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A Practical Study on Competency-Based Team Teaching in Urology Nursing Education

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Abstract: *Based on the practical demands of clinical nursing positions, this study constructs a team-based teaching model oriented toward job competency. It systematically explores its application effectiveness in urology nursing education to provide a replicable teaching approach for cultivating nursing professionals with comprehensive practice capabilities. Eighty nursing students undergoing clinical training in the Urology Department of Huai'an Fifth People's Hospital from January 2024 to December 2025 were enrolled. Using computerized random sampling, they were divided into an observation group and a control group, each comprising 40 participants. The control group received traditional clinical mentoring, while the observation group underwent competency-based team teaching. Post-intervention, compare core competency dimensions, teaching satisfaction, and combined theoretical/practical scores between groups.The observation group scored significantly higher than the control group in all five core competency dimensions: and (8.91 ± 1.23), respectively, all significantly higher than the control group's scores of (5.20 ± 0.95), (5.41 ± 0.95), (5.12 ± 1.03), (4.90 ± 0.52), and (5.20 ± 0.75), respectively. These differences were statistically significant (P < 0.05). Nursing students in the observation group reported higher satisfaction scores than the control group across all five dimensions (teaching content, teaching methods, etc.). Specifically, satisfaction with teaching methods reached (96.20 ± 9.75) points, significantly superior to the control group's (80.20 ± 4.30) points (P < 0.05). The theoretical exam scores (86.35 ± 4.25) and skill operation scores (85.70 ± 3.75) of nursing students in the observation group were significantly higher than those of the control group (71.20 ± 2.65) and (72.52 ± 2.81), respectively (P < 0.05). In conclusion, competency-based team teaching effectively addresses shortcomings in traditional instruction, comprehensively enhancing clinical adaptability and learning outcomes among urology nursing students. This approach has gained widespread recognition among students, aligns with modern nursing education reform directions, and warrants further promotion and optimization in specialized nursing education.*

Keywords: job competency, team-based teaching, urology, nursing education, clinical practice

INTRODUCTION

As a discipline in clinical medicine that combines both specialization and practical application, urology nursing encompasses multiple aspects of urinary system disease prevention, treatment, and rehabilitation. It involves core procedures such as catheterization, bladder irrigation, and urinary stone care, while also requiring nursing staff to possess efficient doctor-patient communication skills, precise clinical judgment capabilities, and strong teamwork abilities [1]. Currently, clinical demand for nursing talent has shifted from "knowledge-based" to "competency-based," with job competency emerging as the core standard for evaluating nursing quality. Its key dimensions include professional knowledge application, clinical reasoning, communication and collaboration, self-directed learning, and professional ethics [2][3][4].

Traditional clinical teaching models predominantly employ passive instruction through "lectures by instructors + student shadowing," emphasizing theoretical knowledge transfer while neglecting systematic development of clinical skills and comprehensive competencies. This results in some nursing students mastering foundational theory yet struggling with complex clinical cases—often exhibiting inflexible knowledge application, inefficient communication, and inadequate emergency response capabilities—making it difficult for them to rapidly adapt to clinical demands [5][6]. Team-Based Learning (TBL), proposed by American scholar Larry K. Michaelsen in 2002, has gained traction in medical education due to its emphasis on teamwork and problem-oriented teaching [7]. This study deeply integrates competency-based training objectives with team-based learning, designing a teaching plan tailored to the core needs of urology nursing education. Through systematic teaching practices, it explores effective pathways to enhance nursing students' clinical adaptability, providing practical references for nursing education reform.

MATERIALS AND METHODS

General Information

Eighty nursing students undergoing clinical training in the Department of Urology at Huai'an Fifth People's Hospital from January 2024 to December 2025 were enrolled as study subjects. All participants held a three-year associate degree in nursing, had completed foundational medical coursework, and lacked prior clinical experience in urology. The students ranged in age from 19 to 23 years, with a mean age of (20.56 ± 1.02) years. The sample comprised 4 males and 76 females. Using computer-generated randomization, the students were divided into an observation group and a control group, each consisting of 40 subjects. The observation group comprised 2 males and 38 females, with a mean age of (20.51 ± 1.00) years; the control group included 2 males and 38 females, with a mean age of (20.65 ± 1.10) years. Statistical analysis revealed no significant differences between groups in gender, age, educational background, or foundational course grades ($P>0.05$), indicating comparability.

Teaching Methods

Control Group

Traditional clinical teaching model was employed, implemented as follows: Instructors

developed teaching plans based on the syllabus, primarily delivering theoretical lectures and practical demonstrations. Theoretical instruction primarily consisted of classroom lectures covering nursing knowledge for common urological conditions, diagnostic and treatment procedures, and nursing protocols. Practical training employed a "one-on-one" shadowing model, where instructors demonstrated core procedures followed by student imitation practice with on-site correction of errors. Throughout the teaching process, nursing students passively received knowledge and procedural guidance, regularly participated in department-administered theoretical written exams and skill assessments, with evaluation results serving as the basis for teaching effectiveness assessment.

Observation Group

Implementation of competency-based team teaching centered on five core dimensions: communication and collaboration, self-directed learning, clinical reasoning, knowledge application, and professional ethics. The teaching process is designed with the following specific steps:

Teaching Preparation Phase: Form a specialized teaching team comprising three nurse practitioners with over five years of clinical urology nursing experience and certified nursing instructor qualifications. One serves as the primary instructor responsible for overall teaching plan design and implementation. Based on urology clinical job requirements, core teaching content was defined. The primary textbooks selected were: - "Progress in Urological Obstruction and Nursing" from Surgery (7th Edition, People's Medical Publishing House, Chapter 55) - "Nursing in Surgery" (4th Edition, People's Medical Publishing House, Chapter 39) on nursing care for patients with urological obstruction Supplementary materials included typical clinical cases from our hospital's urology department, nursing guidelines, and the latest diagnostic and therapeutic progress literature. Two types of assessment questions were designed: 1. Pre-study assessment questions (25 items) covering fundamental concepts and key knowledge, ensuring consistency, representativeness, fairness, and clarity. 2. Team task assessment questions featuring comprehensive clinical case analyses (15 items) based on real clinical scenarios, such as: "What is the primary nursing issue for this patient with obstruction based on clinical symptoms? How would you prioritize interventions by urgency and develop nursing measures?" "What is the emergency response protocol for patients with complications?" These questions emphasize knowledge application and clinical reasoning skills. "Emergency response protocols for complications." These assess knowledge application and clinical reasoning skills.

Team Formation and Division of Labor: Following the "heterogeneous grouping" principle, the 40 observation group students were divided into 7 teams (6 teams of 6, 1 team of 4) based on theoretical knowledge scores, practical skills, and communication abilities. Each team elected a leader with strong organizational skills. Team leaders were assigned responsibilities including coordinating learning tasks, facilitating group discussions, and managing task distribution. Team members divided roles based on individual strengths—such as data collection, record organization, and presentation preparation—to ensure efficient collaboration.

Pre-class Independent Preparation: Instructors distributed teaching objectives, core textbook

chapters, supplementary materials, and pre-study assessment questions to each team one week in advance. Nursing students were required to independently complete textbook reading, research materials, and the pre-study assessment questions, while documenting any encountered difficulties. Team leaders compiled these issues into a consolidated list of common questions and submitted it to instructors beforehand to inform classroom teaching priorities.

Classroom Implementation:

Preparation Assessment & Q&A (30 minutes):

Begin with individual closed-book preparation assessment tests (20 minutes) to evaluate independent learning outcomes. Teams then discuss test difficulties and pre-compiled question lists (10 minutes). Instructors circulate for guidance, addressing common issues collectively to clarify key concepts and challenges.

Team Case Discussion (60 minutes): Instructors distribute comprehensive case materials (including patient demographics, vital signs, medical history, diagnostic test results, and clinical symptoms). Teams engage in in-depth discussions around 15 case analysis questions. Team leaders facilitate full participation, guiding members to analyze problems and develop solutions using acquired knowledge. Instructors steer discussions toward clinical reasoning to maintain focus.

Presentation and Defense (40 minutes): Each team selects a representative to report case discussion outcomes. For multiple-choice questions, teams answer via raised cards and explain reasoning; for short-answer questions, teams provide written statements with on-site explanations. Other teams may challenge presented content through cross-examination. Instructors guide students to consider issues from multiple angles, deepening knowledge comprehension. Finally, the instructor provides feedback on each team's presentation, summarizing core knowledge points and clinical nursing essentials while correcting misconceptions.

Post-Class Consolidation and Evaluation: Following the session, teams are assigned an extension task to design a nursing plan addressing a clinical issue (e.g., “Optimizing Perioperative Care for Geriatric Urology Patients”), to be presented and discussed in the next class. Assessment combines peer evaluation and instructor evaluation. Team members score each other based on participation and contribution during group learning (maximum 10 points). Instructors evaluate based on task completion quality and presentation performance (maximum 10 points). The average of these two scores constitutes the teamwork component, which contributes to the overall course grade.

Observation Indicators

Job Competency Score: Evaluated based on the Nursing Job Competency Evaluation Standards and urology nursing position requirements across five dimensions—communication and collaboration skills, self-directed learning ability, clinical reasoning skills, knowledge application ability, and professional ethics. Each dimension is scored from 0 to 10 points, with a total score ranging from 0 to 50 points. Higher scores indicate stronger job competency. Three instructors not involved in teaching implementation conduct blind evaluations, with the average score serving as the final result to ensure objectivity and fairness.

Teaching Satisfaction Survey: A customized teaching satisfaction questionnaire was used to evaluate five aspects: teaching content (clinical relevance, practical knowledge), teaching methods (interactivity, engagement, relevance), time allocation (reasonableness), teaching performance (instructor guidance effectiveness, timeliness of responses), and teaching environment (learning atmosphere, collaborative conditions). Each dimension is scored from 0 to 100 points, with a total possible score of 0 to 500 points. Higher scores indicate greater satisfaction. After the teaching session, questionnaires were distributed to both groups of nursing students. A total of 80 questionnaires were distributed, with 80 valid responses collected, achieving a 100% valid response rate.

Teaching Performance Assessment: This consists of two parts: a theoretical examination and a skills assessment. The theoretical exam (closed-book, maximum score 100 points) covered knowledge of common urological disease nursing, diagnostic and treatment procedures, nursing protocols, and emergency management. The skills assessment (maximum score 100 points) evaluated core urological procedures (catheterization and bladder irrigation). Two instructors conducted on-site scoring using standardized criteria, with the average score serving as the final grade.

Statistical Methods

Data analysis was performed using SPSS 23.0 statistical software. Quantitative data are expressed as mean ± standard deviation ($x \pm s$), and intergroup comparisons were conducted using the independent samples t-test. Qualitative data are presented as rates (%), and intergroup comparisons were performed using the chi-square (χ^2) test. $P < 0.05$ was considered statistically significant.

RESULTS

Comparison of Job Competency Scores Between Nursing Students

Nursing students in the observation group demonstrated significantly higher scores than those in the control group across all five dimensions: communication and collaboration skills, independent learning ability, clinical reasoning ability, knowledge application ability, and professional competence ($P < 0.05$). See Table 1.

Table 1 Comparison of Job Competency Scores Between Nursing Students (x ± s, points)

Group	n	Communication and collaboration skills	Self-directed learning ability	Clinical reasoning skills	Knowledge Application Ability	Professionalism
Observation Group	40	8.41±1.05	9.10±1.25	8.86±1.12	8.95±0.78	8.91±1.23
Control group	40	5.20±0.95	5.41±0.95	5.12±1.03	4.90±0.52	5.20±0.75
t-value	15.682	15.327	16.254	28.765	15.893	
P-value	0.000	0.000	0.000	0.000	0.000	

Comparison of Teaching Satisfaction Scores Between the Two Groups of Nursing Students

The observation group scored higher than the control group in all five aspects of teaching satisfaction: teaching content, teaching methods, time allocation, teaching performance, and teaching environment. The differences were statistically significant (P<0.05). See Table 2.

Table 2 Comparison of Teaching Satisfaction Scores Between the Two Groups of Nursing Students (x±s, points)

Group	n	Teaching Content	Teaching Methods	Schedule	Teaching Performance	Teaching Environment
Observation Group	40	95.23±3.75	96.20±9.75	97.50±4.52	92.51±12.52	96.52±13.56
Control group	40	81.10±3.89	80.20±4.30	82.10±5.03	84.12±11.43	82.10±10.43
t-value	18.765	9.234	16.892	3.256	5.123	
P-value	0.000	0.000	0.000	0.002	0.000	

Comparison of Academic Performance Between the Two Nursing Student Groups

The theoretical examination scores and practical skill scores of the observation group were significantly higher than those of the control group, with statistically significant differences (P<0.05). See Table 3.

Table 3 Comparison of Academic Performance Between the Two Nursing Student Groups (x±s, points)

Group	n	Theory Test Score	Skill Operation Score
Observation Group	40	86.35±4.25	85.70±3.75
Control group	40	71.20±2.65	72.52±2.81
t-value	20.321	18.765	
P-value	0.000	0.000	

DISCUSSION

Competency-Based Team Teaching Comprehensively Enhances Nursing Students' Core Competencies

The study findings indicate that nursing students in the observation group scored significantly higher than the control group across all five core dimensions of job competency, demonstrating that this teaching model effectively enhances students' comprehensive abilities. Traditional teacher-centered teaching places students in a passive learning state, lacking opportunities for active thinking and practical application, making it difficult to effectively integrate theoretical knowledge with clinical practice. In contrast, competency-based team teaching centers on clinical job requirements [8]. By forming heterogeneous groups that leverage students' complementary strengths, this approach requires active resource research, problem analysis, and collaborative communication during pre-class preparation, in-class team discussions, and final presentations. This not only hones independent learning skills but also enhances communication, teamwork, and clinical reasoning abilities [9]. For instance, during comprehensive case discussions, students must analyze nursing issues and formulate interventions based on patient symptoms and acquired knowledge, significantly enhancing their ability to apply theoretical concepts. Through thorough exchanges and collaborative problem-solving within teams, students gradually develop effective communication habits and cooperative awareness, laying the groundwork for future clinical teamwork. Furthermore, the teaching process emphasizes cultivating professional ethics. Through simulations of standardized procedures, patient respect, and emergency response scenarios, nursing students strengthen their sense of responsibility and professional identity, thereby elevating their overall professional competence.

Competency-Based Team Teaching Enhances Nursing Students' Satisfaction

Nursing students in the observation group scored significantly higher than the control group across five dimensions, including teaching content and methods. This outcome is closely tied to the design features of this teaching model. Regarding teaching content, the model closely integrates with urological clinical practice, selecting typical cases and nursing hot topics as teaching materials. This approach avoids the disconnect between theory and practice, allowing students to perceive the practicality and relevance of the knowledge. Regarding teaching methods, team-based teaching breaks the monotony of traditional instruction. Interactive elements like group discussions, project presentations, and cross-examination sessions fully

engage students' learning initiative and motivation. This shifts students from passive knowledge absorption to active participation, enhancing learning enjoyment and involvement. Regarding teacher-student interaction, instructors serve as facilitators and supporters during instruction. Through rounds guidance, centralized Q&A sessions, and feedback summaries, they provide personalized guidance, promptly resolve learning challenges, bolster students' confidence, foster positive relationships, and ultimately enhance teaching satisfaction.

Competency-Based Team Teaching Significantly Improves Learning Outcomes

The observation group demonstrated significantly higher theoretical exam scores and practical skill performance than the control group, indicating this teaching model effectively enhances students' knowledge retention and practical application abilities. Traditional teaching emphasizes theoretical knowledge transmission, often relying on rote memorization, which hinders deep understanding and flexible application. This results in subpar theoretical exam performance and operational skills lacking standardization and proficiency. In contrast, competency-based team teaching employs a closed-loop instructional cycle—"pre-class preparation, in-class discussion, post-class reinforcement"—enabling students to deepen knowledge retention and comprehension through self-directed learning, team collaboration, and practical application, thereby effectively enhancing theoretical knowledge mastery [10][11]. Additionally, in skill-based instruction, peer demonstrations and corrections among team members, combined with professional guidance from instructors, lead to more standardized and proficient operational skills among nursing students, thereby improving their performance in skill assessments.

CONCLUSION

Competency-based team teaching effectively integrates clinical job requirements with educational practice. Through scientific instructional design, rational team formation, and diverse teaching activities, it significantly enhances nursing students' core competencies in urology—including communication and collaboration skills, clinical reasoning abilities, and knowledge application capabilities. This approach improves student satisfaction and overall academic performance while addressing shortcomings of traditional teaching models. This teaching model aligns with modern nursing education reform directions, providing an effective pathway for cultivating high-quality nursing professionals who meet clinical job demands. It warrants further promotion and refinement in urology and other specialty nursing education. Future research may integrate smart teaching tools, such as virtual simulation systems and online learning platforms, to further optimize the teaching model and enhance educational outcomes.

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