and skills training strategies can be practiced with a union system for physicians, dentists, nurses, and other medical personnel.

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