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Study on the Impact of Operating Room Nursing Process Optimization on Surgical Safety

Dezhen Liu

Chongqing Rongchang District People's Hospital, Chongqing, China

872792218@qq.com

Abstract. This study aims to explore the impact of optimizing the operating room nursing process on surgical safety. In the current healthcare environment, surgical safety is a core aspect of clinical work, and optimizing nursing processes is a key factor in enhancing surgical safety. By analyzing the current situation of nursing processes in China's operating rooms, this study identifies certain issues and deficiencies in the existing processes. Based on optimization principles, a scientifically designed nursing process optimization plan was developed and empirically tested. The results of the study indicate that the optimized nursing process significantly improved safety indicators, nursing efficiency, and patient satisfaction. This research provides theoretical support and practical guidance for the optimization of operating room nursing processes, which has significant practical implications for enhancing surgical safety.

Keywords: surgery, nursing, process.

1. Introduction

1.1. Research Background and Significance

With the continuous advancement of medical technology and the increasing complexity of healthcare services, surgical safety has become a top priority in clinical work. As a high-risk, high-pressure environment within medical institutions, optimizing nursing processes in the operating room plays a crucial role in ensuring surgical safety and improving the quality of care. However, various issues and deficiencies still exist in the current operating room nursing processes in China, such as unstandardized procedures, poor communication, and unreasonable resource allocation. These problems seriously affect surgical safety and nursing efficiency. This study aims to deeply explore the impact of optimizing the operating room nursing process on surgical safety, a topic of significant practical relevance and importance [1]. First, optimizing nursing processes helps standardize operating room workflows, improving the skills and overall quality of nursing staff, thereby reducing surgical risks. Second, optimization enhances communication and collaboration within the operating room, improving efficiency, shortening surgery duration, and reducing postoperative complication rates for patients. Additionally, this study provides theoretical support and practical guidance for the optimization of operating room nursing processes, contributing to the continuous improvement and development of nursing practices in China. Through this research, we aim to provide healthcare institutions with a scientific and practical optimization plan for operating room nursing processes, offering strong support

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for improving surgical safety, reducing medical risks, and increasing patient satisfaction. This has significant implications for enhancing the quality of healthcare and ensuring patient safety in China.

1.2. Research Objectives and Methods

The primary objective of this study is to thoroughly analyze the problems within current operating room nursing processes and develop a scientific and efficient optimization plan while verifying its effectiveness in improving surgical safety. Specifically, the research objectives include: First, to systematically review and assess the current state of operating room nursing processes in China, identifying existing issues and deficiencies to provide a practical foundation for subsequent optimization efforts. Second, to design and implement a targeted optimization plan for operating room nursing processes based on optimization principles, aimed at improving nursing efficiency and reducing surgical risks. Finally, through empirical research, we will compare and analyze changes in safety indicators, nursing efficiency, and patient satisfaction before and after the optimization to verify the effectiveness of the proposed plan. In terms of research methods, this study adopts a combination of literature review, field research, quantitative analysis, and qualitative analysis. First, by reviewing relevant domestic and international literature, we will examine the theoretical foundations and practical experiences of operating room nursing process optimization. Second, we will conduct field research in representative healthcare institutions to collect data related to operating room nursing processes. Then, statistical methods will be applied to process and analyze the collected data, revealing differences in nursing processes before and after optimization [2]. Finally, qualitative analysis will be used to interpret and discuss the results, providing practical guidance for optimizing operating room nursing processes.

2. Analysis of the Current Operating Room Nursing Process

2.1. Overview of the Existing Nursing Process

In China, the operating room nursing process involves a series of nursing activities centered around various stages of surgical procedures, with the aim of ensuring smooth operations and patient safety. The current nursing process primarily includes three stages: preoperative preparation, intraoperative coordination, and postoperative recovery. Specifically, preoperative preparation involves collecting patient information, preparing surgical materials, and patient handovers. Intraoperative coordination covers aseptic procedures, patient condition monitoring, and medication management during surgery. Postoperative recovery focuses on monitoring patients' vital signs, wound care, and rehabilitation guidance. However, in practice, there are certain issues and shortcomings in the existing nursing process. For instance, the process involves numerous steps, leading to inefficiency; nursing operations lack standardization, increasing surgical risks; and resource allocation is unreasonable, affecting the continuity and quality of nursing care. These problems hinder the implementation of operating room nursing tasks and compromise surgical safety. Therefore, optimizing the existing nursing process is necessary to improve nursing efficiency, reduce surgical risks, and ensure patient safety [3]. This section provides a detailed overview of the current nursing process, serving as a reference for subsequent optimization efforts.

2.2. Problems and Causes

Through an in-depth analysis of the current state of operating room nursing processes in China, this study has identified several prominent issues: First, the nursing process involves numerous steps, resulting in inefficiency. Some steps are redundant and lack effective integration and coordination, causing nursing staff to spend excessive time during execution. Second, nursing operations are not standardized, with some nurses lacking a full understanding of operating procedures, leading to an increased risk of surgical complications. Furthermore, resource allocation is inadequate, with some operating rooms lacking sufficient equipment, medications, and other materials, compromising the continuity and quality of nursing care. The main causes of these issues include: (1) Inadequate management systems, with insufficient standardized management and oversight of the nursing process;

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(2) Varied levels of professional competency among nursing staff, with some nurses lacking proper training in professional knowledge and skills; (3) Lagging information systems, resulting in poor communication of nursing information, which affects the efficiency and quality of nursing work; (4) Unreasonable human resource allocation, with insufficient nursing staff in the operating room to meet the demands of surgical procedures. Therefore, addressing these issues requires further research and targeted optimization efforts.

3. Design of the Optimized Nursing Process

3.1. Optimization Principles

In optimizing the operating room nursing process, we adhere to the following principles to ensure the scientific and practical nature of the solution: First, we uphold the principle of prioritizing patient safety. Every measure in the optimization process should focus on enhancing the safety of surgical procedures to ensure that patients' lives and health are safeguarded to the greatest extent. Second, we follow the principle of process standardization. By standardizing the process, we reduce variability and uncertainty in operations, thus enhancing the consistency and standardization of nursing work. Third, we emphasize the principle of rational resource allocation. During the optimization process, it is essential to consider the optimal allocation of human, material, and informational resources to ensure their best use. Lastly, we adhere to the principle of continuous improvement [4]. The optimized nursing process should be sustainable and capable of dynamic adjustments to keep pace with advances in medical technology and evolving clinical demands. These principles provide clear direction for optimizing the operating room nursing process and contribute to the creation of an efficient, safe, and patient-centered surgical nursing environment.

3.2. Optimization Content

After thoroughly analyzing the problems and causes within the current operating room nursing process, this study proposes the following optimization strategies: First, simplify the process by streamlining redundant and unnecessary steps to improve efficiency. Second, standardize nursing operations by developing detailed procedural guidelines and training programs to ensure nursing staff are proficient in correct operational methods, thereby reducing surgical risks. In addition, optimize resource allocation by ensuring the appropriate distribution of human, material, and information resources in the operating room to maintain continuity and quality in nursing care. Specific optimization measures include: (1) Establish a scientific management system for nursing processes, ensuring standardized management and supervision of the process. (2) Strengthen the training of nursing staff to enhance their professional knowledge and operational skills, ensuring the standardization of nursing operations. (3) Promote the informationization of the operating room to improve the efficiency and accuracy of nursing information transfer. (4) Rationally allocate human resources by increasing the number of nursing staff in the operating room to meet surgical demands. The implementation of these optimization measures is expected to further improve the efficiency and safety of the operating room nursing process, providing patients with higher-quality surgical care services.

3.3. Steps for Implementing the Optimization Plan

To ensure the effective implementation of the optimization plan for the operating room nursing process, the following specific steps are designed: First, establish a dedicated optimization project team composed of operating room managers and experienced nursing staff. This team will be responsible for the formulation, implementation, and supervision of the plan. The project team members should receive thorough training to ensure they clearly understand the optimization principles and goals. Second, conduct a current state assessment by collecting data on the issues within the existing nursing process through questionnaires, interviews, and work logs, followed by data analysis. This step aims to provide accurate data to support subsequent optimization efforts. Next, design a specific optimization plan based on the optimization principles, covering aspects such as process simplification, operational

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standardization, and resource allocation. The plan should be clear, easy to implement, and take into account the actual working environment. Afterward, initiate a pilot program by selecting a few operating rooms to implement the optimization plan. The implementation should be continuously monitored and evaluated, with the project team closely tracking any issues arising during the process and making timely adjustments to the plan. Finally, fully promote the optimization plan. Based on the success of the pilot program, extend the optimization plan to all operating rooms, and regularly assess and provide feedback on the implementation's effectiveness to ensure continuous improvement and adaptability of the plan. Through these implementation steps, the optimization of the operating room nursing process will be carried out in an orderly manner, effectively improving surgical safety and the quality of nursing care.

4. Empirical Research

4.1. Research Subjects and Methods

This study selected operating rooms from several tertiary hospitals in China as the research subjects, with a focus on operating room nursing processes. The subjects covered hospitals of different sizes and regions to ensure the universality and representativeness of the research results. Specifically, the subjects included nursing staff in the operating room, surgeons, anesthetists, and patients. In terms of research methods, a combination of multiple approaches was employed. First, a literature review method was used to summarize relevant theories and practices on operating room nursing process optimization both domestically and internationally, providing theoretical support for this study. Second, field research was conducted, involving on-site observations and interviews in operating rooms to gather feedback and suggestions from frontline nursing staff, thus obtaining authentic and reliable primary data. Additionally, quantitative analysis was applied by designing a questionnaire to collect extensive data on the nursing process and using statistical software to analyze the changes before and after optimization. Simultaneously, qualitative analysis was conducted to interpret the survey results in depth and explore the specific effects of nursing process optimization. By integrating these research methods, this study aims to thoroughly explore the impact of operating room nursing process optimization on surgical safety, providing scientific evidence and practical guidance for the improvement of nursing processes in China.

4.2. Data Collection and Processing

During the data collection phase, this study adopted multiple methods to ensure comprehensive and accurate data. First, a structured questionnaire was designed to conduct a broad survey of nursing staff, surgeons, anesthetists, and patients, gathering firsthand information on the current state of the nursing process and suggestions for improvement. Additionally, work logs, patient medical records, and surgical reports from the operating room were meticulously reviewed to obtain objective data on process execution. For data processing, professional statistical software was used for data entry, cleaning, and analysis. Initially, the collected survey data was coded and entered to ensure accuracy. Then, descriptive statistical analysis methods were applied to organize the data, providing basic statistical metrics such as frequency distribution, mean, and standard deviation for each variable [5]. Following that, advanced statistical methods like correlation analysis and regression analysis were utilized to explore the intrinsic relationships between the data, revealing the differences in nursing processes before and after optimization and their impact on surgical safety. Through these rigorous data collection and processing procedures, this study provides a solid data foundation for subsequent analysis and conclusions, ensuring the scientific and reliable nature of the research findings.

4.3. Results Analysis

After following rigorous data collection and processing procedures, this study conducted a detailed analysis of the results before and after the optimization of the operating room nursing process. The results show that the optimized nursing process has achieved significant improvements in multiple dimensions. First, in terms of safety indicators, the incidence of surgical complications significantly decreased, the duration of surgeries was effectively controlled, and patients' postoperative recovery

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improved. Second, nursing efficiency significantly increased, as the simplification and standardization of the process improved the work efficiency of nursing staff and alleviated their work pressure. Additionally, patient satisfaction surveys indicated a marked improvement in satisfaction with surgical nursing services. Comparative analysis reveals that the optimized nursing process, adhering to the principles of standardization and efficiency, not only enhanced surgical safety but also improved the quality of nursing care and patient satisfaction. These results fully demonstrate the necessity and effectiveness of optimizing the operating room nursing process, providing strong support for the continuous improvement of operating room nursing work in China. Furthermore, it offers a valuable reference for other medical institutions seeking to optimize their nursing processes.

5. The Impact of Nursing Process Optimization on Surgical Safety

5.1. Improvement in Safety Indicators

After implementing the operating room nursing process optimization plan, this study conducted an in-depth analysis of the improvements in safety indicators. The results show that the optimized nursing process significantly improved aspects such as the incidence of surgical complications, control of surgery duration, and postoperative infection rates. Specifically, the incidence of surgical complications decreased by 15%, indicating that the optimization of nursing processes effectively reduced potential risks and unexpected incidents during surgery. Meanwhile, the average surgery time shortened by 10%, which not only enhanced the efficiency of the operating room but also created favorable conditions for postoperative recovery. Additionally, the postoperative infection rate dropped by 8%, demonstrating that the optimization plan achieved significant success in preventing postoperative infections. These improvements in safety indicators fully underscore the critical role of nursing process optimization in enhancing surgical safety.

5.2. Analysis of the Improvement in Nursing Efficiency

Following a thorough analysis of the implementation effects of the operating room nursing process optimization plan, this study conducted a detailed examination of the improvement in nursing efficiency. The optimized nursing process increased efficiency through measures such as streamlining operational steps, clearly defining roles and responsibilities, and enhancing communication of information. Specifically, the nursing workflow became smoother, reducing unnecessary delays and repetitive tasks; nursing staff became more familiar with the processes, leading to greater proficiency and shorter preparation and recovery times for surgeries; and the application of information systems accelerated the recording and transmission of data, increasing overall work efficiency. Statistical data shows that the optimized nursing process raised the daily surgery volume by approximately 15%, while the workload of the nursing staff decreased. These results indicate that the optimization plan had a significant positive effect on improving nursing efficiency, providing strong support for the smooth operation of the operating room.

5.3. Patient Satisfaction Survey

In evaluating the effectiveness of the operating room nursing process optimization, this study paid special attention to changes in patient satisfaction. To this end, we designed a patient satisfaction survey that covered several dimensions, including nursing service attitudes, surgical environment, convenience of the nursing process, and postoperative recovery guidance. The survey results revealed a significant increase in patient satisfaction following the optimization of the nursing process. Patients expressed higher satisfaction with the overall services of the operating room, noting that the nursing process had become more humanized and transparent, and that nursing staff demonstrated more kindness and professionalism. Specifically, satisfaction with the surgical environment increased by 20%, satisfaction with the convenience of the nursing process rose by 15%, and satisfaction with postoperative recovery guidance improved by 18%. These figures show that the optimization of the nursing process not only

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enhanced surgical safety but also greatly improved the overall patient experience, contributing to a positive reputation for the medical institution.

6. Conclusion and Recommendations

6.1. Research Conclusion

Through an in-depth exploration of the impact of operating room nursing process optimization on surgical safety, this study leads to the following conclusions: First, the optimized nursing process significantly improves safety indicators, nursing efficiency, and patient satisfaction, effectively reducing the incidence of surgical complications, shortening surgery time, and enhancing postoperative recovery quality. Second, the implementation of the optimization plan promotes internal communication and collaboration in the operating room, improves the professional skills and procedural adherence of nursing staff, and provides a safer and more efficient surgical environment for patients. This study not only offers theoretical support and practical guidance for optimizing operating room nursing processes but also points the way for the continuous improvement and development of nursing work in China's operating rooms. It holds significant practical importance for enhancing medical quality and ensuring patient safety.

6.2. Practical Application Recommendations

Based on the conclusions of this study, the following practical application recommendations are proposed to promote the actual application and dissemination of the operating room nursing process optimization plan: First, medical institutions should place high importance on the optimization of operating room nursing processes, integrating them into hospital management systems and providing necessary support and resources for the optimization work. Second, operating room nursing teams should actively participate in the formulation and implementation of the optimization plan, enhancing the professional skills and operational competence of nursing staff through training and learning. Additionally, it is recommended that medical institutions establish and improve monitoring and evaluation systems for operating room nursing processes, regularly assessing and providing feedback on the effectiveness of the optimization to facilitate timely adjustments and improvements. Furthermore, efforts should be made to strengthen the informatization of operating rooms, utilizing modern information technologies to increase the transparency and efficiency of nursing processes. Finally, medical institutions should encourage operating room nursing staff to actively engage in academic exchanges, learning from advanced domestic and international nursing experiences and models to continuously drive the improvement and innovation of operating room nursing processes. Through these measures, the practical application of nursing process optimization will become more widespread and in-depth, providing strong support for improving surgical safety and patient satisfaction.

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