

Application of Student Standardized Patient in the Clinical Teaching of Acute Abdomen

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Abstract: *Background:* In recent years, with the gradual expansion of the scale of medical education, the shortage of medical teaching resources and the reluctance of patients to cooperate with teaching have become increasingly prominent. *Objective:* To explore the application effect of student standardized patient (SSP) in the clinical teaching of acute abdomen. *Methods:* Fifty-four fifth-year general medical students from class 1826 of the general department of The First Affiliated Hospital of Xi'an Medical University were selected as the research subjects and randomly divided into two groups, with 27 students in the experimental teaching group, and the remaining 27 students in the conventional teaching group. The experimental teaching group adopted the SSP teaching approach. The SSPs were generated from the training students of the hospital through the recruitment and training process of SSP. In this study, seven qualified SSPs were selected for the clinical teaching of acute abdomen. At the end of the course, a periodic assessment was held. The rank sum test was used to compare the excellent and good rates between the two groups, while t-test was used to compare the difference between the two groups. *Results:* The results showed that the excellent and good rate of the experimental teaching group was significantly higher than that of the conventional group, in which the difference between the two groups was statistically significant ($p < 0.05$). In terms of the assessment results, the theoretical scores and skills scores of the experimental teaching group were better than those of the conventional teaching group, in which the differences between the two groups were statistically significant ($p < 0.05$). *Conclusion:* Through the training of SSP for acute abdomen and its application in surgical teaching and examination, the superiority of SSP is emphasized. Although there are still some shortcomings in the application of SSP in clinical teaching, it is a relatively new and effective teaching method, and it will play an increasingly critical role in clinical skills training pertaining to the medical specialty.

Keywords: Standardized patient; Student standardized patient; Clinical teaching; Acute abdomen

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1. Introduction

The practical teaching of clinical medicine has its particularity, which requires not only respecting the rights and privacy of patients, but also guaranteeing the training quality of medical students. In recent years, with the gradual expansion of the scale of medical education, the contradiction of the shortage of medical teaching resources and the unwillingness of patients to cooperate with clinical teaching has become increasingly prominent. In order to solve this contradiction, many teaching hospitals have introduced the standardized patient (SP) program^[1]. SPs refer to normal people (or patients) engaged in non-medical work

who can constantly and accurately imitate the clinical symptoms, signs, attitude, emotion, and/or history of patients in a lifelike manner under clinical examination after receiving special training; they have three functions, which include simulating patients, evaluators, and mentors [2-4]. SPs can also be divided into professional standardized patients and simple standardized patients, in which the latter can be further divided into teacher standardized patients (TSPs) and student standardized patients (SSPs) [5]. With the deepening of medical education reform, standardized patients are now commonly seen in medical practice teaching, and SSP has emerged as a new force in SP with its exceptional benefits for shortening training time and reducing expenses [6].

In 1968, the American Barros first put forward the concept of SP, which was soon widely applied by medical colleges and universities in the United States and Canada for clinical teaching, skill assessment, and course evaluation [7]. This concept was introduced to China by Paula Stillman in 1991 [8], and China's first batch of standardized patients was cultivated in 1993. In recent years, some medical colleges and teaching hospitals have applied SP to clinical skills training and course assessment for medical students [9-12]. Previously, in order to explore the application value of SP in medical education, especially in clinical teaching, Xi'an Medical University started training standardized patients in 2018 and has been using them for clinical medical undergraduate teaching and in OSCEs (objective structured clinical examinations). This study will further explore the application effect of SSP in the clinical teaching of acute abdomen.

2. Methods

2.1. Study population

Fifty-four fifth-year general medical students from class 1826 of the general department of The First Affiliated Hospital of Xi'an Medical University were selected as the research subjects and were randomly divided into two groups, with 27 students in the experimental teaching group and the remaining 27 in the conventional teaching group. The experimental teaching group adopted the SSP teaching approach.

2.2. Selection process of SSP

2.2.1. Training and assessment of SSP

2.2.1.1. Principles of SSP training

The principles of SSP training include the following: (1) standardization; the history described by the SSP embodies the typical characteristics of the disease and is unified and standardized; (2) humanization; the medical history described by the SSP is realistic and typical; (3) individuation; the SSP is trained as an individual with different characteristics of the same disease, in order to simulate various situations that may occur in clinical practice.

2.2.1.2. Training process of SSP

Firstly, the SSPs were trained to perform based on the designed cases. During the training process, the SSPs should not only master the case content, but also emphasize the feelings of real patients. The SSPs were evaluated and given feedback in real time during the simulation process.

2.2.1.3. Assessment process of SSP

The stability of SSP and the accuracy of the evaluation are the guarantees for the teaching effect. Therefore, only after evaluation and assessment, the SSP can participate in the teaching. After a month of training, the SSP should have had memorized the script and scoring standard of the simulated case as well as mastered the steps and essentials of each link. Subsequently, trained doctors from each corresponding specialty would have had simulated the dialogues between the students and the exercise script for the SSP. The performance should be consistent, and the SSP should present the disease in a standardized manner and complete the

assessment accurately. By comparing the performance of the SSP with the evaluation form designed by the trained doctors, those with high coincidence rate, realistic performance, feedback standard, and fair evaluation were included in the research.

2.2.2. Screening process of SSP

Ten candidates were recruited from among the training students of The First Affiliated Hospital of Xi'an Medical University, in which seven qualified candidates were selected for teaching through the SSP training process. The seven SSPs played the roles of patients presenting with acute abdomen, of which the diagnoses include acute appendicitis, acute perforation of gastric ulcer, acute intestinal obstruction, acute cholecystitis, acute pancreatitis, urinary calculi, and ectopic pregnancy.

2.3. Study design

Based on the "Clinical Diagnostic Thinking" course in the fourth academic year of clinical medicine in Xi'an Medical University, this study only included the first stage of the course, namely the chapter related to acute abdomen. The teaching was different for the two groups. In the conventional teaching group, the teachers used the traditional teaching method in combination with video data and molds to convey the knowledge points to the students and carry out consultation, history-taking, physical examination, operation, diagnosis, and management training. In the SSP teaching group, in addition to the traditional teaching method, the teachers explained the knowledge points to the students, and the students themselves conducted the consultation, history taking, and physical examination on the SSP, performed invasive operations on the molds, and derived a diagnosis and management plan according to the obtained data. Following the first stage, an assessment was conducted. The assessment content is shown in **Table 1**, and based on the assessment results, the teaching effect was analyzed.

Table 1. Assessment score

Assessment	Theory		Skill		Total score
	Content inquisition	Physical examination content	History-taking skill	Physical examination skill	
Score	30	30	20	20	100

Note: A score of 90% and above is considered as excellent, 80% and above is considered as good, 60% and above is considered as qualified, and below 60% is considered as poor

2.4. Statistical analysis

The results of the experimental teaching group and the conventional teaching group were statistically analyzed. The data were analyzed by using SPSS 24.0. The measurement data were in mean \pm standard deviation ($\bar{x} \pm s$), and t-test was used. Rank sum test was used for rank data.

3. Results

In the experimental teaching group, the classroom atmosphere was more active, and more students took the initiative to participate in the training. The students were the main body of the class and had high enthusiasm for learning. Compared with the conventional teaching group, exaggerated lines and realistic stories stimulated the classroom atmosphere and strengthened students' understanding and memory of theoretical knowledge. The excellent and good rate of the experimental teaching group was significantly higher than that of the conventional group, in which the difference between the two groups was statistically significant ($p < 0.05$). The results are shown in **Table 2**.

Table 2. Teaching effect evaluation of experimental teaching group and conventional teaching group

Effectiveness evaluation	Theoretical grade				Skill grade			
	Excellent	Good	Qualified	Poor	Excellent	Good	Qualified	Poor
Experimental teaching group (n=27)	4	7	16	0	5	9	13	0
Conventional teaching group (n=27)	1	4	20	2	2	5	19	1
Statistical value (z, p)	-2.107, 0.035				-2.057, 0.040			

In terms of assessment results, the theoretical and skills scores of the experimental teaching group were better than those of the conventional teaching group, in which the differences between the two groups were statistically significant ($p < 0.05$), as shown in **Table 3**.

Table 3. Comparison of assessment results between the experimental teaching group and the conventional teaching group

Score (points)	Experimental teaching group (n=27)	Conventional teaching group (n=27)	Statistical value (t, p)
Theoretical score (60 points)	46.7 ± 4.18	43.9 ± 3.79	3.684, 0.013
Skills score (40 points)	31.8 ± 2.63	29.1 ± 3.14	3.425, 0.001

4. Discussion

The training of medical students' clinical thinking ability has always been a weak point in teaching. The clinical thinking ability of students requires serious and rigorous teaching from teachers, not to mention clinical practice [13]. As a new teaching method, the application of standardized patients in simulated diagnosis and management training is the ideal way to solve this problem [14-16]. It enables medical students to experience clinical situations and improve their ability to take standardized medical history. The emergence of standardized patients alleviates the shortage of medical education resources, prevents unnecessary doctor-patient conflicts, provides medical students with typical cases similar to actual clinical cases, and achieves the purpose of objectively evaluating the quality of medical students in a comprehensive manner (professional knowledge, clinical skills, and communication skills), which is in line with the national training goal of modern medical education [17].

During the recruitment and training of SSPs for acute abdomen and the application of SSP in the teaching and assessment of students in relation to the surgical chapters in "Clinical Diagnostic Thinking," the superiority of SSP is acknowledged. In the training process, the students were required to complete history taking and physical examination of the patients presenting with acute abdomen within a set period of time, make a preliminary diagnosis according to the obtained data, and suggest a management plan for the "patient." This is consistent with clinical requirements, and it can be said that the best carrier of this training method is through SSPs [18]. After history taking and physical examination, the SSPs act as teaching instructors, pointing out and correcting the students' mistakes. In conventional teaching, it is a challenge to bring perceptual knowledge to students through the presentation of pure theoretical knowledge, and the organic integration of theory and practice is unlikely [19]. With the participation of SSPs in teaching, there is an improvement in the rate of which medical students master the essentials of consultation and physical examination. At the same time, teachers would be able to grasp the issues and blind spots in teaching through the SSPs' evaluation of students, so as to further improve their teaching.

However, there are still some limitations in the use of SSP^[20,21]: (1) since SSPs are generally normal people and they do not present any positive signs clinically, this approach will only benefit in completing basic clinical training; (2) the types and symptoms of diseases that SSPs can imitate are limited; they are only able to imitate the subjective aspects of diseases, since the objective manifestations of diseases would be difficult to imitate; (3) the patients encountered in actual ward practice do not always fall into the typical category, and because of this, it is impossible for SSPs to completely replace bedside teaching guided by real patients and teachers; (4) SSPs are often too cooperative with students, which facilitates training but hinders students from adapting to the complex environment in actual ward practice. These limitations also apply to other types of standardized patients. Although there is tendency for SSPs to use medical jargons when conversing with the examinees, which will affect the fairness of the examination to a certain extent, this approach has been introduced into teaching as a new teaching method, and it will continue to play an increasingly important role in clinical skills training for medical students.

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Disclosure statement

The authors declare no conflict of interest.

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