Efficacy of Communication Skills Training of Preclinical Medical Students via Health Literacy Teaching to High School Students: A Pilot Study

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ABSTRACT

Objective: Communication Skills via Health Literacy (CSvHL) was a pilot elective communication skills training (CST) course, which allowed preclinical medical students to gain communication competence through the experience of being a health educator for high school students (HSSs). The efficacy of CSvHL was explored.

Materials and Methods: All 10 medical students were prepared for their HSS-health-educator roles by participating in several observation sessions at an outpatient department and via communication workshops. In-field health education courses were subsequently delivered to HSSs by the medical students. Developments of the medical students' communication skills were fostered through loops of learning activities and regular feedbacks. Assessments of the pre- and post-CSvHL communication skill levels by means of an OSCE, with adapted ComON Check were evaluated by each medical student, a standardized patient, and three medical instructors.

Results: In general, the overall and category-specific average ComON Check scores of the whole class were significantly improved after the CSvHL course. The 3 communication defects with the lowest scores in the pre-CSvHL assessments were subsection division, summarization, and comprehension-check while counseling.

Conclusion: CSvHL was successfully established as a preclinical-year CST course. The improvements in the ComON Check scores reflected the transformative learning gained from the hands-on experience, individualized CST, and 360° feedback OSCE for communication skill assessment.

Keywords: Preclinical communication skills training (CST); early clinical exposure; health literacy; health educator; transformative learning (Siriraj Med J 2021; 73: 532-540)

INTRODUCTION

Communication skills training (CST) is essential for medical students since productive doctor-patient communication and multidisciplinary collaboration are required for qualified medical practitioners in their daily practice.[1-4] However, CST is typically not specifically delivered throughout the medical curriculum. Some institutes provide CST separately from basic clinical-skills training (e.g., history taking and counseling) during the preclinical years, whereas others expect communication competence to be indirectly gained via clinical clerkships (e.g., during ward rounds, bedside teaching, and medical report discussions) during the clinical years without any explicit CST. It has been suggested that CST in clinical

year clerkships should be promoted via a repetitive and supportive environment, with structured training that is adaptable and tailored to medical-students.[5,6] However, with promising expectations, carefully-selected clinical skills and topics might be introduced and taught sooner, as part of **preclinical CST**; this early exposure has the potential to assist medical students to perform better during their later clinical years.[7-9]

Health literacy refers to the skills needed to obtain, interpret, and utilize health information[10-12] and comprises a wide range of biomedical knowledge and life skills. It is an appropriate foundation topic to be taught and practiced during the preclinical years. Aspects of fundamental healthcare – such as smoking cessation and diet control – can be selected to enable preclinical medical students to practice the communication skills related to patient counselling, despite lacking in-depth medical knowledge. Hess et al.[13] reported on a pilot project at Harvard Medical School that allowed medical students, in collaboration with the medical librarian, to deliver a short, plain-language, health-literacy presentation to adult, multi-ethnic learners. A post-intervention survey revealed that 88% of those students had improved their physician-patient communication skills, including adult learner interaction, health communication, and plain-language expression abilities. In another study by Milford et al.[14], preclinical first- and second-year medical students were trained in pediatric obesity intervention strategies. They were involved with Head Start children, parents, and staff in the conduct of pediatric-obesity education programs and the setting of the related management goals for the families concerned. Pre- and post-intervention surveys found that the students had made significant improvements in confidence in their health-literacy knowledge and skills. Moreover, the sophistication of communication compositions (e.g., the pre-existing knowledge and health behaviors of parents, patients, and the community, doctor-patient interactions of empathy, and family concerns) were also acknowledged by the medical students. Hence, with such supporting evidence, involving medical students in the provision of health education for patients or communities appears to have the potential to improve quality of care, enhance medical education, and develop communication skills.[8,15-20]

Conducted in academic year 2018, **Communication Skills via Health Literacy (CSvHL)** was a pilot elective course for preclinical medical students. It had two major aims. The first was to develop the communication skills of preclinical medical students via direct experience gained from teaching and facilitating health education at a high school.[21-27] By teaching health education to high school students (HSSs), the medical students were encouraged to identify and prepare relevant information and to practice their presentation and communication skills. Wong et al. postulated that medical students assuming the role of health educators gain high levels of trust and comfort from HSSs. More specifically, Wong and colleagues proposed that the unique position of medical students-healthcare providers who are only slightly older than HSSs – allows them to foster trust via peer relationships with HSSs rather than by adopting the more traditional authoritarian – role of a teacher.[28] In turn, the bonding enables the medical students to freely prepare mini-health education courses for the HSSs that incorporate an active-learning teaching style and are less stressful to deliver than with real-life patients. Moreover, essential communication skills are intensified through the preparation of the courses in that the medical students need to consider the level of the audience, the appropriate media to be utilized, and the language level to be employed. The second aim of the CSvHL course was to enhance health literacy awareness, thereby motivating the medical students to gain a comprehensive medical knowledge which could be applied in their future clinical practice.[10,19]

This study explored the effectiveness of the CST provided to the participating medical students by the CSvHL course.

MATERIALS AND METHODS

The "Communication Skill via Health Literacy (CSvHL)" course provided a health-educator experience for medical students and assessed their communication skills (Fig 1). Below are details of the participants, the curricular learning activities, and the communication skills assessments.

Participants

Medical students: The participants comprised all ten of the 2nd and the 3rd year medical students who enrolled in the pilot CSvHL elective course in academic year 2018. They completed an informed consent form, in accordance with Siriraj Institutional Review Board protocol 580/2018 (EC1).

Medical instructors: Three instructors – each with 10- to 15-years' teaching experience – assumed the roles of advisors for the medical students. They were drawn from the Radiation Oncology Division of Radiology Department (PD); the Department of Preventive and Social Medicine (TJ); and the Department of Physiology and the Health Science Education Excellence Center (YD). In addition, a 6th year medical student took on
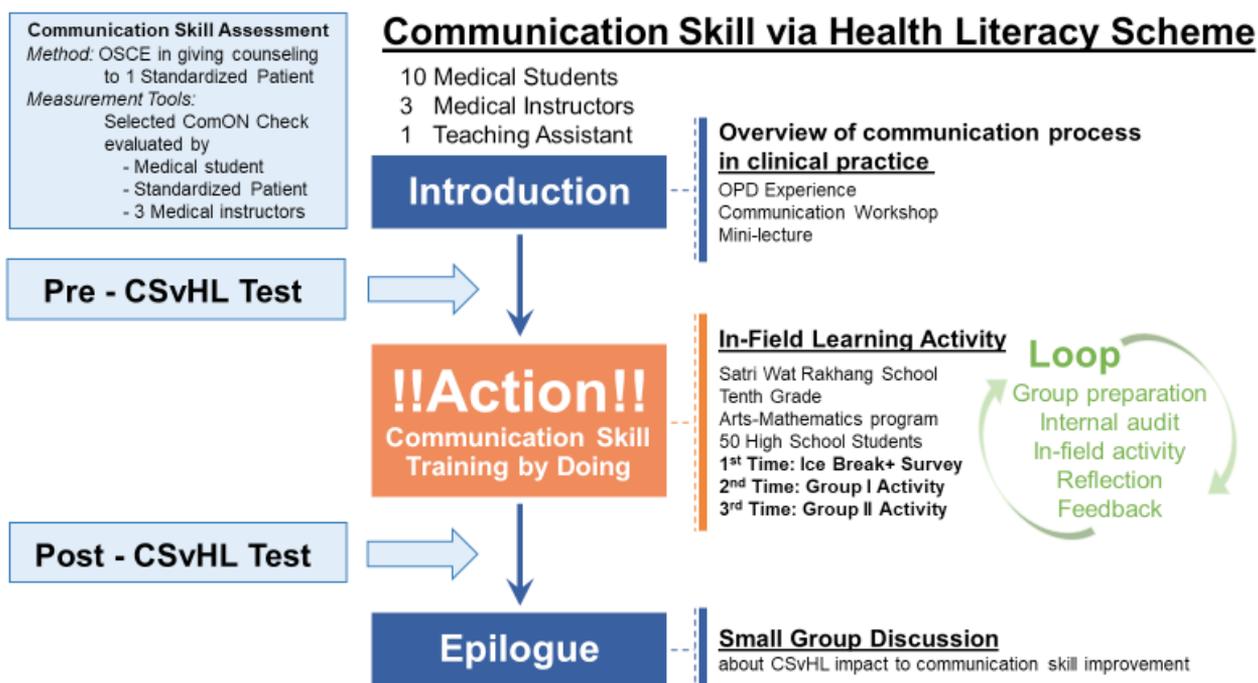
Fig 1. Communication Skills via Health Literacy (CSvHL) scheme. The three phases of the CSvHL course are illustrated. To determine the communication skills improvements of the medical students, a pre-CSvHL assessment was conducted after the Introduction, while a post-CSvHL assessment was made before the Epilogue.

Abbreviations: OPD, outpatient department; OSCE, Objective Structured Clinical Examination.

the role of teaching assistant and curriculum developer during the externship (TP).

High school students (HSSs): Fifty female, 10th grade, Arts-Mathematics-program students from Satri Wat Rakhang School were included as the subjects for the in-field health education program. Informed consent was obtained as per Siriraj Institutional Review Board protocol 580/2561 (EC1). Satri Wat Rakhang School is a girls' school which is located near Siriraj Hospital. It was selected because of its accessibility.

CSvHL curriculum

The course was divided into 3 phases: Introduction, Communication Skills Training by Doing, and Epilogue (Fig 1).

In the introductory phase, the medical students were given an overview of the communication processes utilized in clinical practice via observation sessions at the outpatient department, communication-workshop group activities, and mini-interactive lectures. Each of the aforementioned activities was 2- to 3-hours long, and they were conducted once per week for 3 consecutive weeks. The baseline communication skills of the students were assessed at the end of the phase. Verbal and nonverbal communication-skill learning points were identified for individual students, allowing the instructors to tailor the advice to be given to each student during the subsequent lessons.

As to the second phase, the medical students developed their communications skills through hands-on experience. To this end, they were assigned to 2, in-field, health education groups, with the 2nd and 3rd year students being equally distributed between the groups. To promote engagement with the HSSs, icebreaking activities were arranged to facilitate the introduction of the medical students and their subsequent surveying of the topics of interest to the HSSs. Each of the 2 education groups was then requested to devise a health education session for delivery to the HSSs that incorporated health literacy as one of its learning points. Although the learning task was required to be interactive or activity-based, no other limitation was placed on its design. The loop of presentation preparation, internal audit, and onstage HSS teaching activity lasted about 4 weeks for each education group. While one group presented its teaching activity, the members of the other group helped the medical instructor by playing the role of commentator in the internal audit and facilitator in the onstage period. Group and individual performance reflections and feedback were given for every internal audit and on-stage presentation.

In the epilogue phase, a post-CSvHL communication assessment was executed. During the following week, a group discussion about how the CSvHL course had improved the medical students' communication skills was held as the end of the course.

Communication skills assessment and statistical analysis

As depicted in Fig 1, pre- and post-CSvHL communication skills competency was assessed by an Objective Structured Clinical Examination. Relevant materials were given to the medical students one week prior to each assessment to complement the clinical basics used in the OSCE. During a 5-minute session, each medical student was required to take a short history to probe a standardized patient's (SP's) problem before giving medical advice to the SP; 3 medical instructors observed the interaction through one-way glass. After the session, each student presented a 2-minute self-reflection of their performance before being given a 3-minute feedback by the instructors and the SP on what worked well and areas for improvement.

The simulation scenarios developed by the 3 instructors and the teaching assistant covered all scoring criteria encompassed in the communication skills assessment. Only one experienced SP, who had an MSc in psychology and was a postgraduate educator for 2 years, participated in both the pre- and post-assessments. The SP was well prepared for the scenario performance, feedback, and evaluation of the medical student.

For the pre-assessments executed after the introductory phase, pairs of students were required to advise a 1st-trimester pregnant woman who wanted to quit smoking. As to the post-assessments, they were executed one week after completing the CSvHL course. For those assessments, the medical students had to individually counsel a Type 1 diabetes mellitus patient on the choice of an appropriate insulin pump injector. The diabetic patient had a history of poor insulin-injection compliance due to a hectic lifestyle stemming from her work as a commercial designer. With both the pre- and post-assessments, the simulated patient and the 3 instructors were identical; they were blinded to the pre-assessment score before performing the post-CSvHL communication assessment.

Selected categories from ComON Check[29-31] namely, the starting and ending of a conversation, the structure of a conversation, general communication skills, and overall evaluation of a conversation (Fig 2) were evaluated by each medical student, the SP, and the 3 medical instructors. A paired t-test of the pre- and post-assessment scores was performed. Statistical significance was deemed to be a p-value of 0.05 or less.

How do you assess the communicative competence of the physician in this conversation?

	Strongly Disagree				Strongly Agree
A Start of the conversation					
A1 Does the physician initiate the conversation appropriately?	O	O	O	O	O
A2 Does the physician manage to get an idea of the patient's perspective at the beginning of, or during the consultation?	O	O	O	O	O
B Structure of conversation					
B1 Does the physician actively give structure to the conversation (set an agenda of central topics)?	O	O	O	O	O
B2 Does the physician set sub-sections in the course of the conversation (in detail)?	O	O	O	O	O
D End of conversation					
D1 Does the physician summarize the content of the consultation and do they close the conversation appropriately?	O	O	O	O	O
E General communication skills					
E1 Does the physician use clear and appropriate words during the conversation?	O	O	O	O	O
E2 Does the physician use appropriate non-verbal communication during the consultation?	O	O	O	O	O
E3 Does the physician adjust his pace during the consultation and does he make appropriate pauses?	O	O	O	O	O
E4 Does the physician offer the patient the chance to ask questions during the consultation?	O	O	O	O	O
E5 Does the physician check whether the patient has understood the consultation?	O	O	O	O	O
F Overall Evaluation					
F1 How do you assess the communication skills of the physician in this conversation?	O	O	O	O	O

Fig 2. Adapted ComON Check.
Radziej et al. (2017). How to assess communication skills? Development of the rating scale ComON Check-Evaluation of communication skills.[11]

RESULTS

In the 2 in-field learning activities, each medical student participated in one as an activity leader and the other as a facilitator.

The first group of medical students conducted an interactive lecture on weight control that was based on the educational gaming platform, Kahoot! The comprehension of the HSSs about weight control (e.g., body composition, energy expenditure, nutrition facts, and diet-control strategies) were challenged with 10 multiple-choice questions. After each question, additional discussion was held to clarify the HSSs' perceptions.

The second group of medical students examined the mythology of abnormal menstruation using a small-group discussion approach, with the HSSs divided into groups of 5-7 students each. True and false information on menstruation was drawn from social media sites (Line, Instagram, Facebook, and a popular Thai web-board) and transformed into a series of statements. Each discussion group had to decide whether to believe and share the given information via social media or to follow the suggestions of the simulated advisories. Answers were scored. Each social media statement was then reviewed at length after the activity, with the incorrect answers of the HSSs being discussed. The HSS group with the highest score received a small prize.

An analysis of the communication skill assessments revealed that the average ComON Check score of the whole class improved significantly (Fig 3). Compared with the overall scores, those given by the medical instructors tended to be low whereas the scores assigned by the SP tended to be high. The self-assessment scores showed the highest standard deviation. The 3 categories with the lowest scores in the pre-CSvHL assessments were B2 (setting subsections), D1 (concluding), and E5 (checking patient comprehension of a conversation). The total pre-assessment scores of 3 medical students were less than half the ComON Check score when assessed by the medical instructors. In a comparison of the ComON Check scores from the pre- and post-CSvHL assessments, most ComON Check categories assessed by the medical students, the instructors, and the SP demonstrated a significant improvement. The exceptions were A1 (appropriate initiation of a conversation), E2 (using appropriate nonverbal communication during the consultation), and E4 (offering the chance to ask questions during the consultation). The scores for these 3 items improved without statistical significance when evaluated by the medical students. Similarly, the scores assigned by the SP for both E1 (using clear and appropriate wording) and E2 went up, though with no significance. The data are presented in Fig 4 and Table 1.
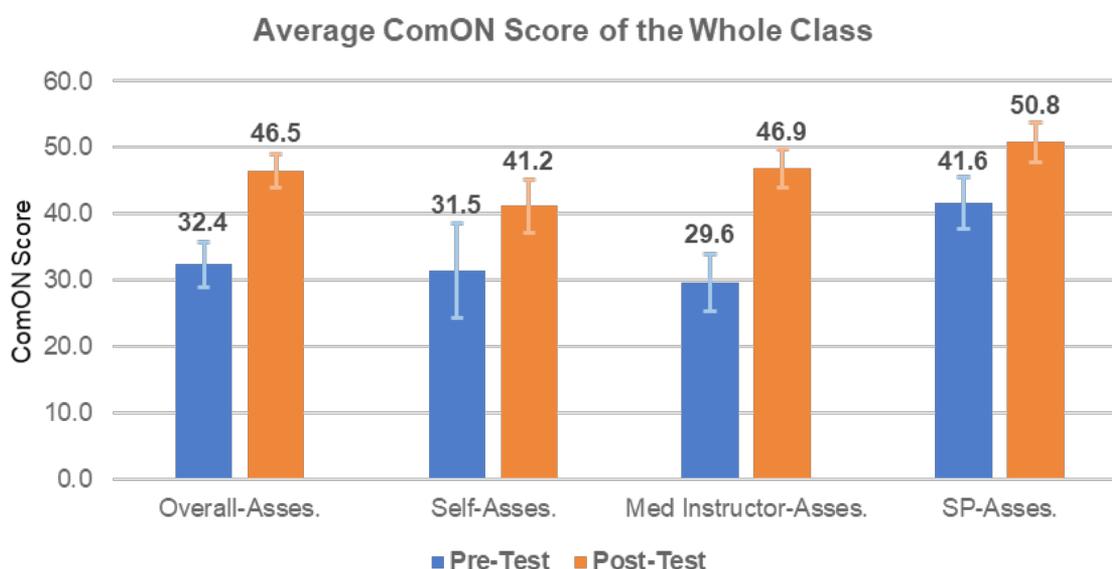
Fig 3. Average ComON Check scores of the whole class.
Abbreviations: Asses, assessed; Med Instructor, medical instructor; SP, standardized patient
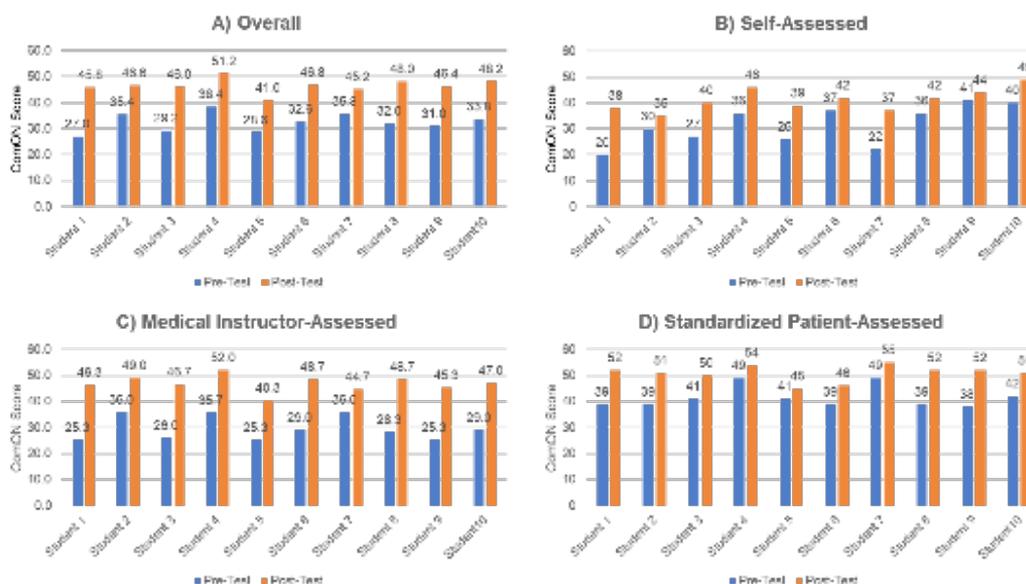
Fig 4. Individual medical students' ComON Check scores.

DISCUSSION

CSvHL was successfully established as a preclinical-year CST course. It is suggested that the significant improvements in the ComON Check scores resulted from 2 factors. The first of these is the transformative learning gained from the hands-on experience in communication in various settings. The second contributing factor is the individualized feedback and training provided by the areas of improvements individually extracted from the pre-CSvHL communication skills assessments.

From the medical students' perspectives, the learning of communication skills proved to be challenging and complex. Their lack of clinical experience limited their communication abilities and their perspectives during the communication skills training. In this pilot program, the hands-on experience of teaching the HSSs provided the medical students with the opportunity to simultaneously upskill and understand the learning process, to which the communication mechanisms homogeneously relate. By being cycled in each in-field learning activity, the communication components–learning objectives, communicator factors, and recipient factors–were critically re-evaluated, leading to a more effective teaching strategy. This was evident in the shift of the learning activity from an interactive lecture using a game-based learning platform to small group discussions, which was considered as a sign of transformative learning being experienced by the medical students.[32,33] In the reflection and feedback session following the first in-field activity, the interactive lecture was identified as having provided only health knowledge, being rather dull, and failing to achieve health literacy skill training

of the HSSs. Learning from the first group, the second group decided to develop a more interactive activity and facilitated the in-action health decision-making.

Moreover, with the pre-CSvHL communication skills assessment being made from 3 perspectives: the medical students, the SP, and the 3 mentors (a "360° behavior-oriented feedback" approach[34,35]), the potential verbal and nonverbal communication-skill learning points were identified. These points enabled the instructors to focus on the medical students' performances and give specific feedback. This approach was proved to be useful, especially during the in-field activity, as the instructor feedback enhanced the efficacy of the CST.[36,37] The end result was that the medical students could communicate better, as evidenced by the improved ComON Check scores.

As to the communication skills assessments using the selected ComON Check categories, the relatively low pre-CSvHL scores given by the medical instructors reflect the high expectations of medical professions, consistent with result of the prior study which lower scores were given by the experienced SP.[38] On the other hand, the high scores given by the SP might signify that the medical students who participated in the CSvHL course may have possessed good communication skills before their enrollment in the course. This suggests that the study may have had a selection bias.

Other than the possibility of a selection bias, the small sample size could have affected the statistical significance of the improvements in the ComON Check scores given by the medical students and SP. Moreover,

TABLE 1. Average ComON Check Scores ± standard deviations.

ComON Check categories	Overall assessments				Self-assessments				Medical instructor assessments				Standardized patient assessments			
	Pre-test	Post-test	Change	P (t-test)	Pre-test	Post-test	Change	P (t-test)	Pre-test	Post-test	Change	P (t-test)	Pre-test	Post-test	Change	P (t-test)
A Start of the conversation																
A1 Does the physician initiate the conversation appropriately?	3.1 ± 0.4	4.3 ± 0.5	1.2 ± 0.6	0.0002	3.3 ± 1.2	3.7 ± 0.8	0.4 ± 1.4	0.2113	2.9 ± 0.4	4.5 ± 0.4	1.6 ± 0.4	< 0.0001	3.6 ± 0.5	4.5 ± 0.9	0.9 ± 1.2	0.0271
A2 Does the physician manage to get an idea of the patient's perspective at the beginning of, or during the consultation?	3.1 ± 0.2	4.5 ± 0.3	1.4 ± 0.3	< 0.0001	3.4 ± 0.8	4.1 ± 0.5	0.7 ± 0.8	0.0124	2.8 ± 0.4	4.5 ± 0.3	1.8 ± 0.5	< 0.0001	3.8 ± 0.4	4.7 ± 0.6	0.9 ± 0.8	0.0050
B Structure of conversation																
B1 Does the physician actively give structure to the conversation (set an agenda of central topics)?	2.8 ± 0.4	4.2 ± 0.3	1.4 ± 0.5	< 0.0001	2.8 ± 0.7	3.9 ± 0.7	1.1 ± 1.0	0.0058	2.6 ± 0.5	4.1 ± 0.3	1.5 ± 0.5	< 0.0001	3.5 ± 0.5	4.7 ± 0.6	1.2 ± 0.9	0.0013
B2 Does the physician set sub-sections in the course of the conversation (in detail)?	2.8 ± 0.4	4.1 ± 0.3	1.3 ± 0.4	< 0.0001	2.7 ± 0.9	3.9 ± 0.8	1.2 ± 0.9	0.0112	2.5 ± 0.4	4.1 ± 0.3	1.6 ± 0.5	< 0.0001	3.7 ± 0.5	4.6 ± 0.5	0.9 ± 0.5	0.0004
D End of conversation																
D1 Does the physician summarize the content of the consultation and do they close the conversation appropriately?	2.7 ± 0.5	4.2 ± 0.4	1.5 ± 0.5	< 0.0001	2.2 ± 1.0	4.0 ± 1.0	1.8 ± 0.9	< 0.0001	2.5 ± 0.7	4.1 ± 0.4	1.6 ± 0.7	< 0.0001	3.7 ± 0.5	4.7 ± 0.5	1.0 ± 0.8	0.0019
E General communication skills																
E1 Does the physician use clear and appropriate words during the conversation?	3.1 ± 0.4	4.3 ± 0.2	1.1 ± 0.3	< 0.0001	2.9 ± 0.7	3.7 ± 0.5	0.8 ± 0.7	0.0054	2.9 ± 0.4	4.4 ± 0.3	1.5 ± 0.5	< 0.0001	4.0 ± 0.6	4.4 ± 0.5	0.4 ± 0.7	0.0519
E2 Does the physician use appropriate non-verbal communication during the consultation?	3.2 ± 0.4	4.1 ± 0.3	0.8 ± 0.3	< 0.0001	3.2 ± 1.0	3.4 ± 0.7	0.2 ± 1.2	0.3097	2.9 ± 0.5	4.2 ± 0.4	1.3 ± 0.5	< 0.0001	4.2 ± 0.4	4.3 ± 0.5	0.1 ± 0.5	0.2955
E3 Does the physician adjust his pace during the consultation, and does he make appropriate pauses?	3.0 ± 0.4	4.2 ± 0.3	1.2 ± 0.3	< 0.0001	2.8 ± 0.7	3.5 ± 0.7	0.7 ± 0.8	0.0124	2.8 ± 0.4	4.3 ± 0.4	1.5 ± 0.3	< 0.0001	3.7 ± 0.8	4.5 ± 0.5	0.8 ± 0.9	0.0112
E4 Does the physician offer the patient the chance to ask questions during the consultation?	2.9 ± 0.5	4.2 ± 0.4	1.3 ± 0.6	< 0.0001	3.1 ± 1.2	3.7 ± 0.6	0.6 ± 1.0	0.0557	2.6 ± 0.6	4.1 ± 0.5	1.5 ± 0.7	< 0.0001	3.6 ± 0.8	4.8 ± 0.4	1.2 ± 0.7	0.0005
E5 Does the physician check whether the patient has understood the consultation?	2.7 ± 0.5	4.2 ± 0.5	1.5 ± 0.5	< 0.0001	2.4 ± 1.2	3.8 ± 1.2	1.4 ± 0.7	< 0.0001	2.4 ± 0.6	4.1 ± 0.4	1.7 ± 0.7	< 0.0001	3.8 ± 0.7	4.7 ± 0.5	0.9 ± 0.7	0.0019
F Overall evaluation																
F1 How do you assess the communication skills of the physician in this conversation?	3.0 ± 0.4	4.3 ± 0.3	1.4 ± 0.4	< 0.0001	2.7 ± 0.9	3.9 ± 0.5	1.2 ± 1.2	0.0065	2.7 ± 0.5	4.3 ± 0.3	1.6 ± 0.5	< 0.0001	4.0 ± 0.6	4.9 ± 0.3	0.9 ± 0.7	0.0019
Sum ComON Check Score	32.4 ± 3.4	46.5 ± 2.4	14.1 ± 2.6	< 0.0001	31.5 ± 7.1	41.2 ± 4.1	9.7 ± 4.7	< 0.0001	29.6 ± 4.3	46.9 ± 3.0	17.3 ± 3.8	< 0.0001	41.6 ± 3.9	50.8 ± 3.0	9.2 ± 3.5	< 0.0001

only the short-term outcomes of the communication skills improvement were explored, and the target group of the in-field learning activity was HSSs, not real patients. Both limitations were accepted while the study was being designed: doing so kept an appropriate teacher-per-student ratio and enabled the course to be run with a limited number of instructors.

The 3 communication defects with the lowest scores in the pre-CSvHL assessment (subsection division, summarization, and comprehension checking while counseling) should be highlighted in the counseling part of a future CST course. Including an Objective Structured Clinical Examination and seeking SP feedback are also considered crucial.[9,35,39–45] To achieve improvements in medical students' communication skills and, potentially, their eventual medical performance, both features should be incorporated in the CST.[1,7] Furthermore, the identification of the long-term outcomes-such as sustained communication-skills improvement and overall clinical proficiency-should be explored. Even though the pilot CSvHL course may be a promising vehicle for preclinical CST, a larger class may alter its efficacy by limiting the mentor-per-medical-student ratio and the in-field activities. Teacher-learner adjustment is therefore mandatory to achieve the optimal learning outcomes in any altered circumstances.

CONCLUSION

The pilot CSvHL was proved to be successful as a preclinical-year CST course for a small class size. The improvements in the ComON Check scores reflected the transformative learning gained via hands-on experience and individualized CST. For assessment purposes, an Objective Structured Clinical Examination and 360° feedback are crucial. Teacher-learner adjustment is advised for larger CST classes to ensure that there is an appropriate mentor-per-medical-student ratio for the in-field activities.

Practical points:
- **Communication Skills via Health Literacy (CSvHL)** provides the experience of being a health educator for high school students (HSSs).
- Transformative learning gained from the hands-on experience, individualized CST, and 360° feedback OSCE is crucial for communication skill improvement.
- The 3 communication defects in medical students from this study were subsection division, summarization, and comprehension-check while counseling.

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