Application and evaluation of improved surgical aseptic technique curriculum in specialty nurse training in Henan Province

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ABSTRACT

Objective: To develop and apply a novel surgical aseptic technique curriculum in specialty training for operating room (OR) nurses.

Methods: As surgical environments were improved, related specifications were revised. The proposed surgical aseptic procedure was discussed, improved, and recorded as procedure videos. In the new training program, traditional theoretical lecture training was replaced with sequential theoretical lessons and video demonstration, operation presentation, and skill competition. At the end of the training, the trainees were given questionnaires to assess training outcomes. Differences in student satisfaction regarding the proposed training program and conventional training programs were then compared.

Results: A GPA of 3.61 ± 0.58 was recorded after the new training program was implemented. The minimum and maximum average scores of each item were 3.05 ± 0.43 and 4.61 ± 0.33, respectively. The satisfaction rate of the trainees in 2013 was significantly higher than that in 2011 (t = 2.14, P = 0.039).

Conclusion: Novel surgical aseptic technique and application in the curriculum design of training for OR nurses should be developed to enhance their mastery of theoretical and practical skills and to modify their behaviors.

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Specialty nurse training programs with varied modes and methods have been implemented in several provinces in China since 2005 [1]. Health administrative departments, hospital managers, and nursing staff have facilitated the improvement of nursing training programs to innovate training modes, develop training curricula, and improve core capabilities and professional quality of nurses [2–4]. With a very large population, medical resources in Henan Province are insufficient and characterized by the lack of training opportunities and information delays in primary hospitals. Since OR nursing training programs began in Henan in 2008, numerous nurses have actively participated in such programs. For instance, 4600 nurses underwent training in August 2013.
In 2012, the Nursing Association of Henan Province and the Association of Operating Room Nurses organized a professional team to analyze and discuss the standardization and revision of a surgical aseptic technique curriculum in accordance with the revised reference standards and advancements in surgical techniques, instrumentation, and other elements in surgical environments. Training methods have been modified from purely theoretical lessons to a new method, which consists of theoretical lessons, video demonstration, operation presentation, and operation skill competition, to promote the revised surgical processes. Quantitative studies have revealed that the new training program yields results superior to those of previously implemented programs. The new training program is also highly anticipated by trainees every semester.

1. General information

The new OR specialized nurse training program organized by Operating Room Quality Control Center and Health Personnel Training Center of Henan Province is held annually. Trainees were registered nurses from 100 hospitals in 18 cities in Henan. The training curriculum covered 10 days of theoretical lessons and 20 days of clinical practice. Nurses who passed the final examination were issued specialist nurse certificates and given credits for further education. A questionnaire was distributed after each stage of training was completed to determine and assess the trainees’ feedback and satisfaction on the basis of 6 dimensions and 12 items.

2. Methods

2.1. Improvement of surgical aseptic technique curriculum

Protective asepsis describes the principles of good hygiene, sanitation, and typical aseptic techniques. New specifications, reference standards, and guidance are proposed, and surgical environments are developed rapidly. However, problems and questions regarding standard surgical aseptic procedures have yet to be resolved.

Four meetings were held. Specialists from ORs proposed improvements in aseptic procedures. The staff of sterilization and supply centers and hospital infection management departments also participated. The standardization of surgical aseptic technique curricula was difficult. Specialists further discussed each procedure in detail on the basis of comprehensive knowledge and analysis of hand hygiene standards for medical personnel, trial version of management standards for operation departments, trial guidelines for the prevention and control of surgical site infections, and management standards for sterilization and supply centers. Specialists also facilitated their discussion in accordance with scientific, rational, and practical principles. Several topics, including surgical scrubbing, gowning, and gloving; sterile field preparation, appropriate time and methods for unpacking sterilized items, assorted packing of aseptic supplies, and cooperation between OR and supply room personnel, were discussed.

2.2. Conceptual development of the training curriculum for specialized nursing training program

In the nurse training held in 2012, almost 58% of trainees reported unregulated and non-standard operation details encountered in clinical settings and an urgent desire for province-wide standardization of aseptic techniques. Approximately 70% of trainees considered the conventional training pattern as overwhelming and uninteresting. They also observed that the pattern disregarded personnel learning demands; therefore, conventional training can hardly motivate learners [4].

Surgical aseptic procedures were first included in the training curriculum in 2013. In this new curriculum, trainers facilitated the enhancement of trainees’ critical thinking and operational ability, problem solving skills related to aseptic techniques, and focus on addressing one issue in each training program.

2.3. Continuous improvement of different teaching techniques

In theoretical lessons, 4–8 trainees were arranged into one group for a 30 minute discussion. In one such discussion, sterile drapes, used on the operating table, were noticed to always be of excessive or insufficient length. This was attributed to a mismatch of instrument carriages and sterile drape sizes; therefore, dressings should be customized on the basis of the size of the instrument table. To prepare our training information platform for communication and feedback, we collected relevant information by group discussion before data, such as operation videos, courseware, and pictures, were sent to public email.

The operation skill competition was arranged 2 days after the curriculum was completed. Trainees were divided into 5 groups on the basis of their work places, and 2 members were chosen as competitors by 2 appointed group leaders in each group. The competition consisted of aseptic operation table preparation, surgical gown dressing, and sterile gloving. A panel of judges was composed of 5 experts. At the end of the competition, remarks were given to competitors by the judges and the audience. Awards and certificates were given to the winners.

3. Result assessment

Data were analyzed in SPSS 16.0. Statistical differences between groups were compared by performing a t-test for independent samples, and $\alpha = 0.05$ was set as the significance level.

3.1. Trainees’ comments on the revised aseptic technique curriculum

The trainees reacted on the basis of 6 dimensions and 12 items and scored each item in terms of Likert 5-point scale, where scores of 1–5 correspond to reactions from strongly disagree to totally agree. Cronbach’s $\alpha$ of the total scale was 0.76. The grade point average (GPA) of the reactions was 3.61 ± 0.58. The
Trainee satisfaction was assessed on the basis of practicability of training contents, rationality of curriculum arrangement, appropriateness of training form, and satisfaction on training process and scored using Likert 5-point scale, where scores vary from 1 to 5 corresponding to strongly disagree to totally agree. The satisfaction scores in 2013 were significantly higher than those in 2011 ($t = 2.14$, $P = 0.039$) (see Table 2).

### 4. Discussion

#### 4.1 Development of the training pattern and improvement of trainees' satisfaction

Video teaching and operation presentation can be used to provide visual aids and easily explain the topics. Skill competition and interactive learning sessions with experts also offer an interesting and relaxed environment for trainees to promote teaching, learning, and healthy competition [5,6]. Our survey revealed that training satisfaction in 2013 ($3.82 \pm 0.17$) was significantly higher ($t = 2.14$ and $P = 0.039$) than that in 2011 ($2.64 \pm 0.27$). The GPA of training in 2013 was $3.61 \pm 0.58$. Trainee satisfaction was higher, particularly regarding competition relevance and lecture. The aseptic technique curriculum also stimulates trainees’ enthusiasm for learning. This training pattern is promoted and implemented in other training courses, such as position placement, which has been applied successfully.

#### 4.2 Standard surgical aseptic procedure by using the training platform

Trainees from remote county hospitals and small hospitals are provided few opportunities to receive professional training and are equipped with limited knowledge on new reference standards. Therefore, they highly value training opportunities. We applied the training platform, implemented the new standard, revised our working process, promoted the standard operation, and improved working quality. The competitors, who exerted great effort and gained a great deal, were chosen in accordance with strict selection guidelines. Those who observed and emulated the competition also concentrated on the details, and some of them even recorded videos of their colleagues. In the monitoring survey conducted after the training was completed, certain primary hospitals highly value trainees who received awards in the competition and recognized their efforts upon their return to their hospitals. Approximately 70% of trainees can properly apply aseptic techniques to their work and corrected informal behaviors, which is a step toward the standardization of the aseptic operation process in Henan. This observation also showed that training programs can help solve relevant problems.

Discussing the improvement of the training curriculum for the aseptic technique operation process and design, we received much attention and support from leaders and experts in the Henan Health and Family Planning Commission, Nursing Association of Henan Province, and Association of Operating Room Nurses. However, we encountered many difficulties, problems, and drawbacks. We were satisfied that our training program was in accordance with the establishment of Operating Room Industry Standards by Chinese Nursing Association, which set Aseptic Technique as 1 of the 33 operation items in the operating room that must be unified and standardized. Aseptic Operation Nursing Practice Guidelines were the first topic to be completed [7–9]. This phenomenon may be used as a basis for further research. In future studies, training curricula will be developed and effective methods for intervention and behavior modification in professional operations will be established.

### Author contributions

Sheng-Yun Li and Bing Bai conceived the study, designed the trial and obtained research funding. Sheng-Yun Li supervised the conduct of the trial and data collection. Zeng-Mei Zhang...
and Bian-Yun Wang undertook recruitment of participating centers and patients and managed the data. Li-Qun Sun provided input on statistical analyses. Bing Bai drafted the manuscript and all authors contributed substantially to its revision.

REFERENCES