Application of Mind Mapping-Based Teaching Strategy in Airway Care Training

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Abstract

Objective To evaluate the effectiveness of a comprehensive teaching intervention strategy based on mind mapping in tiered training for airway care.

Methods Using random sampling, 120 nursing staff directly involved in airway care at Yizheng People's Hospital from January to June 2024 were selected as study subjects and randomly divided into a control group and an observation group, with 60 participants in each group. The control group received traditional nursing teaching methods, while the observation group received a comprehensive teaching intervention incorporating mind mapping, online learning, group discussions, and simulated operation assessments. Theoretical knowledge mastery, practical competency, and satisfaction with training content were compared between the two groups.

Results The observation group achieved theoretical knowledge scores of (85.52 ± 7.74) and practical competency scores of (83.7 ± 6.78), significantly higher than the control group's scores ($P<0.001$). The observation group's satisfaction score was (7.21 ± 1.18), also significantly higher than the control group ($P<0.05$).

Conclusion The use of a comprehensive teaching intervention strategy based on mind mapping significantly improved learning efficiency and satisfaction.

Full Text

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Abstract

Objective: To evaluate the application effect of a comprehensive teaching intervention strategy based on mind mapping in layered training for airway care. **Methods:** Using random sampling, 120 nursing staff directly involved in airway care at Yizheng People's Hospital from January 2024 to June 2024 were selected as study subjects and randomly divided into a control group and an observation group, with 60 participants in each group. The control group adopted traditional nursing teaching methods, while the observation group utilized teaching methods combining mind mapping with online learning, group discussions, and simulated operation assessments. Theoretical knowledge mastery, practical ability, and satisfaction with training content were compared between the two groups. **Results:** The observation group achieved theoretical knowledge scores of $(85.52\$\pm7.74) and practical skill scores of (83.7\pm6.78), significantly higher than the control group's (78.88\pm7.36) a$ 0.001). The observation group's satisfaction score was (7.21 ± 1.18), also significantly higher than the control group ($P<0.05$). **Conclusion:** The use of a comprehensive teaching intervention strategy based on mind mapping significantly improved learning efficiency and satisfaction.

Keywords: Mind mapping; Airway care; Layered training; Integrated teaching

Airway care is fundamental to clinical nursing practice and is crucial for maintaining patient respiratory function, preventing complications, and ensuring life safety [1]. Effective airway care can significantly improve patient treatment outcomes and survival rates [2]. During public health emergencies such as the COVID-19 pandemic, safe airway care training for nursing personnel across different practice areas is essential. Such training helps ensure that COVID-19 patients receive life-saving treatment while safeguarding the safety of healthcare workers [3]. Mind mapping is widely applied across multiple disciplines, particularly in medical and nursing education [4-7]. By providing clear visual learning pathways, it helps students integrate complex information and promotes deep learning [8-10]. The application of integrated teaching strategies in medical education demonstrates the profound value of diversified pedagogical approaches. By combining various teaching modes such as lectures, group discussions, practical operations [11], and online learning [12], these strategies effectively meet the needs of different learners. This approach not only enhances student motivation and engagement but also promotes the development of critical thinking and practical skills, significantly improving teaching effectiveness and students' clinical competence [13-16].

This study aims to overcome the limitations of traditional teaching methods by applying a comprehensive teaching intervention strategy based on mind mapping to layered training in airway care. We seek to enhance training effectiveness, help nursing personnel more effectively master the theory and skills of airway care, strengthen their self-directed learning motivation, and ultimately improve clinical care quality and patient safety.

1 Subjects and Methods

This study employed a prospective randomized controlled trial design, randomly assigning participants to control and observation groups to compare the effectiveness of two training methods in improving nursing staff's airway care knowledge and skills.

1.1 Study Subjects

The study subjects were 120 on-duty nursing staff directly involved in airway care at Yizheng People's Hospital from January 2024 to June 2024. Using a computer-generated random number table, 120 nursing staff meeting the inclusion criteria were randomly assigned to the control group and observation group, with 60 participants in each group. **Inclusion criteria:** On-duty nursing staff directly participating in airway care work, willing to participate in this study and sign informed consent. **Exclusion criteria:** Nursing staff who had participated in similar training within the past year, and those unable to complete training due to health or other reasons.

1.2 Intervention Methods

1.2.1 Observation Group Intervention The teaching design and implementation for the observation group centered on mind mapping strategies, encompassing training content design, diversified teaching strategies, and comprehensive application of digital platform resources. Through specific strategies in three aspects, we aimed to improve understanding and retention of airway care knowledge through visual learning tools and enhance training effectiveness.

1.2.1.1 Layered Training Content Design Combined with Mind Mapping Application
Targeting different experience levels of nursing staff, we designed training content according to competency levels [17, 18], as shown in Figure 1 [Figure 1: see original paper]. Using mind mapping tools, we structured and presented training materials for each level, clearly visualizing the airway care knowledge system through graphical representation. This enabled nursing staff to select the most suitable learning path based on their individual capabilities and needs.

1.2.1.2 Integration of Digital Platform Resources to Optimize Learning Experience
Combined with the mind mapping framework, we actively integrated existing digital platform resources to provide online courses and video teaching materials. This not only enriched training content but also enhanced flexibility and efficiency, ensuring nursing staff could learn at different times and locations.

1.2.1.3 Implementation of Diversified Teaching Strategies to Accommodate Different Learning Needs
Group Discussion and Interaction: Regular group discussion sessions centered on mind maps were organized to encourage nursing staff to exchange learn-

ing experiences and clinical insights, deepening understanding of knowledge and application of skills.
Simulation Operation Practice: Combined with mind maps, airway care operation training was conducted in simulated environments [19], providing practical opportunities to enhance skill mastery.

1.2.2 Control Group Intervention 1.2.2.1 Theoretical Classroom Teaching: Face-to-face theoretical knowledge lectures were delivered using multimedia equipment. Instructors emphasized key and difficult knowledge points through focused instruction and questioning to ensure students understood and mastered core concepts. At the end of each session, operation videos for relevant chapters were played to deepen students' theoretical understanding through visual presentation.

1.2.2.2 Practical Training: Instructors first explained operation essentials, demonstrated through teaching videos, and then performed demonstration operations with detailed explanations of common errors and precautions. Students practiced through imitation based on the demonstrations to strengthen skill learning through hands-on operation. After practice, instructors provided summary feedback and implemented skills assessment to evaluate students' mastery of operational skills.

1.3 Outcome Measures

1.3.1 Theoretical Knowledge Mastery: Tests covering key knowledge points of airway care were designed to assess nursing staff's theoretical knowledge levels before and after training. The tests used single-choice, multiple-choice, and true/false questions.

1.3.2 Practical Skill Level: Standardized practical skill assessment tools (OSCE, Objective Structured Clinical Examination) were used to test nursing staff's clinical airway care abilities before and after training.

1.4 Statistical Methods

SPSS 26.0 statistical software was used for analysis. Measurement data were expressed as mean and standard deviation. Independent samples t-test was used for inter-group comparisons. $P<0.05$ was considered statistically significant.

The comparison of scores between the two groups of nurses showed that the observation group's theoretical scores and practical levels were both significantly higher than those of the control group ($P<0.001$). See Table 1 and Table 2 for details. All participants from both groups completed the satisfaction survey. The results showed that observation group students held positive attitudes toward the flipped classroom teaching based on mind mapping, believing that this teaching method helped rationally arrange learning content and time, improved learning efficiency, communication skills, and teamwork abilities. See Table 3 for details.

Table 1 Comparison of Theoretical Knowledge Mastery Between Two Groups of Nurses
Theoretical knowledge scores: 78.88$±7.36*vs*.85.52±$7.74
Note: t=3.75, P<0.001.

Table 2 Comparison of Practical Skill Levels Between Two Groups of Nurses
Practical skill scores: 78.77$±7.24*vs*.83.7±$6.78
Note: t=3.8518, P<0.001.

Table 3 Comparison of Satisfaction with Teaching Methods Between Two Groups of Nurses
Satisfaction scores: 6.53$±1.11*vs*.7.21±$1.18
Note: t=3.29, P<0.05.

3 Discussion

3.1 Application Effect of Mind Mapping in Layered Airway Care Training

Layered training provides personalized teaching plans according to learners' skill levels and learning needs [20]. By creating layered training materials through mind mapping, we could clearly display information structure. The graphical presentation of information helped learners quickly grasp key concepts to more effectively understand and memorize complex airway care knowledge [9]. The use of visual tools increased the attractiveness of learning materials. The online self-learning courses based on mind mapping, covering basic to advanced airway care skills, met the personalized learning needs of different nursing staff, making the learning process more vivid and interesting, thereby improving learning efficiency and training quality [16]. During and after training, mind mapping helped nursing staff integrate and review learned knowledge, strengthen learning memory, and better understand and memorize complex airway care concepts and procedures, promoting long-term memory formation [13].

3.2 Optimizing Role of Comprehensive Teaching Intervention Strategies

The comprehensive teaching intervention strategy combining mind mapping, OSCE assessment, group discussions, case analysis, and digital platform resources provided a multi-dimensional learning platform for layered airway care training. This strategy not only promoted students' in-depth understanding of airway care knowledge, improved their mastery speed of key concepts, strengthened the connection between theory and practice, and effectively enhanced learning efficiency, but also stimulated students' learning interest through diversified learning activities, enhancing their sense of participation and satisfaction [14]. Particularly noteworthy was its significant effect in cultivating students' integration ability, critical thinking, and self-directed learning skills, providing

problem-solving approaches for encountering complex issues in future clinical practice.

3.3 Future Application Potential and Challenges

Although initial implementation of mind mapping and comprehensive teaching strategies may encounter certain challenges, such as resource allocation, teacher training [21], and learner adaptability issues [22], these are all surmountable. In the long term, mind mapping has tremendous potential for improving nursing education effectiveness, particularly in promoting theory-practice integration, enhancing learning efficiency, and developing complex problem-solving abilities. Therefore, future research should further explore its application in broader nursing and medical fields to maximize the advantages of this teaching tool.

This study explored the application of mind mapping in layered airway care training, revealing its significant advantages in improving teaching efficiency, optimizing teaching quality, and enhancing student learning motivation. The implementation of comprehensive teaching intervention strategies not only deepened students' understanding of professional knowledge but also promoted the development of self-directed learning abilities. Despite initial challenges, the long-term educational benefits of mind mapping and its potential for widespread application in nursing education warrant further exploration and utilization. Our research recommends integrating mind mapping into nursing education curricula, particularly in airway care training where technology and theory are closely integrated, to optimize learning outcomes and improve clinical care quality.

References: [1] Lu Liqi, Xiao Li, Meng Zhenbo. The role of airway care teams in airway care quality management [J]. Contemporary Nurse (Early Issue), 2022, 29(3): 140-2.
[2] Zhou Xiaoling, Shao Xiaoyan, Ding Juhong, et al. Effect of targeted airway care on comfort and ventilator-associated pneumonia in ICU patients [J]. Nursing Practice and Research, 2024, 21(1): 106-11.
[3] GUPTA B, JAIN G, PATHAK S, et al. Airway management training program for nurses via online course in COVID-19 preparedness [J]. World J Methodol, 2022, 12(3): 113-21.
[4] Dong Jing, Chen Yuzhuo, Wang Qing, et al. Meta-analysis of the intervention effect of mind mapping-based health education on patient discharge readiness [Z]//Dong Jing, Chen Yuzhuo, Wang Qing, et al. Nursing Practice and Research. 2023: 547-53.
[5] Hao Limin, Han Wenping, Guo Chaoli, et al. Application of planned behavior theory combined with mind mapping in health education for postpartum pelvic floor rehabilitation [J]. Journal of Nurses Training, 2023, 38(14): 1331-5,9.
[6] Li Fenhong, Tang Leilei, Wan Juan, et al. Effect observation of mind mapping health education for skin care in lung cancer immunotherapy patients [J]. Nursing Practice and Research, 2024, 21(3): 380-6.
[7] Li Ting, Wang Yan, Xu Ling, et al. Application of information-based mind

mapping health education in patients undergoing upper extremity arteriovenous fistula surgery [J]. Chinese Nursing Research, 2023, 37(10): 1844-7.
[8] Hao Li, Zheng Xin, Wang Peng, et al. Application of Feynman technique combined with mind mapping in clinical teaching of diabetes chronic complications nursing [J]. Chinese Journal of Nursing Education, 2023, 20(4): 451-6.
[9] Zhang Fan, Dai Meiling, Wang Chu. Application of flipped classroom based on mind mapping in higher vocational obstetrics and gynecology nursing teaching [J]. Chinese Journal of Nursing Education, 2022, 19(6): 527-30.
[10] Yang Yiping, Li Jin, Li Jing. Application value of individualized nursing guided by mind mapping in ICU critically ill patients [J]. Chinese Journal of Integrated Traditional and Western Medicine in Intensive and Critical Care, 2019, 26(4): 463-6.
[11] Huang Kun, Zhang Hailin. Application research of pre-internship training program for undergraduate nursing students based on OSCE model [J]. Journal of Nurses Training, 2023, 38(4): 350-3.
[12] Wei Shenyi, Li Jin, Lü Juan, et al. Development and application of a hierarchical training and management system for nurses [J]. Chinese Journal of Nursing Education, 2023, 20(6): 691-6.
[13] Deng Wenfang. Construction and practice of "theory-practice dual-drive and three-class linkage" teaching innovation system for critical care nursing [Z]. Journal of Nursing. 2024.
[14] Fan Na, Han Shifan, Yan Rui, et al. Design and implementation of comprehensive practical teaching mode for nursing graduate students based on core competencies of advanced practice nurses [J]. Chinese Nursing Research, 2024, 38(9): 1658-62.
[15] Xu Lanlan, Ke Li, Li Yan, et al. Design and practice of ideological and political teaching in online and offline blended "golden course" of fundamental nursing [J]. Journal of Nursing Science, 2024, 39(7): 77-80.
[16] Zhu Lina, Yao Aichun, Zhang Chencheng, et al. Application of 5G+ smart classroom based on BOPPPS model in clinical nursing teaching [J]. Journal of Nursing Science, 2024, 39(5): 14-7.
[17] Lin Yuanyuan, Fan Weiying, Chen Yuan, et al. Construction of a hierarchical training curriculum system for medical nursing assistants based on post competency [J]. Evidence-Based Nursing, 2023, 9(2): 271-8.
[18] He Xiaoli. Effect of information-based Benner theory competency level management combined with personalized training mode on core competency improvement of junior nursing staff [J]. Nursing Practice and Research, 2021, 18(11): 1715-7.
[19] ANDO K, ANDO A, TANAKA A, et al. Educational Effects of Simulation and Non-Simulation Training in Airway Management according to Levels of the Kirkpatrick Model: A Systematic Review and Network Meta-Analysis [J]. J Clin Med, 2022, 11(19).
[20] Li Hongyan, Chen Baoyun, Zhang Yuanhong, et al. Application of hierarchical training pathway for nurses based on competency advancement model [J]. Evidence-Based Nursing, 2023, 9(7): 1228-31.
[21] Yan Lanlan, Yin Min, Liang Xueping, et al. Construction of an evaluation

index system for online classroom teaching quality of undergraduate nursing [J]. Journal of Nursing Management, 2024, 24(2): 150-5.
[22] Liu Meiqi, Zhang Xuehui, Wang Wenjun, et al. Learning engagement and its influencing factors among undergraduate nursing students in online teaching [J]. Nursing Practice and Research, 2024, 21(2): 234-9.

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Note: Figure translations are in progress. See original paper for figures.