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Evaluation of the Effectiveness of Standardized Patient Scenario Simulation Teaching in Geriatric Medicine Education

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Abstract: *Objective*: To investigate the effectiveness of standardized patient scenario simulation teaching in geriatric medicine clinical education and provide references for improving teaching methods in geriatrics. *Methods*: Sixty-five clinical physicians from other departments who rotated into the Geriatric Medicine Department for training between August 2024 and July 2025 were randomly divided into a control group (n = 32) and an observation group (n = 33). The control group received traditional centralized theoretical lectures combined with instructor-led clinical mentoring, while the observation group underwent standardized patient scenario simulation training. The two groups were compared on post-rotation examination scores and teaching satisfaction metrics. *Results*: The observation group achieved significantly higher post-rotation examination scores (88.37 ± 3.04) than the control group (80.17 ± 3.29) ($p < 0.01$). Teaching satisfaction surveys revealed that trainees in the observation group demonstrated significantly higher satisfaction than the control group ($p < 0.05$) regarding the teaching method's effectiveness in enhancing learning interest, independent learning ability, comprehensive clinical problem-solving skills, patient communication skills, teamwork capabilities, and research conceptualization abilities. *Conclusion*: Standardized patient scenario simulation teaching effectively improves clinical teaching quality in geriatric medicine, enhances trainees' comprehensive clinical competencies, and holds value for broader application.

Keywords: Standardized patients; Scenario simulation teaching method; Geriatrics; Clinical teaching; Teaching evaluation

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1. Introduction

Geriatrics is a discipline focused on the health and disease prevention of the elderly. Geriatric patients often present with multiple chronic conditions, complex and variable clinical presentations, and unique physiological and psychological characteristics. This necessitates clinical medical education that emphasizes the development of trainees' comprehensive analytical skills, problem-solving abilities, communication techniques, and humanistic

care competencies [1]. Currently, geriatric medical education predominantly relies on classroom lectures, leading to issues such as disconnect between theory and practice, low student engagement, and insufficient cultivation of clinical reasoning. Li Yongyong and colleagues compared the effectiveness of traditional lectures versus the BOPPPS combined with CBL teaching methods in geriatric clinical education [2]. They found that while traditional methods enhance knowledge retention, they weaken students' ability to apply knowledge, failing to meet clinical demands. Scenario simulation is an emerging teaching approach that uses clinical case scenarios to enable students to practice diagnostic procedures and decision-making in simulated environments. Clinical practice demonstrates that this method helps address the shortcomings of traditional teaching, enhancing students' clinical skills and critical thinking. Li Nan and colleagues found that applying scenario simulation in standardized residency training effectively improves residents' clinical knowledge, practical abilities, doctor-patient communication skills, and proactive learning attitudes [3]. This study attempts to deeply integrate scenario simulation with standardized patients, employing specially trained standardized patients in realistic clinical scenario simulations. Trainees engage in practical exploration based on accurately grasping simulated patients' symptoms, signs, and medical histories, analyzing the application value of this integrated teaching method in geriatric medicine education.

2. Materials and methods

2.1. General data

The study included 65 clinical physicians from other departments of our hospital who rotated through the Geriatrics Department for training between August 2024 and July 2025.

2.1.1. Inclusion criteria

(1) Active clinical physicians from departments such as General Practice, Endocrinology, and Cardiology within our hospital
(2) Comprehensive competency assessment scores meeting the hospital's rotation training requirements
(3) Voluntary participation in this study with signed informed consent

2.1.2. Exclusion criteria

(1) Prior participation in standardized patient scenario simulation training
(2) Training interruption exceeding one month for any reason (e.g., sick leave, maternity leave, resignation)
(3) Physicians with prior specialized training in geriatrics or long-term (over 6 months) work experience in geriatrics.

Participants were randomly assigned using a random number table to a control group (n = 32) and an observation group (n = 33). The control group received traditional centralized theoretical instruction combined with faculty-led clinical mentoring, while the observation group underwent standardized patient scenario simulation training. Comparisons of general characteristics (gender, age, medical theory exam scores upon admission) between groups showed no statistically significant differences ($p > 0.05$), indicating comparability (**Table 1**).

Table 1. Comparison of general characteristics between groups

Group	Gender [n (%)]		Age ($\overline{x}$ ± s, years)	Entrance theoretical score ($\overline{x}$ ± s, points)
	Male	Female		
Control group (n = 32)	13	19	22.51 ± 0.93	79.67 ± 5.23
Observation group (n = 33)	15	18	22.53 ± 0.87	78.89 ± 5.35
χ^2/ t	0.155		0.089	0.594
p	0.694		0.929	0.554

2.2. Methods

Both groups were led by the Director of Geriatric Medicine and Associate Chief Physicians, with each group receiving 45 teaching hours.

2.2.1. Control group

Employed traditional teaching methods combining concentrated theoretical lectures with instructor-led clinical supervision. For instance, after lectures, instructors systematically explained the etiology, pathology, clinical manifestations, and treatment principles of common geriatric diseases based on the department's syllabus. They then organized discussions on typical cases, guiding trainees to analyze conditions and propose diagnostic and therapeutic approaches. Subsequently, trainees were led to participate in daily ward activities within the geriatric medicine department, interacting with actual patients. Instructors demonstrated physical examination techniques on-site and explained key points for clinical observation and doctor-patient communication.

2.2.2. Observation group

Standardized patient scenario simulation teaching method, with the following implementation plan:

(1) Standardized patient training

Recruit standardized patients from retired hospital staff and medical volunteers, providing a 4-week intensive training program. Training covers typical clinical manifestations of common geriatric diseases (e.g., Alzheimer's disease, geriatric syndromes, multimorbidity), unique psychosocial characteristics of elderly patients, and communication approaches.

(2) Scenario design

Developed teaching scenarios based on the curriculum, including "Management of Elderly Patients with Multiple Coexisting Conditions," "Patient-Physician Communication with Elderly Patients," and "Resuscitation of Critically Ill Elderly Patients." Each scenario specified clear learning objectives and assessment criteria, requiring trainees to independently complete medical history taking, physical examination, analysis of auxiliary test results, and formulation of appropriate multi-disease collaborative treatment plans.

(3) Scenario simulation implementation

The teaching cycle spans 4 weeks, with two 90-minute scenario simulation sessions per week. The teaching process is divided into three phases: Phase 1 (first 10 minutes): Instructors briefly introduce the case background and learning objectives. Phase 2 (60 minutes): Trainees interact with standardized patients in small groups to complete history-taking, physical examination, and preliminary diagnosis, while instructors observe and record. Phase 3 (final 20 minutes): Standardized patients provide feedback,

followed by instructor summarization and evaluation. After each simulation, trainees submit reflection reports to reinforce learning.

(4) Multi-level feedback

Establish a multi-level feedback mechanism: Standardized patients primarily evaluate trainees' communication skills and compassionate care abilities; instructors focus on clinical reasoning, knowledge mastery, and procedural competence; peers assess teamwork and mutual learning capabilities. Trainees gain comprehensive insights into their strengths and areas for improvement through diverse feedback.

2.3. Observation indicators

2.3.1. Final examination scores (assessment method)

(1) Theoretical knowledge assessment

Administered via written exam covering four domains: pathogenesis of common geriatric diseases, diagnostic and treatment protocols for common geriatric conditions, principles of rational medication use, and geriatric medicine guidelines/consensus statements. Each domain is worth 10 points, totaling 40 points.

(2) Clinical diagnostic and therapeutic competency

Assessed through simulated case scenarios evaluating five competencies. including history-taking ability, standardized physical examination, interpretation of ancillary tests, diagnostic and differential diagnostic skills, and rational treatment planning. Each competency is worth 12 points, with a maximum of 60 points. The combined score of theoretical knowledge and clinical competency constitutes the final score.

2.3.2 Teaching acceptance (survey method)

A self-designed questionnaire assessed trainees' acceptance of teaching methods. The questionnaire included six items: whether teaching methods enhance learning interest, improve self-directed learning ability, boost comprehensive clinical problem-solving skills, strengthen patient communication skills, enhance teamwork capabilities, and improve research conceptualization abilities. Trainees selected "Yes" or "No" based on their genuine perceptions. A total of 65 questionnaires were distributed, with 65 valid responses collected, achieving a 100% valid response rate.

2.4. Statistical methods

Data analysis was performed using SPSS 26.0 software. Quantitative data were expressed as mean ± standard deviation ($\overline{x} \pm s$), with intergroup comparisons conducted using *t*-tests. Qualitative data were presented as rates (%), with intergroup comparisons using chi-square (χ^2) tests. "Example count (%)" indicated intergroup comparisons using chi-square (χ^2) tests. $p < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of final examination scores between groups

At the end of the course, the observation group demonstrated significantly higher scores than the control group in all assessments of theoretical knowledge and clinical diagnostic and therapeutic capabilities, with statistically significant differences ($p < 0.05$), as shown in **Table 2**.

Table 2. Comparison of final examination scores between groups ($\overline{x} \pm s$, points)

Group	Theoretical knowledge				Clinical diagnostic and therapeutic skills					Total score
	Pathogenesis of common geriatric diseases	Diagnosis and treatment guidelines for common geriatric diseases	Principles of rational drug use	Geriatric medicine guidelines and consensus statements	Medical history taking skills	Standardized physical examination	Analytical skills for auxiliary tests	Diagnostic and differential diagnostic skills	Rationality of treatment plans	
Control group (n = 32)	7.32 ± 0.23	8.21 ± 0.19	8.09 ± 0.25	7.55 ± 0.36	9.67 ± 0.45	9.33 ± 0.95	10.02 ± 0.39	10.77 ± 0.24	9.21 ± 0.23	80.17 ± 3.29
Observation group (n = 33)	8.76 ± 0.17	9.02 ± 0.04	8.78 ± 0.12	8.34 ± 0.15	10.75 ± 0.45	10.31 ± 0.44	10.65 ± 0.78	11.02 ± 0.36	10.72 ± 0.53	88.37 ± 3.04
t	28.767	23.954	14.254	11.612	9.674	5.363	4.099	3.284	14.818	10.441
p	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001

3.2. Comparison of teaching method approval between groups

Trainees in the observation group demonstrated significantly higher agreement than the control group regarding the teaching methods' effectiveness in enhancing learning interest, improving self-directed learning abilities, boosting comprehensive clinical problem-solving skills, strengthening patient communication skills, enhancing teamwork capabilities, and improving research conceptualization abilities. These differences were statistically significant ($p < 0.05$), as shown in **Table 3**.

Table 3. Comparison of teaching method approval between groups (trainees) [n(%)]

Group	Enhancing Learning Interest	Enhancing Self-Directed Learning Ability	Enhancing comprehensive ability to address clinical issues	Enhancing patient communication skills	Enhance teamwork skills	Enhance the ability to develop research concepts
Control group (n = 32)	21 (65.63)	22 (68.75)	23 (71.88)	24 (75.00)	22 (68.75)	23 (71.88)
Observation group (n = 33)	30 (90.91)	32 (96.97)	31 (93.94)	32 (96.97)	31 (93.94)	32(96.97)
χ^2	6.146	9.202	5.626	4.861	6.848	6.049
p	0.013	0.002	0.018	0.028	0.008	0.014

4. Discussion

From a pathophysiological perspective, the degenerative changes in organ function among the elderly are often accompanied by multiple chronic conditions such as hypertension, diabetes, and coronary heart disease. These various diseases interact with one another, and their treatment plans constrain each other [4]. This further complicates diagnosis and treatment, requiring geriatric clinicians not only to possess solid expertise in geriatric medicine but also strong clinical reasoning skills and comprehensive management capabilities for multiple coexisting conditions. This enables rapid identification of atypical symptoms in elderly patients and precise diagnosis through multi-system assessment [5].

Currently, clinical teaching in geriatrics predominantly relies on traditional models centered on concentrated theoretical lectures, where instructors unilaterally deliver knowledge and trainees passively receive it. Under this teaching approach, which disconnects theory from clinical practice, trainees may grasp fundamental disease knowledge points. However, due to the lack of systematic cultivation of communication skills and teamwork abilities, trainees struggle to apply this knowledge flexibly in clinical practice. There is an urgent need to explore more efficient teaching methods [6]. Standardized patient scenario simulation teaching represents an innovative approach that deeply integrates standardized patients with scenario-based simulation. This method involves systematically training standardized patients to accurately simulate the typical clinical manifestations, psychological characteristics, and communication patterns of common geriatric diseases. Trainees then interact with these standardized patients in small groups to complete the entire clinical process, including history taking, physical examination, and treatment plan formulation, thereby effectively enhancing their clinical practice skills and clinical reasoning [7].

The study findings indicate that the observation group demonstrated significantly higher scores than the control group in both theoretical knowledge and clinical diagnostic/therapeutic competency assessments at the end of the course ($p < 0.05$). Furthermore, the observation group exhibited significantly higher levels of agreement than the control group regarding the teaching method's effectiveness in enhancing learning interest, independent learning ability, comprehensive clinical problem-solving skills, patient communication skills, teamwork capabilities, and research conceptualization abilities ($p < 0.05$). These findings confirm the effectiveness and applicability of this teaching method in geriatric medical education. First, the standardized patient scenario simulation method transforms abstract theoretical knowledge into concrete practical operations through highly realistic clinical scenarios. Through interactions with standardized patients, trainees deepen their understanding of disease fundamentals by integrating geriatric knowledge. During simulated consultations, physical examinations, and clinical decision-making, they not only reinforce foundational concepts but also achieve synergistic enhancement of theoretical internalization and practical skills through repeated practice [8]. Second, by creating a highly simulated and interactive feedback-rich learning environment, this method compels trainees to engage in dynamic "integration-differentiation-decision-making" thinking when confronting simulated patients. This approach trains them to comprehensively consider the coexistence of multiple conditions and the interplay of pathophysiology in geriatric patients, enabling differential diagnosis from complex symptoms and signs, thereby directly honing their clinical reasoning skills [9]. Finally, standardized patients not only simulate symptoms but also provide feedback from the "patient's" perspective on trainees' diagnostic and communication effectiveness. This enables trainees to develop more systematic and rigorous clinical thinking patterns through continuous reflection and adjustment of their diagnostic strategies and communication approaches [10].

5. Conclusion

In summary, the application of standardized patient scenario simulation teaching in geriatric medicine education demonstrates significant effectiveness, systematically enhancing trainees' comprehensive competencies. To deepen educational reform, it is recommended to vigorously promote this model in subsequent work, expand its application scope, and thereby fully unlock its pedagogical potential to support the cultivation of high-caliber medical professionals.

Disclosure statement

The authors declare no conflict of interest.

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