



Effect of Scenario Simulation Based on Situated Learning Theory on Endocrinology Interns' Communication Skills and Satisfaction: A Quasi-Experimental Study

Lili Yang*, Zhen Zhang* and Peng Yun

Departments of Endocrinology and, The Seventh Affiliated Hospital, Sun Yat-sen University, Shenzhen 518000, China

*These authors contributed equally to this work.

Corresponding Author: Peng Yun, MD/PhD, Department of Endocrinology, The Seventh Affiliated Hospital, Sun Yat-sen University, Shenzhen 518000, China. Email: yunpeng@sysush.com

ABSTRACT

Objective: This study explored whether scenario simulation (rooted in situated learning theory) improves interns' communication skills and satisfaction in endocrinology.

Subjects and Methods: We used a quasi-experimental design. A total of 121 clinical medicine undergraduates who completed their internship in the Department of Endocrinology at the Seventh Affiliated Hospital of Sun Yat-sen University between November 2024 and April 2025 were divided into a study group (n = 55) and a control group (n = 66) based on their internship batches. The study group received scenario simulation teaching based on situated learning theory,— including scenario anchoring, role immersion, and structured debriefing,— in addition to conventional teaching. The control group received only conventional teaching. Physician-patient communication skills were measured using the SEGUE Scale. Teaching satisfaction was assessed with a self-designed questionnaire. Semi-structured interviews were also conducted with 14 students from the study group.

Results: The study group scored significantly higher than the control group on several SEGUE subscales (e.g., information giving, understanding the patient, overall caring), but not on pre-history preparation. Teaching satisfaction scores were significantly higher in the study group across all dimensions. The qualitative interviews revealed three major themes: "emotional impact and perspective-taking awakening", "internalization and transfer of communication strategies," and "a safe psychological space for trial and error".

Conclusion: Scenario simulation rooted in situated learning theory improved interns' communication skills and satisfaction. Role immersion and structured debriefing likely drove this gain by building empathy and reflection.

ARTICLE HISTORY

Received: June 2, 2026

Revised: June 15, 2026

Accepted: June 16, 2026

KEYWORDS

Situated Learning Theory,
Scenario Simulation,
Medical Humanities,
Doctor-Patient
Communications, Clinical
Internship

Introduction

As the bio-psycho-social medical model continues to advance, medical humanities competency has become part of the core competency frameworks in medical education worldwide. The Healthy China 2030 Plan explicitly calls for strengthening humanistic care in medical services and promoting harmonious physician-patient relationships. In addition, the Action Plan to Enhance Medical Humanistic Care (2024–2027), released in 2024, identified improving doctor-patient communication as a key component of such efforts. However, current medical humanities education in China is still delivered mainly during the theoretical course phase, and the

teaching content heavily emphasizes knowledge transmission and lacks sufficient integration with clinical practice [1]. Students say they understand the concepts but struggle to apply them at the bedside. Clinical internship serves as a critical transition period for medical students moving from the classroom to the ward, making it an optimal window for strengthening medical humanities education. Surveys indicate that more than half of medical students hope to begin systematic courses in doctor-patient communication during their internship phase after the third year of medical school [2]. Nevertheless, current internship teaching continues to focus largely on professional skills training, with

systematic cultivation of students' humanistic competencies still missing [3].

In scenario simulation, students role-play in realistic cases and later restructure their understanding during a guided debriefing. The international medical education community has widely applied scenario simulation in communication skills training [4,5]. A randomized controlled trial involving oncology residents showed that scenario simulation based on the AIDET communication framework significantly improved SEGUE scores in the study group (22 vs. 18, $p < 0.001$) [6]. However, existing research has mostly focused on technical procedural skills, with insufficient exploration of the mechanisms underlying the cultivation of non-technical humanistic competencies. Reflective Practice theory posits that professionals transform tacit experience into explicit knowledge through "reflection-in-action" and "reflection-on-action" [7]. Drawing on these theoretical frameworks, this study designed a teaching cycle comprising "scenario anchoring, — role immersion — , structured debriefing," aiming to verify its effectiveness and mechanism of action in cultivating doctor-patient communication skills among interns in the endocrinology department.

Subjects and Methods

Study Participants

A total of 121 clinical medicine undergraduates who completed their clerkship in the Department of Endocrinology at the Seventh Affiliated Hospital of Sun Yat-sen University from November 2024 to April 2025 were selected as study participants. Inclusion criteria were: 1) completion of all theoretical courses in the undergraduate phase; 2) entry into clinical clerkship. Exclusion criteria were: 1) absence for more than 2 days during the clerkship; 2) withdrawal from the program. Before entering the department, students were equally divided into 15 groups based on their student identification (ID) numbers, and each group entered the endocrinology clerkship sequentially on a weekly basis. Based on the order of clerkship, even-numbered groups were assigned to the study group ($n = 55$) and odd-numbered groups to the control group ($n = 66$). There were no statistically significant differences in general data, such as age, gender, and previous academic performance, between the two groups ($p > 0.05$), indicating comparability. This study was approved by the hospital's ethics committee

(approval number: KY-2026-066-01), and all participants provided informed consent.

Teaching Methods

The control group received conventional teaching methods, including small lectures (2 class hours in one day), case-based Case-Based teaching discussions (twice in one day), bedside history-taking (twice in total), and teaching ward rounds (once in total). The teaching content covered common endocrinological diseases according to the curriculum.

In addition to the conventional teaching content and formats, the study group received an additional scenario-based simulation teaching module (once in on the second day of the clerkship, lasting 120 minutes). The teaching design was based on situated learning theory and reflective practice theory, following a "four-stage closed-loop" process.

Phase 1: Contextual Anchoring (released 48 hours in advance). Preset case: The patient is a 14-year-old adolescent with no prior medical history, admitted with symptoms of dry mouth, polydipsia, and polyuria for one month, plus loss of consciousness for 2 hours. Initial diagnosis: Type 1 Diabetes Mellitus with Diabetic Ketoacidosis (DKA). After treatment, the DKA has been resolved. A conversation needs to be held with the family to explain the condition and the long-term treatment and management plan for Type 1 Diabetes. The case emphasizes psychosocial conflicts (psychological adjustment of the adolescent patient, parental guilt, and anxiety).

Phase 2: Role Immersion and Collective Construction. Students are divided into two groups (4–5 per group), taking on the roles of family members and the attending physician. Non-participating students act as observers. Through literature review and group discussion, each group formulates communication strategies around three core issues: 1) How to explain the need for lifelong management without causing despair. 2) How to provide psychological support while conveying information. 3) How to respond to family members' questions and emotional reactions. Subsequently, role-playing rehearsals are conducted (15 minutes per round), after which roles are swapped.

Phase 3: Simulated Practice and Teacher Observation. Formal practice takes place in a simulated clinic environment. The teacher observes the entire process without intervening, documenting key communication nodes (e.g., information delivery, emotional response, conflict management).

Phase 4: Structured Debriefing. This is the innovative core of the teaching model, strictly following the four-step method of “Reaction — Description — Analysis — Summary”: 1) Reaction Stage: Invite role-players to say how they felt (e.g., frustrated, anxious). 2) Description Stage: Objectively reconstruct specific behaviors observed during the practice (e.g., interrupting or a hand on the shoulder). 3) Analysis Stage: Teacher and students jointly explore the motivations behind behaviors, the patient’s psychological needs, and the pros and cons of different communication strategies, introducing theoretical concepts like “perspective-taking” and “empathetic response.” 4) Summary Stage: Extract transferable communication principles (e.g., “respond to emotions first, then convey information”) and require the completion of a written reflective journal.

Observation Indicators and Assessment of Physician-Patient Communication Skills

The SEGUE Framework (Set the stage, Elicit information, Give information, Understand the patient’s perspective, End the encounter) was used [8]. This framework includes five core dimensions (preparing for history taking, information gathering, information giving, understanding the patient, ending the encounter) and supplementary dimensions (e.g., physical examination, organizational effectiveness, overall care). Each item is scored from 1 to 9 (1–3: needs improvement; 4–6: adequate; 7–9: good/excellent). In this study, the Cronbach’s α for this scale was 0.87.

Assessment of Teaching Satisfaction

A self-developed questionnaire with 7 items was used: 1) understanding of norms and techniques in doctor-patient communication; 2) necessity of adding medical humanities courses; 3) practicality of the course; 4) meeting expectations; 5) clarity of content; 6) attractiveness of teaching methods; 7) overall satisfaction. Each item was scored from 1 to 9. The Cronbach’s α for this scale was 0.89.

Qualitative Interviews

After the intervention, purposive sampling was used to select 14 students from the study group for semi-structured interviews (until data saturation). The interview guide included: 1) “What was your greatest psychological impact or emotional touch-point while playing the family member role?” 2)

“How did the debriefing session specifically help you understand the patient’s or family member’s inner world?”

“How has this simulation changed your attitude towards future doctor-patient communication?” Interview recordings were transcribed. The Colaizzi seven-step analysis method was used to extract themes.

Statistical Methods

Data analysis was performed using SPSS 23.0. Measurement data are expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$). Comparisons between the two groups were conducted using independent samples t-tests. The significance level (α) was set at 0.05.

Results

Comparison of Baseline Data

There were 55 participants in the study group, 35 males (63.6%) and 20 females (36.4%). The control group consisted of 66 participants: 34 males (51.5%) and 32 females (48.5%). No statistically significant differences were found between the two groups in age ($t = -1.06$, $p = 0.29$), sex composition ($\chi^2 = 1.80$, $Pp = 0.179$), or cumulative pre-internship observation time ($t = -0.50$, $p = 0.62$), indicating comparability.

Comparison of Doctor-Patient Communication Skills

Between the Two Groups, as shown in Table 1, the study group scored significantly higher than the control group in seven dimensions: information gathering, information giving, understanding the patient, ending the encounter, physical examination, organizational effectiveness, and overall care ($p < 0.05$). Only in the dimension of preparing for history taking, there was no statistically significant difference between the two groups ($p = 0.098$).

Qualitative Interview Results

Analysis of interview data from the 14 students in the study group yielded three core themes.

Theme 1: Emotional shock and seeing the other side.

Most students mentioned the intense emotional experience evoked by playing the family member role. Student A: “When I was playing the family member and heard the doctor say ‘need to take insulin for life,’ my heart skipped a beat. I suddenly understood that

Table 1. Comparison of baseline data and physician-patient communication skills scores between the two groups of interns

Variables	Intervention	Control	Total	t-value	p value
Gender					
Male, n (%)	35 (63.6%)	34 (51.5%)	69 (57.0%)		0.179
Female, n (%)	20 (36.4%)	32 (48.5%)	52 (43.0%)		
Age (yrs)	21.5±0.6	21.6±0.5		-1.06	0.29
Completed Internship Duration (in weeks)	8.71±5.1	9.23±6.1		-0.5	0.62
Specialty					
History taking preparation	6.62±1.86	6.18±0.94		1.58	0.098
Information gathering	7.84±1.21	5.76±1.10		9.89	0.000
Information giving	7.40±1.20	5.65±1.09		8.41	0.000
Understanding the patient	7.31±1.23	5.68±0.91		8.12	0.000
Closing the interview	7.24±1.19	5.02±1.18		10.27	0.000
Physical examination	7.33±0.80	5.80±1.22		8.27	0.000
Organizational efficiency	7.58±0.81	5.74±0.97		11.22	0.000
Overall caring	7.62±0.93	6.00±1.02		9.02	0.000

feeling like the sky was falling.” Student B: “I used to think family members’ questions were unnecessary, but now I understand that it’s anxiety.”

Theme 2: From practice to real use

Students reported that the debriefing session helped them transform emotional experiences into concrete actions. Student C: “During the debriefing, the teacher pointed out that we should say ‘I know this is very difficult for you to accept’ first, instead of directly explaining the treatment plan. I used this technique later during a bedside consultation, and it worked very well.” Student D: “I learned to respond to the emotion first, then respond to the question.”

Theme 3: Safe to try and fail.

Students valued the low-risk learning opportunities provided by the simulated environment. Student E: “If I say something wrong in the simulation, I can start over, but I can’t do that in front of a real patient. This practice gave me confidence.” Student F: “Observing others make mistakes and then discussing them is more enlightening than making mistakes myself.”

Comparison of Satisfaction Scores Between the Two Groups of Intern Students

The satisfaction scores of intern students in the study group were higher than those in the control group, and the difference was statistically significant.

Discussion

Analysis of the Teaching Mechanism Based on Situated Learning Theory

The results show that the study group performed significantly better than the control group across multiple dimensions of the SEGUE scale, which is consistent with the conclusions of domestic and international research on scenario-based simulation teaching [6, 9]. However, this study further reveals the underlying mechanism from a theoretical perspective. Situated learning theory emphasizes that knowledge is constructed within authentic activities, contexts, and cultures. Traditional medical humanities education often teaches competencies such as empathy and communication as abstract principles, making it difficult for students to activate and apply them in real clinical situations. The “adolescent type 1 diabetes with ketoacidosis” case designed for this study closely replicates a typical high-emotional-load scenario in the chronic disease management of endocrinology (life-long illness, family psychological crisis, information asymmetry). This enables students, through “legitimate peripheral participation” [10],— first observing, then role-playing, and finally debriefing, — to gradually move from peripheral participants to competent clinical communicators. The emergence of the “perspective-taking awakening” theme in the qualitative interviews directly confirms the catalytic effect of situated embedding on empathic ability.

Table 2. Comparison of satisfaction scores of intern students between the two groups of interns

Variables	Intervention, n (%)	Control, n (%)	Total	t-value	p value
Gender					
Male, n (%)	35 (63.6%)	34 (51.5%)	69 (57.0%)		0.179
Female, n (%)	20 (36.4%)	32 (48.5%)	52 (43.0%)		
Age (yrs)	21.5±0.6	21.6±0.5		-1.06	0.290
Completed Internship Duration (in weeks)	8.71±5.1	9.23±6.1		-0.5	0.620
Satisfaction Scores					
Level of understanding of doctor-patient communication	8.38±0.87	7.35±1.03		5.89	0.000
Whether medical humanities courses need to be added	8.64±0.62	7.29±0.89		9.79	0.000
Practicality of the course	8.78±0.42	7.82±0.89		7.81	0.000
Whether expectations were met	8.75±0.44	7.89±0.99		6.26	0.000
Whether the content was clear	8.69±0.57	7.94±1.05		4.99	0.000
Whether the teaching methods were engaging	8.69±0.57	7.64±0.91		7.78	0.000
Overall satisfaction	8.78±0.46	7.61±0.94		8.94	0.000

Structured Debriefing: A Bridge from “Emotional Experience” to “Rational Strategy” The core innovation of this study lies in establishing structured debriefing as a necessary component of the teaching closed loop. Schön’s theory of reflective practice points out that professional competence develops through “reflection-in-action” and “reflection-on-action” [6]. Role-playing alone provides only the former (students making real-time adjustments during the simulation). Without the latter, fragmented experiences cannot be systematically transformed into transferable principles. The four-step method of “Reaction — Description — Analysis— Summary” in this study pushes students to progressively move from emotional catharsis (Reaction) to behavioral description (objectification), theoretical analysis (conceptualization), and principle extraction (transferability), completing a full reflective cycle. The statement from a student in the qualitative interview, — “I learned to respond to the emotion first, then respond to the question”, — is typical evidence of this cognitive restructuring. In contrast, although the control group also had clinical exposure, they lacked structured reflective guidance, making it difficult to achieve the transformation from experience to competence.

In-depth Analysis of the “No Significant Difference in Preparing for History Taking”

There was no significant difference between the two groups in the “Preparing for History Taking” dimension in our study. This negative result actually

provides important insights into the boundaries of medical humanities education. Preparing for history taking (e.g., verifying patient information, preparing instruments, reviewing medical records) is essentially procedural, technical knowledge. Its execution relies primarily on prior theoretical learning and rote memory, rather than on humanistic literacy or empathic ability. Therefore, a scenario-based simulation intervention aimed at enhancing humanistic literacy would naturally not have a significant impact on this dimension. Conversely, the significant improvement of the study group in core humanistic dimensions such as “Understanding the Patient,” “Overall Care,” and “Giving Information” precisely confirms that the true value of medical humanities education lies in optimizing the “process of human-to-human interaction,” rather than improving “instrumental preparation beforehand” [11]. This finding enriches our understanding of the boundaries of effectiveness of medical humanities education, suggesting that future evaluations of humanities teaching should distinguish between “technical communication” and “emotional communication,” avoiding the use of a single standard to measure all dimensions.

Teaching Satisfaction and Feasibility Analysis

The study group’s high scores in the dimensions of “attractiveness of teaching methods” and “practicality of the curriculum” indicate that scenario simulation teaching meets the expectations of interns for “learning by doing.” Traditional small-group lec-

tures are teacher-centered, with students in a passive, receptive state. In contrast, scenario simulation places students in the role of problem-solvers, and through role-swapping and an observer mechanism, ensures high levels of participation from every student. The theme of a “safe psychological space for trial and error” identified in qualitative interviews further explains the reasons for high student satisfaction: the simulated environment reduces the psychological cost of making mistakes in real clinical settings, enabling students to dare to try different communication strategies, thereby enhancing their self-efficacy [12].

Research Limitations and Future Directions

This study has the following limitations: grouping was based on internship batches rather than random assignment, which may introduce selection bias. The sample came from a single-center endocrinology department, limiting the generalizability of the conclusions. Only short-term teaching effects were evaluated, without tracking students’ long-term performance in subsequent internships. In addition, the qualitative interview sample was small and only collected subjective reports from students in the study group. Future research could incorporate third-party evaluations from standardized patients or clinical instructors. Future studies may adopt a multicenter randomized controlled design, introduce long-term follow-up (e.g., reassessment at 3 and 6 months), and develop an artificial intelligence-based coding system for communication behaviors to achieve more objective outcome evaluation.

Conclusion

Scenario simulation with structured debriefing improved interns’ communication skills and satisfaction. The core mechanisms of this model are as follows: role-playing provides an emotional trigger for perspective-taking, while structured debriefing facilitates cognitive restructuring from experiential knowledge to rational strategies. The study also found that scenario simulation had no significant effect on technical communication components (e.g., preparation before history taking), which helps define the effective boundaries of medical humanities education. It is recommended that this model be further promoted in clinical teaching practice, and that multicenter, long-term validation studies be conducted.

Data Availability Statement: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request, as the data contain potentially identifiable information of medical students.

Acknowledgements: The authors acknowledge the use of DeepSeek for Chinese-to-English translation during the preparation of this work. All translated content was reviewed and revised by the authors, who assume full responsibility for the accuracy and integrity of the manuscript.

Funding Statement: This research received no specific grant from any funding agency.

Competing interests: The authors declare no competing interests.

Ethics Approval Statement: This study was conducted in accordance with the Declaration of Helsinki. The research protocol was approved by the Institutional Ethics Committee of The Seventh Affiliated Hospital, Sun Yat-Sen University (Approval No.: KY-2026-066-01)

Consent Statement: Written informed consent was obtained from all student participants before enrollment in the study. Participants were informed that their responses would be used for research purposes and that their anonymity would be protected.

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Originality Statement: The authors confirm that this manuscript has not been published previously and is not under consideration for publication elsewhere.

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