

Influence of Diversified Training and Fragmented Time Management on Post-Competence of Nurses in the Cardiology Department

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Abstract: *Objective:* To explore the influence of diversified training on the post-competence of nurses in the cardiology department under fragmented time management. *Methods:* The training data of 80 in-service nurses in the Cardiovascular Hospital of our hospital from January 2025 to December 2025 were analyzed retrospectively. From January 2025 to June 2025, 40 nurses who received the conventional single centralized teaching training method were used as the conventional training group, and from July to December 2025, 40 nurses who received diversified training under fragmented time management were used as the diversified training group. The annual theoretical and operational achievements, adverse events, and nurses' core competence of the two groups were compared. *Results:* The theoretical and operational achievements of the diversified training group were higher than those of the routine training group, and the difference was statistically significant ($p < 0.05$). The incidence of adverse events among nurses in the diversified training group was lower than that in the routine training group, and the difference was statistically significant ($p < 0.05$). The core competence of nurses in the diversified training group was higher than that in the routine training group, and the difference was statistically significant ($p < 0.05$). *Conclusion:* Diversified training methods under fragmented time management can improve nurses' specialized knowledge level and clinical comprehensive ability in the training of cardiology nurses, train nurses at all post levels who are more competent in cardiology, and provide high-quality nursing services for patients.

Keywords: Fragmentation time; Diversification training; Department of cardiology; Post competency

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1. Introduction

The National Nursing Development Plan (2016–2020) proposes to establish a nurse training system that is “demand-oriented, with post competency as the core” to improve the professional quality and service ability of nursing effectively^[1]. Competency refers to an individual's potential deep-seated characteristics, including

the sum of knowledge, skills, abilities, and characteristics ^[2]. Nursing post competency is the potential feature of nurses' excellent work and excellent performance ^[3]. Cardiovascular patients have complex and changeable diseases, high mortality and heavy first aid tasks, which require nurses to have solid professional knowledge, first aid ability, communication and coordination ability, and clinical critical thinking ^[4]. At present, the technical level of nurses in departments is uneven, and traditional centralized training often takes up rest time or night shift time, which makes nurses susceptible to fatigue and the training effect is not good ^[5]. In recent years, the development of information technology has promoted the concept of fragmented learning, and the management of scattered time has provided new ideas for clinical training. How to make full use of fragmented time and improve the competency of nurses in cardiology by diversified training methods has become an urgent problem to be solved ^[6,7]. The purpose of this study is to explore the influence of diversified training on the post-competence of nurses in the cardiology department under fragmented time management. The report is as follows.

2. Data and methods

2.1. General data collection

80 nurses working in the cardiovascular hospital of our hospital from January 2025 to December 2025 were included. In chronological order, 40 nurses working from January 2025 to June 2025 were divided into the regular training group, and 40 nurses working from July 2025 to December 2025 were divided into the diversified training group. There was no significant difference in the basic data of nurses between the two groups ($p > 0.05$), which was comparable.

2.1.1. Inclusion criteria

- (1) On-the-job nurses who have signed contracts;
- (2) Training compliance is good.

2.1.2. Exclusion criteria

- (1) Nursing managers;
- (2) Newly recruited nurses during the study period;
- (3) Poor compliance and non-compliance with relevant regulations;
- (4) Personnel changes during the study period.

2.2. Methods

2.2.1. Regular training group

According to the traditional regular training methods, the post-level training scheme is formulated, and centralized theoretical teaching training and on-site operation demonstration are conducted once a month according to the training plan, with an average training duration of 2.5 hours.

2.2.2. Diversified training group

On the basis of traditional regular training methods, we use fragmented time to conduct diversified training and learning feedback methods, such as morning learning, nail online classes, small knowledge groups on WeChat, scenario simulation emergency drills, three-level rounds, afternoon discussions, and follow-up

assessments.

(1) Morning study

10 minutes after the daily shift, the head nurse or the designated nurse will give a lecture on the core system, specialty process, emergency plan, and new knowledge of cardiology specialty. The training time is short, the nurses concentrate, the learning effect is good, and the eloquence and training ability of the lecturer nurses are also exercised. Other nurses who are not present on that day use the fragmented time to teach themselves.

(2) Nailing network course

Our hospital uses the online Nailing Network platform to teach the theory of training at various post levels synchronously/asynchronously ^[8]. The course can be viewed retrospectively and repeatedly. Nurses can study anytime and anywhere, free from the influence of night shift, rest, and working hours, with high flexibility, which promotes the enthusiasm of nurses for learning.

(3) WeChat group learning

The department has established a WeChat group for nurses' post-level training, which is managed by educational nurses and mainly includes the following aspects: (a) Nurses regularly issue notices and documents, and nurses learn the latest system and industry norms in real time; (b) Training tutors share clinical special cases and can use various forms of education such as voice, pictures, and videos. At the same time, it can answer the difficult questions of junior nurses at any time. (c) Nurses, specialist nurses, and education nurses regularly send new knowledge of the nursing frontier, and nurses learn new progress of specialist nursing at any time ^[9].

(4) Scenario simulation emergency drill

The department organizes a scenario simulation emergency drill every quarter, focusing on first aid skills and clinical key link process training. It mainly simulates acute myocardial infarction, hypertensive emergency, acute heart failure, and other critical diseases. The key links include the handling of accidents such as loss, suicide, and allergic reaction. The time is controlled in 10–20 minutes, and the most realistic scene and standardized process are displayed to achieve the purpose of nurses mastering the handling of clinical events.

(5) Three-level rounds

During the shift change every morning, it takes 20–30 minutes to organize nursing three-level rounds for high-risk patients to solve the problems in clinical nursing and train nurses in clinical thinking.

(6) Clinical follow-up assessment

The head nurse or nursing team leader randomly follows the nurse's clinical operation or health guidance during clinical working hours, and gives real-time evaluation and guidance. The follow-up examination can not only reflect the most real clinical operation state of nurses, but also achieve the purpose of examination and training, without delaying the rest and work of nurses and improving the clinical operation skills of nursing.

2.3. Evaluation indicators

2.3.1. Comparison of theoretical and operational assessment scores between the two groups of nurses

Scores of nurses in both groups were extracted from the nursing management system. The average scores of theoretical examinations and operational assessments of the two groups were compared under identical

assessment items, with a full score of 100 points for each test.

2.3.2. Comparison of the incidence of adverse nursing events between the two groups

Adverse events including falls/bed falls, inappropriate infusion rate, improper observation and management of patients' conditions in the two groups were analyzed and compared.

2.3.3. Comparison of core competencies between the two groups of nurses

The Competency Inventory for Registered Nurses (CIRN), adopted for evaluation in hierarchical on-the-job training, was used to assess nurses' core competencies. The CIRN consists of 58 items covering 7 dimensions with a 5-point scoring system; higher scores indicate stronger comprehensive competency. The overall Cronbach's α coefficient of the CIRN scale is 0.890^[10].

2.4. Statistical methods

Statistical analyses were performed using SPSS 21.0 statistical software. Independent-samples *t*-test and Chi-square (χ^2) test were adopted for intergroup comparisons. A *p* value less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of theoretical examination and operational assessment scores between the two groups of nurses

There was a statistically significant difference between the routine training group and the diversified training group, and the scores of the diversified training group were higher than those of the routine training group, as shown in **Table 1**.

Table 1. Comparison of theoretical and operational assessment scores between the two groups of nurses (Points)

Project	n	Theoretical achievement	Operational performance
Regular training group	40	88.52 ± 2.46	85.45 ± 2.65
Diversified training section	40	94.25 ± 2.03	90.24 ± 2.11
χ^2 value		11.36	8.94
<i>p</i>		< 0.001	< 0.001

3.2. Comparison of adverse events of nurses between the two groups

The difference between the conventional training group and the diversified training group was statistically significant, and the diversified training group was lower than the conventional training group, as shown in **Table 2**.

Table 2. Comparison of adverse events of nurses between the two groups (example)

Project	n	Fall/fall out of bed event	Improper infusion speed	Improper observation and treatment of illness
Regular training group	40	6	9	9
Diversified training section	40	1	1	2

χ^2 value	3.914	7.314	4.114
p	0.048	0.007	0.042

3.3. Comparison of nursing core competence between the two groups

The difference between the conventional training group and the diversified training group was statistically significant, and the diversified training group was better than the conventional training group, as shown in Table 3.

Table 3. Comparison of nursing core competence between two groups (score)

Project	Regular training group (40 people)	Diversity training group (40 people)	t value	p
Thinking and scientific research ability	29.63 ± 0.47	35.21 ± 6.42	5.48	0.000
Nursing ability	26.31 ± 1.26	32.26 ± 2.34	14.16	0.000
Leadership	27.63 ± 3.27	34.23 ± 4.22	7.82	0.000
Legal and ethical practical ability	28.33 ± 5.41	32.21 ± 3.42	3.83	0.000
Professional development ability	27.24 ± 3.57	31.19 ± 5.23	3.95	0.000
Interpersonal ability	26.43 ± 3.44	30.21 ± 6.52	3.24	0.000
Education and consulting ability	24.23 ± 2.17	27.21 ± 3.62	4.47	0.000

4. Discussion

4.1. Diversified training under fragmented time management can improve nurses' theoretical knowledge and practical ability in the cardiovascular specialty

The daily nursing work of cardiovascular medicine is busy, and nurses often have time conflicts between training, work, and social activities, which leads to the inability to participate in centralized training on time and the difficulty of in-depth study. Therefore, we must fully manage the fragmented time for training and learning^[11]. Diversified training methods are more easily accepted by nurses. Morning study, online classes, and three-level rounds are all combined with clinical work, which makes full use of time and improves nurses' participation in learning. The results of this study show that **Table 1** shows that the theoretical performance and operational performance of nurses in the diversified training group are better than those in the conventional training group, indicating that the diversified training mode based on the concept of fragmented time can help nurses improve their cardiovascular theoretical knowledge and operational practice skills. Based on the idea of fragmented time management, nurses in the cardiology department not only master the theoretical knowledge of nursing comprehensively and deeply, but also master the clinical skills skillfully. By organically combining theory with clinical practice, nurses can acquire more comprehensive and in-depth theoretical knowledge and master more clinical skills in emergency drills and other training processes, thus further improving the learning effect and achieving the effect of improving the theoretical examination and operational assessment results^[12].

4.2. Diversified training under fragmented time management can strengthen the specialized ability of nurses and reduce the occurrence of clinical adverse events

Cardiology nurses are prone to events such as untimely observation of illness and improper adjustment of drip rate if their specialized knowledge is not firm, their emergency ability is insufficient, and their

communication and cooperation are not smooth. Although traditional centralized teaching training can impart knowledge systematically, it is difficult for nurses to truly internalize theoretical knowledge into clinical practice ability. Diversified training methods such as scenario simulation and emergency drills can effectively improve nurses' clinical stress and observation ability. Studies have also confirmed that information training and scenario simulation teaching can quickly improve the ability of new nurses to observe the condition and adapt to the clinic, reduce the risk of adverse events, and ensure the safety of patients ^[13,14]. Fragmented training methods, such as morning study, three-level rounds, and clinical follow-up examination, integrate safety knowledge and standardized operation into daily work through intensive study with high frequency and short time, and continuously strengthen nurses' awareness of risk prevention. In addition, the nail net course can be reviewed and watched repeatedly, which reduces the time cost and psychological burden of nurses participating in the training, and enables nurses to take the initiative to use the fragmented time to complete the learning task; Small-scale interactive training, such as morning study and afternoon discussion, also makes nurses change from passive acceptance of knowledge to active participation and experience sharing, which enhances their learning enthusiasm and sense of accomplishment. The improvement of self-efficacy makes nurses more confident to identify risks, implement norms, and take the initiative to warn when facing complex clinical situations, thus preventing the occurrence of adverse events ^[15]. As can be seen from **Table 2**, the incidence of adverse events such as falling/falling out of bed, improper infusion speed, ill observation, and improper treatment of nurses in the diversified training group is significantly lower than that in the conventional training group, indicating that diversified training can effectively reduce the risk of adverse events in the clinical work of nurses in the cardiology department.

4.3. Diversified training based on fragmented time management can improve nurses' core comprehensive ability and post competence

At present, the mortality rate of cardiovascular disease ranks first among all kinds of diseases, and the prevention and control of cardiovascular disease has become a major public health problem. With the rapid development of cardiovascular disease diagnosis and treatment technology, various new technologies and new businesses have been applied to the clinic ^[16]. At present, new nurses need standardized training in the hospital, and the professional level of nursing is uneven. In order to make more rational use of nursing human resources and continuously improve the post competence of nurses at different levels, the training of nurses' core comprehensive ability has become the focus of nursing managers and nursing educators. Although some achievements have been made in the training of cardiovascular nurses in China, there are still many problems that seriously affect the training effect. The busy clinical work makes all kinds of training a mere formality, so exploring new training modes has attracted more and more attention. The results of this study show that, as can be seen from **Table 3**, the scores of nurses' core competence assessment scale in the diversified training group are higher than those in the conventional training group, which shows that diversified training based on fragmented time management can improve nurses' core comprehensive competence. By using diversified training methods, using the core system and process of morning learning, consolidating specialized knowledge by nailing online classes, enhancing first-aid ability by scenario simulation emergency drills, exercising clinical nursing thinking by three-level rounds, learning new progress and knowledge of nursing by WeChat, and evaluating continuous nursing quality improvement by follow-up, we can guide nurses to accumulate learning knowledge and improve their comprehensive ability of nursing core, so as to

meet the requirements of post competence and improve the nursing level of cardiology nurses.

5. Conclusion

To sum up, the diversified training mode under fragmented time management can effectively improve nurses' theoretical knowledge and operational skills, improve nurses' comprehensive core competence, enhance their post competence, and reduce the occurrence of adverse events. However, the training time of nurses in the two groups in this study is different, and there may be time-mixing bias, which can be further verified by prospective randomized controlled studies in the future.

Disclosure statement

The authors declare no conflict of interest.

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