

Evaluating Results of Trial Application of Some Clinical Teaching-learning Methods for Medical Students of Haiphong University of Medicine and Pharmacy

Sang Ngoc Nguyen (✉ nnsang@hpmu.edu.vn)

Haiphong University of Medicine and Pharmacy

Hanh Thi Pham

Haiphong University of Medicine and Pharmacy

Lam Tung Vu

Haiphong University of Medicine and Pharmacy

Truong Xuan Pham

BIDMC

Barbara Gottlieb

Harvard Medical School, Harvard TH Chan School of Public Health

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Abstract

Background: Communication, history-taking, and documentation are critical skills for medical students to master in their training. To improve these skills, we designed, and pilot tested a curriculum to teach a sample of Y4 students these skills and compared the clinical performance of these students with students not receiving the intervention.

Methods: We designed a curriculum to teach HPUMP Y4 students clinical skills. We then studied the effectiveness of the curriculum in enhancing the performance of these skills. We randomly assigned intervention and control groups from different societies to limit exposure between groups. We assessed the clinical competency of each group at 3 times: before intervention, after 9 weeks, and after 2 years of intervention.

Results: There was no difference at baseline between 2 groups. Immediately following the intervention, the mean score of the intervention group's skills was significantly higher than before the intervention and higher than the control group in each clinical skill. The performance difference between the 2 groups was maintained two years following the intervention.

Discussion and conclusions: Communication, history-taking, and documentation are essential skills requiring focused instruction and practice. Following a 9-week curriculum, students' performance was rated higher by evaluators than their counterparts who learned these skills through standard informal exposure in the clinical setting. The fact that this performance advantage was maintained 2 years following the intervention is a testament to the durability of the intervention and to the value of dedicated training in these key areas at an early point in students' clinical careers.

Introduction

Teaching and learning in the clinical setting are a cornerstone of medical education. Communication with patients and history taking are critical skills for medical students to master in their training (1–3) and are the building blocks for advanced clinical skills, including diagnostic reasoning, clinical decision making, patient education, and counseling. Accurate and clear documentation is also a critical skill that builds students' capacity to synthesize subjective and objective information, summarize and prioritize a patient's problems, and apply clinical reasoning in formulating an assessment and plan (4, 5). These skills are best learned while working in a clinical environment through observed practice and feedback from experienced supervisors and multiple opportunities to refine their skills (6). However, students who enter their clerkships without a foundation in clinical skills may be at a disadvantage in acquiring these skills in a busy clinical environment that does not have a formal clinical skills curriculum and where demands of patient care may overshadow the teaching of basic skills (7, 8). A vast body of research demonstrates that students entering clinical clerkships have not yet mastered these 4 clinical skills. This has been a particularly notable problem in medical schools in Vietnam, where students in the first 3 pre-clinical years have limited direct contact with patients, limited exposure to clinical settings, and limited

formal training in these clinical skills. In order to address this deficiency in our university and to contribute to improving the overall quality of clinical teaching and learning at HPUMP, we developed an intervention to provide students with formal training in these clinical skills in year 4, their first clerkship year. If successful, this training would become standard practice for all medical students at our UMP and might be adapted by other UMPs in Vietnam.

Subjects And Methods

Subjects

187 Y4 students

Methods

Research design: Randomized controlled educational trial with blinded assessment. Each class at Haiphong UMP consists of approximately 562 students, randomly divided into 12 societies for administrative purposes. In order to limit exposure and possible contamination of the intervention and control groups, we randomly selected Y4 students from different societies for the intervention and control groups.

Sample size: intervention group: 93 students randomly selected from Societies A and B; control group 94 students randomly selected from Societies E and F.

Intervention

The intervention consisted of formal training in 4 key clinical skills through 18 structured modules: communication with patients (8 modules), history taking (current illness and past medical history (5 modules), and documentation in medical records (5 modules) (see Appendix 1). Sessions were 2–4 hours each. Students in the control group acquired these skills through their clinical exposures during clerkships, as is standard practice for clerkship students, without formal or standardized training. The research was conducted in the Pediatric and Surgery departments of Haiphong University of Medicine and Pharmacy.

Student performance was assessed in the 4 clinical domains using a 44 item checklist (see Appendix 2). Assessments took place at baseline, following the 9-week intervention and 2 years following the intervention. Assessors included lecturers from the UMP, post-graduate students, resident physicians, and medical specialists. All assessors were trained in techniques of clinical observation and trained to use the checklist and were blinded as to student status (control vs. intervention).

Performance was evaluated using a 3-point rubric:

0 point: skill not performed

1 point: skill performed incorrectly or incompletely

2 points: skill performed correctly and completely

Data analysis

We calculated the average score of skills for the intervention and control groups at baseline, 9 weeks, and 2 years. We compared the performance of the intervention and control groups at each stage as well as the progress of each group across the stages.

% Skill gained = total score achieved / total score x 100%

Data processing: Data collected, analyzed using SPSS 26.0 software. From the raw scores, we calculated frequency, percentage, and mean.

Ethics in research: The Research Council of Hai Phong UMP reviewed and approved this research protocol.

Results

Summary scores and means were calculated for the 4 clinical domains, comparing intervention and control groups.

Table 1

Comparison of students' communication skill scores before, after intervention for 9 weeks, for 2 years, and with the control group

Score	Control group (n = 94)			Intervention group (n = 93)		
	Baseline ^a	After 9 weeks ^b	After 2 years ^c	Baseline ^d	After 9 weeks ^e	After 2 years ^f
Average score	40.12 ± 10.23	43.01 ± 11.34	48.76 ± 13.07	41.06 ± 9.75	47.12 ± 12.93	60.07 ± 11.18
Average change in scores		2.89	5.75		6.06	12.95
p _(a vs. b) > 0.05; p _(d vs. e) < 0.001; p _(a vs. c) < 0.01; p _(d vs. f) < 0.001; p _(b vs. c) < 0.01						
p _(e vs. f) < 0.001; p _(a vs. d) > 0.05; p _(b vs. e) < 0.01; p _(c vs. f) < 0.001						

Table 1 demonstrates that there was no baseline difference between intervention and control groups in summary scores for the communication skill. Immediately following the intervention (at 9 weeks), there was a significant increase in scores for the intervention group ($p < 0.001$) but no significant change in scores for the control group ($p > 0.05$). After 2 years, the intervention group demonstrated significant improvement compared to immediate post-intervention scores ($p < 0.001$), whereas the control group showed more modest improvement ($p < 0.01$). All differences are statistically significant.

Table 2

Comparison of students' taking history skill and taking past history scores before, after intervention for 9 weeks, for 2 years and compared with the control group

Skills	Score	Control group (n = 94)			Intervention group (n = 93)		
		Baseline ^a	After 9 weeks ^b	After 2 years ^c	Baseline ^d	After 9 weeks ^e	After 2 years ^f
Taking history	Average score	49.78 ± 11.06	52.05 ± 10.43	64.62 ± 13.61	50.46 ± 0.14	55.07 ± 9.42	73.57 ± 12.08
	Average change in scores		2.27	12.57		4.61	18.5
Taking past history	Average score	51.17 ± 9.23	53.01 ± 12.01	60.17 ± 10.03	50.96 ± 10.16	56.45 ± 13.05	68.05 ± 11.07
	Average change in scores		1.84	7.16		5.49	11.6
$p_{(a \text{ vs. } b)} > 0.05$; $p_{(d \text{ vs. } e)} < 0.01$; $p_{(a \text{ vs. } c)} < 0.001$; $p_{(d \text{ vs. } f)} < 0.0001$; $p_{(b \text{ vs. } c)} < 0.001$ $p_{(e \text{ vs. } f)} < 0.001$; $p_{(a \text{ vs. } d)} > 0.05$; $p_{(b \text{ vs. } e)} < 0.05$; $p_{(c \text{ vs. } f)} < 0.001$							

A similar pattern was found for both history-taking skills (history of present illness and past medical history). Table 2 demonstrates that baseline skill levels for the history of present illness showed no significant difference between intervention and control groups. At 9 weeks, the average score for the intervention group had improved significantly compared to baseline ($p < 0.001$) and was significantly higher than the control group ($p < 0.01$). At 2 years, the average score of the intervention group increased significantly compared to previous measurements and compared with the control group ($p < 0.001$ for the intervention group and $p < 0.001$ for the control group).

Table 2 also demonstrates a similar pattern of results for the skill of taking the past medical history.

Table 3

Comparison of students' writing medical record skill scores before, after intervention for 9 weeks, for 2 years and in comparison with the control group

Score	Control group (n = 94)			Intervention group (n = 93)		
	Baseline ^a	After 9 weeks ^b	After 2 years ^c	Baseline ^d	After 9 weeks ^e	After 2 years ^f
Average score	48.76 ± 8.23	51.04 ± 11.65	65.07 ± 13.16	49.85 ± 9.05	55.01 ± 12.73	76.09 ± 10.18
Average change in scores		2.28	14.03		5.16	21.08
$p_{(a \text{ vs. } b)} > 0.05$; $p_{(d \text{ vs. } e)} < 0.01$; $p_{(a \text{ vs. } c)} < 0.001$; $p_{(d \text{ vs. } f)} < 0.001$; $p_{(b \text{ vs. } c)} < 0.001$						
$p_{(e \text{ vs. } f)} < 0.001$; $p_{(a \text{ vs. } d)} > 0.05$; $p_{(b \text{ vs. } e)} < 0.05$; $p_{(c \text{ vs. } f)} < 0.001$						

Table 3 demonstrates an identical pattern of difference in the skill of documentation in the medical record: there were no baseline differences between the control and intervention groups, the scores of the intervention group increased significantly at 9 weeks compared to baseline and compared to control, and also increase at 2 years follow-up compared to previous scores and compared to the control group.

In summary, the same pattern of comparative change in performance scores was seen in all 4 clinical areas: scores for students in the intervention group improved compared to baseline at 9 weeks and improved further at the 2-year follow-up point. Scores for students in the control group changed minimally after 9 weeks and modestly at the 2-year follow-up point; at both 9 weeks, and 2 years the scores for the intervention group were higher than the scores for the control group. All differences across time intervals and between the 2 groups were significant ($p < 0.01$). However, the difference between the 2 groups in communication and documentation skills at both 9 weeks and 2 years was greater than the differences in the 2 history-taking skills.

Discussion

Communication is the cornerstone of the relationship between the patient and physician. Communication includes several important domains: emotional relationship, including the establishment of trust and expression of compassion, bidirectional transmission of key information between patient and physician, and motivation and engagement in decision-making, behavior change, and self-care. History-taking skills are foundational for students in order to master more advanced and complex areas of communication, including conveying “bad news”, discussing end-of-life decisions (9), and addressing the concerns of angry and dissatisfied patients and families (10–12). Students must also learn to communicate effectively with peers and members of the clinical team. Research has shown that effective communication is critical to improving health outcomes for patients and to ensuring patient satisfaction and patient safety (1, 3, 12, 13).

An important question, then, is where and how do students acquire clinical skills? The clinical environment is a rich learning environment in which students can practice clinical skills with guidance and feedback from experienced clinicians as well as peers and near-peers. They learn through modeling themselves after those with greater clinical experience, and they learn through the practical application of the knowledge they have acquired through their pre-clinical curriculum. However, this apprenticeship model, while necessary and valuable, may not be sufficient to guarantee the acquisition of the range of skills or the level of competence expected of a year 4 student who is then prepared to move to the higher levels of clinical responsibility and independence expected in years 5 and 6.

Our study underscores several important points. The first is that at baseline, as they enter the clinical environment of their clerkships, students at Haiphong UMP, like students at many medical schools without a formal curriculum for clinical skills and limited clinical exposure in pre-clerkship years, have poorly developed clinical skills in the 4 key clinical areas studied. However, our study demonstrates that these skills can be taught and that a formal curriculum can lead to significant improvement. Thus, our study adds to a substantial body of evidence that formal training in clinical skills is possible and effective, and that there is a multitude of effective teaching strategies. For example, a review of strategies for teaching medical history identifies several effective approaches, including role-plays, interviews with real patients followed by feedback and discussion, and opportunities for videotaped reviews (14). Niedermier describes the effectiveness of a formal curriculum for medical students in documentation in an electronic medical record (15).

It is beyond the scope of this study to discuss the relative effectiveness of specific teaching strategies, but evidence suggests that a dedicated course and curriculum are superior to learning through informal exposure. In a study by Ahmed (16), medical students at the University of Bahr Elghazal, Khartoum, Sudan, where clinical skills were integrated into other educational programs, without a dedicated clinical skills curriculum, clerkship students were found to lack basic communication skills. In contrast, students at Maastricht University learn communication skills through a highly structured skills lab curriculum (17). The curriculum is longitudinal (once every 2 weeks throughout their 6 years of medical school), and graduated, whereby students are taught increasingly complex communication skills and are exposed to increasingly complex clinical settings beginning with a fully artificial setting, followed by role-plays, and graduating to standardized and finally real patients. The program was evaluated yearly by a questionnaire using a 5-point scale to measure student satisfaction and endorsement of the value of the curriculum (1 = disagree completely – 5 = agree completely.) The findings indicate strong student support for the value of a dedicated longitudinal curriculum focusing on communication and physical exam skills.

Research by Josephine et al. (18) on third-year medical students focused on an intervention to improve evidence-based medicine (EBM) skills by promoting history taking skills. This quasi-experimental study using a pre-post-test design measured attitudes and skills in applying EBM among a sample of third-year student volunteers. The average score in two key EBM skills, precise clinical questioning and finding the best clinical evidence increased from 3 to 4 on a 5-point scale, statistically significant at the $p < 0.05$ level.

Our study also suggests the potential value of a formal curriculum as a catalyst and promoter of informal learning in the clinical environment. In our study, the difference between the students who received formal and standardized training in clinical skills early in year 4 not only persisted but widened over the 2-year observation period. One can presume that students in the control and intervention groups had similar clinical exposures during their clerkship. The fact that the differences in performance persisted and widened suggests that as educators, we cannot count on exposure and role modeling alone; students must have formal training as well as clinical exposure in order to master clinical skills. It is possible that the skills learned through the formal curriculum allowed the students in the intervention group to benefit and consolidate the skills that they learn through clinical exposure and from role models. Although both control and intervention students had multiple opportunities to learn through repeated practice, perhaps the curriculum provided students in the intervention group not only with a toolbox of concrete skills to begin with but also with a framework for deliberate, self-directed learning with which to approach their learning in the clinical environment. Communication, history taking, and documentation are discrete skills up to a point. They are also highly interdependent. Indeed, most formal models for teaching clinical skills integrate several domains. For example, both One Minute Preceptor (19) and SNAPPS (20) are effective methods for teaching communication skills. But both also teach history-taking skills, clinical reasoning, and diagnostic skills. It is possible that through exposure to formal curricula in clinical skills, students gain practice integrating their knowledge and skills that serve as a foundation for their continued learning in the clinical environment.

Further studies, including qualitative studies of how students apply to learn from a curriculum such as ours to learning in the clinical environment, might shed light on which specific aspects of the curriculum contribute to the sustained and widening advantage that the curriculum provided.

Conclusion

Our study demonstrates that in the absence of clinical exposure and training in clinical skills in the pre-clinical years, students enter year 4 clerkships at HPUMP with deficiencies in performance in 4 core clinical skills. Formal training in 4 key clinical skills early in year 4 leads to meaningful and sustainable improvements in the performance of these skills when compared to the traditional informal and non-standardized approach.

RECOMMENDATION

Formal training in core clinical skills should become standard for all medical students. Further studies should investigate optimal timing for this training and identify the most effective curricula for training students in these skills. These might include earlier exposure to patients and clinical skills beginning in the pre-clerkship years. Novel curricular designs, including a longitudinal approach that would allow students to learn and practice clinical skills over several years in a variety of clinical settings before they

enter their clerkship years, might further enhance clinical skills and allow students to enter their clerkships well-prepared for more advanced clinical roles.

Abbreviations

HPUMP: Haiphong University of Medicine and Pharmacy

SNAPPS: a six-step learner-centered process that is specifically geared for advanced and highly motivated learners who prefer greater autonomy. (Summarise the case; Narrow the differential diagnoses; Analyse the differentials; Probe the preceptor about uncertainties; Plan patient management; Select case-related issues for self-study)

UMP: University of Medicine and Pharmacy

Y4: Year 4

Declarations

ETHICAL STATEMENT

Research methods were performed in accordance with the relevant guidelines and regulations of the Declaration of Helsinki. Ethics approval was obtained from Research Ethics Board of Haiphong University of Medicine and Pharmacy.

Written informed consent was obtained from all participants.

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CONFLICT OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

AUTHOR CONTRIBUTION

Sang NN and Hanh TP, Lam TV participated in the study design, protocol development, and performance, data analysis, interpretation of data, writing the manuscript, carrying out the clinical data collection and data analysis, and observing the patient during the treatment. Truong XP and Barbara Gottlieb reviewed the manuscript. All authors read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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Supplementary Files

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- [APPENDIXClinicalLearningTeachingMethod11032022.docx](#)