WHIOCE PUBLISHING PTE. LTD.
PROVIDING
FIRST-CLASS SCIENTIFIC INFORMATION
FOR TOP SCHOLARS

2026 Volume 11, Issue 1
Journal of Medicines Development Sciences
ISSN: 2382-6371(Online) ISSN: 2382-6363(Print)

The Impact of Double-checking and Labeling Management in the Decontamination Process in the Endoscopy Center on the Decontamination Defect Rate

Meng Shi*
Endoscopy Center, Nanjing Jiangning Hospital of Traditional Chinese Medicine, Nanjing 211100, Jiangsu, China

**Author to whom correspondence should be addressed.*

*A***bstract:** *Objective:* To analyze the impact of double-checking and labeling management on the decontamination defect rate in the decontamination process of the endoscopy center. *Methods:* In our hospital from June 2023 to January 2024, 100 records of decontamination sessions in the endoscopy center were selected as the control group, and in our hospital from June 2024 to January 2025, 100 records of the decontamination sessions in the endoscopy center were selected as the research group. The control group did not carry out double verification and identification management, and the research group carried out double verification and identification management, and compared the two sets of data. *Results:* Compared with the control group, the decontamination defect rate of the study group was significantly lower. The pass rate in various aspects, such as cleaning thoroughness, disinfection parameter compliance, drying effect, and instrument integrity, was significantly higher, and the incidence of hospital infection among patients was significantly lower, $P < 0.05$. *Conclusion:* The effect of double-checking and labeling management in the decontamination process of the endoscopy center is ideal, especially since the decontamination defect rate is significantly reduced, which is worthy of clinical use and promotion.

Keywords: Endoscopy center; Decontamination link; Double check; Labeled management; Decontamination defect rate

Online publication: March 16, 2026

1. Introduction

Endoscopy is an important minimally invasive technology in the clinical diagnosis and treatment of diseases of the digestive and respiratory system. It has obvious advantages, mainly intuitive, accurate, and less invasive. However, due to the complex structure and narrow lumen of the endoscope, if it is not thoroughly cleaned after use, residual organic matter and microorganisms will cause hospital infections in patients, posing a serious threat to the patient's life and health [1]. In recent years, the core focus of medical quality and safety management has included hospital infection prevention and control, and great importance is attached to it. The key weak link is the quality control of endoscope decontamination. At present, clinical endoscope decontamination generally relies on single-person operation and subjective judgment, which is

prone to operational negligence, parameter deviations, process omissions, etc., and there is a high risk of decontamination defects, such as incomplete cleaning, substandard disinfection time or temperature, insufficient drying, missing instrument parts, etc. [2], which will affect the service life of endoscopes and make patients more susceptible to hospital infections. Based on this, clinical and scientific and efficient decontamination management models should be explored to significantly reduce the decontamination defect rate and significantly improve decontamination quality. Double-checking of clinical research, with mutual inspection by two people, will form a supervision and control mechanism, and human errors of single-person operations will be significantly reduced. The labeled management of clinical research can trace the entire process of decontamination links, and clarify the responsible parties for each link [3]. This article selects 200 records of the decontamination process in the endoscopy center for data research, and analyzes the impact of double-checking and labeling management on the decontamination defect rate in the decontamination process of the endoscopy center.

2. Materials and methods

2.1. Information

In our hospital from June 2023 to January 2024, 100 records of decontamination sessions in the endoscopy center were selected as the control group, and in our hospital from June 2024 to January 2025, 100 records of the decontamination sessions in the endoscopy center were selected as the research group. The research group involved 100 patients, 52/48 male and female, aged 25–79 (51.01 ± 6.32) years old, and the control group involved 100 patients, 55/45 male and female, aged 22–78 (51.08 ± 6.34) years old. Comparing the two sets of data, $P > 0.05$ was obtained.

2.2. Method

The control group did not carry out double-checking and labeling management. The management was completed in accordance with the "Technical Specifications for Cleaning and Disinfection of Flexible Endoscopes". The decontamination personnel completed all operations alone, including endoscope recovery, side leakage, pretreatment, cleaning, disinfection, drying, storage, etc. After disinfection, a single-person check was completed, and the decontamination information was recorded and archived in handwriting.

The research team carried out double-checking and labeling management, specifically:

(1) Establishing a management team: the team leader is the head nurse, and the quality controllers are two supervisory nurses. A double-checking process is required, labeling specifications and training plans are also formulated, quality inspections are carried out regularly, and data analysis is done well.

(2) Two-person verification system:

(a) Recycling pretreatment side leakage link: Two people will jointly check the endoscope model, quantity, and appearance integrity (whether there is breakage or bend damage). The department and patient information will be recorded to confirm whether the pretreatment is timely (within 1 hour after use) and effective (enzyme solution soaking, flushing the lumen), and signed by both parties.

(b) Cleaning link: Two people collaborate, combining machine cleaning and manual cleaning. After cleaning, jointly check the patency of the endoscope lumen and the presence of residual organic matter on the surface, and check whether the cleaning time meets the requirements (manual cleaning should be 3 minutes or more, machine cleaning should be 5 minutes or more). After the cleaning is correct, confirm the signature

(c) Disinfection process: Two people will check the parameters of the disinfection machine (temperature, time, disinfectant concentration) to ensure that they are in compliance with the corresponding endoscope disinfection standards (high-level disinfection temperature of 55°C and above, time of 10 minutes and above). After the disinfection is completed, the presence of residual water stains after disinfection of the endoscope will be jointly disinfected and signed for confirmation.

(d) Drying and storage: Two people will check the drying effect of the endoscope (no water droplets in the lumen,

no moisture on the surface), check whether the storage environment meets the standards (temperature 18–22 ℃, humidity 40%–60%), ensure that the endoscope is hung according to specifications, and there is no pressure or distortion. Sign and file.

(3) Identification management:

(a) Endoscope identification: Each endoscope has a unique QR code identification, indicating basic information, including endoscope model, serial number, purchase date, maintenance records, etc. After completing each decontamination link, the corresponding link identification will be pasted, indicating the operation time and the name of the operator

(b) Decontamination record identification: Combining electronic ledgers and paper records, each decontamination record has a unique traceability code. Scan the code to query information such as double verification records, operating parameters of each link, quality inspection results, etc., throughout the process.

(4) Training and assessment: Organize decontamination personnel to participate in training, which involves double-checking procedures, labeling specifications, and infection prevention and control knowledge, and then carry out theoretical examinations (0–100 points, qualified points are 80–100 points) and operational assessments (0–100 points, qualified points are 85–100 points). Those who pass the assessment are allowed to work, and retraining is conducted once a month.

(5) Quarterly endoscopic microbiology monitoring: Before sampling, be equipped with a 50mL sterile syringe, special sterile sampling solution containing the corresponding neutralizing agent, sterile containers, gloves, masks, etc. During the sampling period, use a sterile syringe to absorb more than 50 mL of neutralizing agent-containing sampling fluid from the inner pipeline, inject it from the biopsy/suction valve, and use a sterile container to collect all the outflow fluid at the front end of the lens; use a special swab soaked in sampling fluid to repeatedly smear the outer surface of the lens body, the operating part, the opening of the biopsy hole, etc., cut the swab head, and put it into the sampling fluid. Every quarter, all endoscopes in use are fully covered and sent to the laboratory for microbial culture and colony counting. The monitoring results are included in the decontamination quality assessment.

2.3. Observation indicators

(1) Compare the decontamination defect rates of the control group and the study group.

(2) Compare the passing rates of cleaning thoroughness, disinfection parameter compliance, drying effect, instrument integrity and other aspects of the control group and the research group.

(3) Compare the incidence of nosocomial infection among patients in the control group and study group.

2.4. Statistical analysis

Use SPSS 28.0 software, use mean ± standard deviation (SD) to describe measurement data, t test; use rate (%) to describe count data, χ^2 test, $P < 0.05$, statistically significant.

3. Results

Compared with the control group, the decontamination defect rate in the study group was significantly lower. The pass rate in various aspects, such as cleaning thoroughness, disinfection parameter compliance, drying effect, and instrument integrity, was significantly higher, and the incidence of nosocomial infection among patients was significantly lower, $P < 0.05$.

Table 1. Comparison of the decontamination defect rate (%) of the control group and the study group

Group	Decontamination defect rate
Research group (n = 100)	1 (1.00)
Control group (n = 100)	7 (7.00)
χ^2	4.6875
P	< 0.05

Table 2. Comparison of the passing rate (%) of cleaning thoroughness, disinfection parameter compliance, drying effect, instrument integrity, etc. between the control group and the study group

Group	Recycling pre-treatment	Clean	Disinfect	Dry	Save
Research group (n = 100)	98 (98.00)	99 (99.00)	98 (98.00)	97 (97.00)	99 (99.00)
Control group (n = 100)	91 (91.00)	90 (90.00)	91 (91.00)	90 (90.00)	93 (93.00)
χ^2	4.7138	7.7922	4.7138	4.0313	4.6875
P	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Table 3. Comparison of the incidence of nosocomial infection among patients in the control group and study group (%)

Group	Incidence of nosocomial infection among patients
Research group (n = 100)	1 (1.00)
Control group (n = 100)	7 (7.00)
χ^2	4.6875
P	< 0.05

4. Discussion

As a core method for clinical diagnosis and treatment of multi-system diseases, endoscopic technology is widely used in clinical practice. However, its complex structure and narrow lumen will affect the quality of decontamination. As clinical medical quality requirements continue to improve, clinical attention is increasingly focused on how to improve the quality of endoscope decontamination through management model innovation, which has significantly reduced the decontamination defect rate and the risk of hospital infection [4]. This article studies it and verifies the practical value of the innovative management model (double check plus labeled management).

The research results of this article show that the research group carried out double-checking and labeling management, and the decontamination defect rate was 1.00%, which was much lower than the 7.00% of the control group. The pass rate in recovery pretreatment, side leakage, cleaning, disinfection, drying, storage and other links was significantly higher than that of the control group. The incidence of hospital infections in patients was significantly reduced. The reason for the analysis results is due to the synergy of multiple management mechanisms.

First, in the traditional single-person decontamination mode, operators failed to effectively supervise their operating behaviors, and it was difficult to detect problems such as subjective judgment deviations and operational negligence in a timely manner. However, a double-checking system was implemented to build a closed-loop process. The specific steps are double-person collaboration, verification, and signature confirmation [5], which can fundamentally make up for the shortcomings of the traditional single-person decontamination mode. In the recycling pre-treatment process, two people

jointly check the endoscope model, appearance integrity and pre-treatment effect to avoid problems such as information recording errors and untimely pre-processing in single-person operations. In the cleaning process, not only do two people collaborate, but also objectively test the cleaning monitoring test paper, which can ensure that the cleaning time and cleanliness meet the standards, and organic residues are significantly reduced. In the disinfection process, two people check key parameters such as temperature, time, and disinfectant concentration [6]. This can effectively avoid the risk of incorrect parameter settings or equipment operation abnormalities that are not discovered in time, and effectively guarantee the high-level disinfection effect. Two people check the drying and storage links, which can effectively eliminate hidden dangers such as insufficient endoscope drying and a substandard storage environment. The research results of this article can fully prove that the use of a dual supervision mechanism can improve the accuracy of operations, strengthen the operator's sense of responsibility, and promote more standardized and rigorous operations, because decontamination defects caused by human errors will be significantly reduced.

Second, the application of identification management can trace the entire process to ensure decontamination quality control, and completely solve the problems of unclear responsibilities and difficult traceability in the traditional management model. Each endoscope has a unique QR code identification, which integrates basic equipment information and maintenance records. Operators can quickly grasp the historical status of the endoscope. Each link has a corresponding color mark [7], which can visually present the progress of endoscope decontamination and avoid process omissions or confusion. For example, a yellow mark indicates that the recycling preprocessing is completed, while a green mark indicates that the cleaning is qualified. This management model has a visualization feature that can make the decontamination process clearer and more controllable. At the same time, electronic ledgers and paper records can be combined to identify endoscope decontamination records, and unique traceability codes can be used to associate all key information, such as double-check records, operating parameters, and quality inspection results. In the event of decontamination quality problems, specific operators and operating links can be quickly traced, with clear responsibilities. The research results of this article can fully confirm that the use of full-process traceability can ensure ideal quality inspection results, use clarification of responsibilities to encourage operators to strictly abide by operating specifications [8], and significantly improve the decontamination quality compliance rate of each link.

Third, improving the management system and continuing to carry out training and assessment can provide reference and support for the effective implementation of double-checking and labeling management. The research team builds a team, with the head nurse taking the lead and the nurse in charge serving as the quality controller. Using this management team, we can formulate standardized operating procedures and labeling specifications, conduct regular quality inspections and data analysis, identify problems in the management process in a timely manner, and then make targeted optimizations to form and implement a standard formulation-implementation-supervision-continuous improvement mechanism. At the same time, special training and assessment for decontamination personnel are carried out to help decontamination personnel master double-check procedures, labeling specifications, infection prevention and control knowledge, etc., and theoretical examinations and operational assessments are used to test and ensure that each operator can master the skills and knowledge proficiently [9]. Retraining is conducted once a month, which can significantly improve the operational standardization of decontamination personnel, and ultimately significantly improve the professional capabilities and risk prevention and control awareness of decontamination personnel, achieving ideal decontamination quality.

Fourth, applying and promoting the double-check plus identification management model can significantly improve the decontamination team's collaboration capabilities and optimize the work process. During the double-check, the operators communicate closely and cooperate with each other to supervise each other, and the work efficiency is significantly improved [10]. The application of identification management can smoothly connect all decontamination links, avoid process interruption or confusion, and significantly improve the orderliness of the overall work. At the same time, the management team uses regular data analysis, quality inspections, and quarterly endoscopic microbiology monitoring, and combined with monitoring results, can accurately identify and optimize weak links in the decontamination process, improve the management model, and continuously improve decontamination quality.

5. Conclusion

In summary, the results of double-checking and labeling management in the decontamination process of the endoscopy center are ideal, and the decontamination defect rate is significantly lower. In terms of cleaning thoroughness, disinfection parameter compliance, drying effect, instrument integrity, etc., the pass rate is significantly increased, and the incidence of nosocomial infection in patients is significantly reduced. It is worthy of clinical use and promotion.

Disclosure statement

The author declares no conflict of interest.

References

[1] Zhen J, Chen LJ, Liu HX, et al., 2025, Survey on the Use and Management Status of Automatic Endoscope Cleaning and Disinfection Machines in 292 Medical Institutions. Chinese Journal of Infection Control, 24(09): 1278–1285.

[2] Xu Z, Zhou XJ, 2025, Analysis of the Application Effect of FOCUS-PDCA Cycle Management Model in Hospital Endoscope Cleaning and Disinfection. Chinese Public Health Management, 41(03): 459–462.

[3] Liu Q, Sun QN, Zhang L, et al., 2025, The Application Effect of Multi-dimensional Collaborative Management in the Perioperative Period of Patients with Lumbar Disc Herniation Who Underwent Percutaneous Endoscopic Interlaminar Nucleectomy. Chinese Community Physicians, 41(26): 79–81.

[4] Li XH, Shen Y, Chen J, et al., 2025, Current Status of Hospital Infection Management with Flexible Endoscopes and Research Progress on Endoscopic Sterilization Methods. Chinese Journal of Pathogen Biology, 20(09): 1246–1249.

[5] Ni JF, Cui JL, Yang M, et al., 2025, Application Effect of Information Traceability System Combined with Device Mapping Technology in Regenerative Rigid Endoscopic Devices. Journal of Bengbu Medical University, 50(09): 1320–1324.

[6] Wang YJ, Wang HH, 2025, Application Effect of Hierarchical Management Model in Nursing Management of Gastroenterology Endoscopy Room. China Health Industry, 22(16): 137–140.

[7] Li JL, Wang F, Zheng YR, 2025, Effect of Position Positioning Management Applied by Nursing Staff in Digestive Endoscopy Center. China Health Industry, 22(16): 164–166 + 170.

[8] Chen X, 2025, Application of Full-Process Quality Traceability Management Methods in Digestive Endoscope Cleaning and Disinfection Management. China Health Industry, 22(16): 71–75.

[9] Han J, Qi LH, Yang CY, et al., 2025, Analysis of the Application Effect of Detail Management in Centralized Management of Rigid Endoscopic Instruments. Qinghai Medical Journal, 55(08): 17–19.

[10] Wang H, Duan MQ, Wang JP, et al., 2025, Impact of Information Traceability Management on the Quality of Cleaning, Disinfection and Sterilization of Flexible Endoscopes and Air Pollution Protection in the Disinfection Supply Center. Journal of Environment and Health, 42(07): 654–657.