



Research Article

Dual-Teacher System Mixed Teaching Method is Applied to the Training of Undergraduate Nursing Students' CPR Skill

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Abstract

Background: The Dual-teacher system mixed teaching method is a teaching method that combines online and offline hybrid teaching with the dual-teacher system. In view of the uncertain effectiveness of the dual-teacher hybrid teaching method in improving undergraduate nursing students' learning CPR skills training results Evidence, a more thorough understanding of the effects of undergraduate nursing students' learning CPR skills and the dual-teaching mixed teaching method may provide a theoretical basis for the improvement of nursing training. **Purpose:** To explore the application effect of Dual-teacher system mixed teaching method applied to the training of undergraduate nursing students' CPR skill. **Methods:** Adopts the cluster sampling law to choose all the undergraduate nursing students who practiced in the Emergency Department of the first affiliated Hospital of Sun Yat-sen University from April 1, 2018 to April 25, 2021 and randomly divided into the observation group and the control group according to the practice batches. And then compares the CPR operation examination, course satisfaction survey and personal comprehensive ability of the nursing students in the two groups. **Results:** The CPR operation examination, course satisfaction survey and personal comprehensive ability of nursing students in the observation group were higher than those in the control group, and the difference was statistically significant, ($t=19.460, 15.983, 28.375$, all $p<0.001$). **Conclusion /Implications for Practice:** Dual-teacher system mixed teaching method combines online and offline mixed teaching with dual-teacher system, which can improve nursing students' CPR skill examination scores and satisfaction with the teaching mode when it applied to nursing students' CPR training.

Keywords: Dual-teacher system mixed teaching method; Undergraduate nursing students; CPR; Clinical teaching.

Introduction

Cardiopulmonary resuscitation is mainly composed of cardiac compression, opening airway and ventilation, which is an important rescue measure against cardiac arrest, and can promote the recovery

of patients' spontaneous respiration and autonomic circulation. Effective cardiopulmonary resuscitation can significantly improve the survival rate of patients [1]. The traditional cardiopulmonary resuscitation skills training can't update the theoretical knowledge timely and effectively because of the single training form and the decline of medical staff's interest in learning [2]. The relevant literature [3,4] points out that on-site joint distance training is the

first choice for cardiopulmonary resuscitation training, which can enable trainees to firmly master first aid knowledge and skills. In this study, CPR training was carried out for 586 undergraduate nursing students who had practiced in our hospital in the past three years by Dual-teacher system mixed teaching method which combines online and offline mixed teaching, and achieved good results. It is reported as follows.

Objects and Methods

Objects

A total of 586 undergraduate nursing students who practiced in the Emergency Department of the first affiliated Hospital of Sun Yat-sen University from April 1, 2018 to April 25, 2021 were selected by cluster sampling. Inclusion criteria: four-year undergraduate nursing students that was in clinical practice stage of emergency department and volunteered for this study. Exclusion criteria: leave time ≥ 1 week. A total of 586 nursing students in three internship period were divided into observation group (n=293) and control group (n=293) according to the internship batches by random number table method. There were 269 girls and 24 boys in the observation group, with an age of 21.96 ± 0.43 years old. There were 267 girls and 26 boys in the control group, the age was 21.91 ± 0.51 years old. There was no significant difference in sex and age between the two groups ($P > 0.05$).

Method

The clinical practice time and plan of the two groups of nursing students were arranged uniformly according to the practice outline, and the whole training was taught by the general manager of the department. The teaching contents are "Cardiac arrest and cardiopulmonary-cerebral resuscitation" in "Emergency and Critical care Nursing" third edition, published by Peoples' Health Publishing House, and "2015 AHA cardiopulmonary resuscitation and cardiovascular first aid guidelines update" (hereinafter referred to as "2015 guidelines update"). The training equipment mainly includes cardiopulmonary resuscitation model person (Nodo laerdal, Norway), external defibrillator (Philips) equipped with Q-CPR and resuscitation balloon mask.

The control groups

The control group adopted the conventional teaching method, the general manager of the department finished teaching plan writing and slides making according to the syllabus. The training time was 4 hours, including theory teaching and classroom question answering for 1 hour, skill demonstration for 1 hour, concentrated practice and operation guidance for 2 hours.

Observation group

The observation group adopted Dual-teacher system mixed teaching method, and the training time was 4 hours.

The implementation methods are as follows: 1. Microlecture online teaching: the CPR microlecture teaching video was recorded by the general instructor of the emergency department, which was reviewed by the head nurse and clinical experts, and then released to the online live broadcast of the nail group. All nursing students are required to watch and the learning time was counted. 2. The Flipped Classroom: make the catalogue of CPR teaching books and literature, and require nursing students to study by themselves before class. On the premise of volunteering, one of the nursing students was selected as the "nursing student speaker", and the "nursing student speaker" explained the CPR theory and showed operation demonstration. All nursing students discussed and studied together, and the general teaching department was responsible for presiding, guiding and answering questions.

Scenario simulation: combining with cases close to clinical practice in the process of operation demonstration, which can cultivate nursing students' clinical thinking and improve their adaptability and problem-solving ability while learning operation demonstration [5].

The teaching effect evaluation

The teaching effect is comprehensively considered through theoretical and operational assessment, curriculum satisfaction survey and personal comprehensive ability evaluation. (1) theoretical assessment: the types of questions include A1, A2, A3, A4 multiple choice questions, blank questions, short answer questions and case analysis questions, with a full score of 100. The scope of assessment includes basic knowledge of CPR, knowledge related to artificial respiration with balloon mask and guide knowledge. (2) CPR operation examination: used cardiopulmonary resuscitation model person (Nordo laerdal, Norway) and external defibrillator (Philips) equipped with Q-CPR, and the operation examination score was generated automatically by the machine to eliminate the interference of human factors. (3) Comprehensive ability evaluation of nursing students: after the end of nursing practice, the teaching teacher used the comprehensive ability evaluation form to evaluate the comprehensive ability of nursing students in the process of practice. There are 5 items in the evaluation form. The options of each item are very satisfactory (9~10 points), satisfactory (7~8 points), average (5~6 points), dissatisfied (3~4 points), and very dissatisfied (1~2 points). (4) The satisfaction survey: nursing students completed a course

satisfaction questionnaire with 5 items after internship. The choices of each item were very satisfied (9~10 points), satisfied (7~8 points), average (5~6 points), dissatisfied (3~4 points), and very dissatisfied (1~2 points).

Statistical Methods

Adopted SPSS 25.0 statistical software to analyze and process the data. The measurement data were expressed by mean ± standard deviation ($\bar{x} \pm s$), compared with t-test, and the counting data were compared with χ^2 test. The difference was statistically significant when $P < 0.05$.

Results

Comparison of the results of CPR operation examination between the two groups of nursing students

Through the comparison of the scores of CPR theory and operation examination between the two groups, the scores of CPR operation and theory examination of nursing students in the observation group were significantly higher than those in the control group, and the difference was statistically significant. ($t=19.460$, 5.109 , $p < 0.001$).

| Group | n | Operation examination | Theoretical assessment |
|-------------------|-----|-----------------------|------------------------|
| Control group | 293 | 87.79±4.13 | 88.24±3.97 |
| Observation group | 293 | 94.06±3.64 | 93.14±3.84 |
| t | | 19.460 | 15.109 |
| p | | <0.001 | <0.001 |

Table 1: Comparison of the results of CPR operation examination between the two groups of nursing students ($\bar{x} \pm s$).

Comparison of comprehensive ability of two groups of nursing students

Through the comparison of the comprehensive ability of nursing students between the two groups, the comprehensive ability of nursing students in the observation group was significantly higher than those in the control group, and the difference was statistically significant ($t=15.983$, $p < 0.001$).

| Group | n | Comprehensive ability | t | p |
|-------------------|-----|-----------------------|--------|--------|
| Control group | 293 | 7.84±1.12 | 15.983 | <0.001 |
| Observation group | 293 | 9.17±0.88 | | |

Table 2: Comparison of the comprehensive ability of the two groups of nursing students ($\bar{x} \pm s$).

Comparison of course satisfaction between the two groups of nursing students

Through the comparison of the two groups of nursing students' satisfaction with the course, the nursing students' satisfaction with the course in the observation group was significantly higher than those in the control group, and the difference was statistically significant ($t=28.375$, $p < 0.001$).

Discussion

Dual-teacher system mixed teaching method can improve the CPR examination scores of nursing students.

Nursing student s' CPR operation and theory examination scores in the observation group are significantly higher than those in the control group, the difference was statistically significant ($P < 0.001$). Dual-teacher mixed teaching can improve the CPR examination scores of nursing students. Nursing students acting as "teachers" can fully stimulate their learning autonomy and interest in Dual-teacher system mixed teaching method [6], and carrying out situational simulation can realize the combination of theory and practice. The traditional skill teaching adopts the single skill training method of operation demonstration, which can't be organically combined with clinical practice [7]. At the same time, repeated practical training can easily make nursing students produce dull sense, reduce interest in learning, and reduce the effect of learning [8]. In the Dual-teacher system mixed teaching method, a nursing student acting as a teacher, which not only fully stimulates the interest in learning, but also reduces the learning tension of other students, enables students to communicate and study in a relaxed state, and strengthens the exchange of learning experience between nursing students, so as to improve the examination results of nursing students [9].

Dual-teacher system mixed teaching method can improve the comprehensive ability of nursing students.

The study showed that the comprehensive ability of nursing students in the observation group was significantly higher than those in the control group, and the difference was statistically significant ($P < 0.001$). The teaching of Dual-teacher system mixed teaching method is carried out by a nursing student and a general teacher, which changes from traditional passive learning to active learning. And there are teachers act as the gatekeeper of learning quality throughout the process. Nursing students exercise their abilities of expression, communication and learning through self-learning CPR and teaching demonstration. Some studies showed that [10] dual-teacher individualized clinical teaching is better than the traditional teaching method, which can effectively improve the quality of clinical nursing teaching. Scenario simulation cultivates nursing students' subjective initiative and adaptability to complete

nursing operations in case situations; more importantly, it makes nursing students fully feel the sense of cooperation, sense of responsibility and sense of achievement in the whole learning process. The “nursing student speaker” explains the theory and demonstrates operation, and then all nursing students discuss together and cooperate with each other, which can improve nursing students' self-management ability, cooperation ability and autonomous learning ability. Sequentially, the comprehensive ability of nursing students can be improved [11].

Dual-teacher system mixed teaching method can improve nursing students' satisfaction with the new teaching mode.

In this study, through the comparison of curriculum satisfaction between the two groups of nursing students, the curriculum satisfaction of nursing students in the observation group was significantly higher than those in the control group, and the difference was statistically significant ($P < 0.001$). Dual-teacher system mixed teaching method adopts the teaching form of online and offline integrated teaching method which has been needed by the situation, attaches importance to the change of teachers' role and behavior, and constantly promote the innovation of teaching thinking modes. Meanwhile, online and offline integrated teaching mode can effectively realize the whole convergence process of knowledge transfer to knowledge internalization [12,13]. The transfer of knowledge was completed online before the class, which was convenient for nursing students to arrange study time and repeat learning, and combined with offline teaching questions can be solved in time [14]. Nursing students participate in discussion and learning together and situational simulation can make them produce more truly experience of clinical nursing, improve nursing students' interest, improve nursing students' learning enthusiasm and lay a solid foundation for future clinical work [15].

Limitations

When interpreting the results of this study, several limitations must be considered. First, the sample is limited to one region in mainland China, which may limit the promotion of research results to other universities or countries. Secondly, in order to better understand the effectiveness and changes of the learning effect in the dual-teacher hybrid teaching method, future research may consider the use of randomized controlled trials to improve the effectiveness of the results.

Summary

To sum up, Dual-teacher system mixed teaching method combines online and offline mixed teaching with dual-teacher system in nursing students' CPR training, which helped to improve nursing students' CPR skills training effect and satisfaction with the teaching mode, so it is worth continuing to apply in nursing students' teaching.

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Author Contributions

Study Conception and Design: QQL, XJC. **Data Collection:** RZH, YHL. **Data Analysis and Interpretation:** All authors. **Drafting of the Article:** All authors. **Critical Revision of the Article:** XJC

Ethical Approval

Ethical issues are not involved in this paper.

Conflicts of Interest

All contributing authors declare no conflicts of interest.

References

1. Mattu A (2023) Cardiac Arrest!. *Emerg Med Clin North Am* 41: xiii-xiv.
2. Shrestha R, Badyal D, Shrestha AP, Shrestha A (2020) In-situ Simulation-Based Module to Train Interns in Resuscitation Skills During Cardiac Arrest. *Adv Med Educ Pract* 11: 271-285.
3. Tse E, Plakitsi K, Voulgaris S, Alexiou GA (2023) The Role of a First Aid Training Program for Young Children: A Systematic Review. *Children* (Basel). 10.
4. Shemwell K, Jun-Ihn E, Pithia N , Strobel KM, Pinto LAB, et al. (2022) Video simulation to learn pediatric resuscitation skills tailored to a low resource setting: A pilot program in Iquitos, Peru. *SAGE Open Med* 10: 20503121221077584.
5. Li Z, Huang FF, Chen SL, Wang A, Guo Y (2020) The Learning Effectiveness of High-Fidelity Simulation Teaching Among Chinese Nursing Students: A Mixed-Methods Study. *J Nurs Res* 29: e141.
6. O'Shaughnessy SM (2018) Peer teaching as a means of enhancing communication skills in anaesthesia training: trainee perspectives. *Ir J Med Sci* 187: 207-213.
7. Alamrani MH, Alammara KA, Alqahtani SS, Salem OA (2018) Comparing the Effects of Simulation-Based and Traditional Teaching Methods on the Critical Thinking Abilities and Self-Confidence of Nursing Students. *J Nurs Res* 26: 152-157.
8. Gupta R, DeSandro S, Doherty NA, Gardner AK, Pillow MT (2021) Medical and Physician Assistant Student Competence in Basic Life Support: Opportunities to Improve Cardiopulmonary Resuscitation Training. *West J Emerg Med* 22: 101-107.
9. La Cerra C, Dante A, Caponnetto V, Franconi I, Gaxhja E, et al. (2019) Effects of high-fidelity simulation based on life-threatening clinical condition scenarios on learning outcomes of undergraduate and postgraduate nursing students: a systematic review and meta-analysis. *BMJ Open* 9: e025306.

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10. Liu B, Xiao C (2021) Application analysis of scenario simulation teaching method combined with progressive teaching mode in clinical teaching of orthopaedic nursing. *The International Journal of Electrical Engineering & Education*. 07: 92-110.
11. Moon H, Hyun HS (2019) Nursing students' knowledge, attitude, self-efficacy in blended learning of cardiopulmonary resuscitation: a randomized controlled trial. *BMC Med Educ* 19:414.
12. Heo J, Han S (2021) The mediating effect of literacy of LMS between self-evaluation online teaching effectiveness and self-directed learning readiness. *Educ Inf Technol (Dordr)* 2021:1-12.
13. Ochs JH (2017) Online or In-Class: Evaluating an Alternative Online Pedagogy for Teaching Transcultural Nursing. *J Nurs Educ* 56: 368-372.
14. Saiyad S, Virk A, Mahajan R, Singh T (2020) Online Teaching in Medical Training: Establishing Good Online Teaching Practices from Cumulative Experience. *Int J Appl Basic Med Res* 10:149-155.
15. Oermann MH, Krusmark MA, Kardong-Edgren S, Jastrzembki TS, Gluck KA (2020) Training interval in cardiopulmonary resuscitation. *PLoS One*. 15: e0226786.