

# Study on Innovation Mode of Medical Waste Classification Management

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**ABSTRACT. Objectives:** To solve the problems of unclear classification, unsound policies and regulations, and irregular processing procedures for hospital medical waste classification management, a new classification management innovation model was explored to improve the quality of medical waste classification management. **Methods:** Innovative model of new medical waste classification management PDCA cycle mode was adopted. Four phases of PDCA were implemented which is planning, implementation, inspection, and processing. Among planning, collecting data, identifying problems, analyzing causes, and specifying measures were related. **Results:** Before and after the implementation of the PDCA cycle model, the medical waste classification management knowledge examination pass rate increased from 75% to 100%, and the qualified rate of medical waste classification and disposal increased from 70% to 96%. **Conclusions:** The application of PDCA cycle mode for medical waste classification management can enhance the awareness of medical personnel on medical waste and improve the quality of medical waste classification management, which is of great value.

**Keywords:** *Management Innovation Mode; Medical Waste Classification*

## 1. Introduction

Medical waste<sup>[1-2]</sup> refers to wastes directly or indirectly infectious, toxic and other harmful to health care which was produced in prevention, health care and other

related activities of medical institution. In recent years, with the expansion of urban areas and the expansion of urban population and the acceleration of urbanization, the medical waste has also increased rapidly. The survey<sup>[3]</sup> found that the amount of medical waste generated in Beijing was 7.503 t/day; that in Shenzhen was 10 t/day, and that in Taiyuan was 4.4 t/day.

Medical waste usually carries a large number of pathogenic microorganisms, which are characterized by high risk, high pollution and high pathogenicity. It is listed as the number one hazardous waste by China's National Hazardous Waste List<sup>[4-5]</sup>. The World Health Organization describes it as a waste containing living microorganisms or toxins known or suspected to cause human or animal diseases<sup>[6]</sup>, which is regarded internationally as a "health killer" and "the number one source of disease". It can harm human health in many ways. How to dispose of medical waste scientifically, efficiently, and environmentally, and to form a unified operational form of medical waste management standards has become particularly important. At the same time, the scientific management of medical waste is an important issue in the management of health care, and it is worthy of in-depth study on the reduction of medical waste sources, scientific management, and harmless treatment.

## 2. Review

Although China attaches great importance to the management of medical waste, there are still some problems<sup>[7-8]</sup>, such as the classification of medical waste management is not clear, The processing flow is not standardized and Policies and regulations are not sound .

To solve the problems in the classification management of medical waste, PDCA<sup>[9-11]</sup>(plan, do, check and action ) is adopt for classification management mode innovation. Observe the results of the practice in the middle half of the surgery department of a hospital from January 2017 after adopting the PDCA cycle management model.

## 3. Method

Planning stage: (1) Establish an operating room medical waste control group. The medical waste material control team of the operating room consists of the head

of the hospital, the head of the operating room, the quality control staff of the operating room, and the director of the anesthesiology department. The quality control team members urged the department staff to seriously implement the medical waste management system, the medical waste classification catalogue and the medical waste treatment process. And the medical waste related knowledge assessment according to the standard. (2) Collecting data. The current status of classified management of medical waste in the operating room from July to December 2016 was collected. It is found that there are some problems in the classification management of medical waste: the syringe and the needle are not separated directly in the syringe, the mask and the hat are thrown in the black bag, the glass ampoule is thrown in the gauze barrel, and the waste specifically infected with the operation is only collected in a single layer of yellow waste bag. The sharp box is not covered when it is used. The outer packaging of medical sterile articles is mixed into a yellow garbage bag. (3) Analysis of the reasons. The operating room staff did not have any knowledge of the classification of medical waste, and did not pay much attention to the medical waste management system and medical waste management regulations; there was insufficient understanding of the social hazards caused by medical waste<sup>[12-13]</sup>; especially the medical staff of anesthesiology and surgeons on medical waste. The hazard awareness is not deep enough; the medical waste related systems and classification rules have not been put in place. (4) Formulate classification and treatment measures for medical waste. According to the Medical Waste Catalogue, medical waste is classified into five categories<sup>[14]</sup>: infectious, pathological, injurious, medicinal and chemical. The medical waste generated by the surgical department is mainly infectious medical waste (the items contaminated by the patient's blood, body fluids, and excreta, including: cotton balls, cotton swabs, draining slivers, gauze and other various dressings, disposable hygiene products, disposable Use of medical supplies and disposable medical devices), pathological medical waste (disused human tissues, organs, etc. generated during surgery) and injurious medical waste (medical needles, suture needles, various medical sharps including: scalpels) , scalpels, preparation of skin knives) three categories. Infectious medical waste should be placed in a yellow garbage bag; pathological medical waste and specific infectious medical waste should be placed in a double-layer yellow garbage bag; the damaged medical waste should be placed in a stab-resistant and non-leakable weapon box.

Implementation stage: (1) Strengthen the training of medical waste classification management knowledge. The medical staff of the medical department organized training for the medical staff and the cleaners<sup>[15]</sup>. The operating room regularly asked questions about the classification management of medical waste at the conferences and morning meetings, so that the awareness rate was 100%. (2) Implement the operating room medical waste management system. They are classified and collected according to the type of medical waste<sup>[16]</sup>. The medical wastes collected by the classification are placed in medical waste packaging containers with obvious warning signs and Chinese warning instructions. Before loading medical waste, the packaging and containers should be carefully inspected to ensure that there are no damage, leakage and other defects. The operating room workers promptly recover the medical waste generated in each operation room in a timely manner, and fasten the bag in a fixed waste storage place. Infecting patients, special infected patients, medical expenses generated by acute patients, roving nurses promptly notify the operating room workers, use double-layer bags to minimize their storage time in the operating room, pay attention to personal protection during the recycling process, and The hospital waste recycling personnel will make a good handover. The department should register internal medical waste. Medical waste should not be stored in the operating room for more than 24 hours. After the hospital cleaning staff transports the waste every day, the delivery tools are cleaned and disinfected. (3) Execute the operating room medical waste treatment process<sup>[17-18]</sup>. Operating room medical waste→Operator classification and collection→Classification and color separation into special packaging bags or containers (yellow bagged medical garbage, black bagged domestic garbage, sharp weapon put into special weapon box)→medical waste temporary storage place→daily timing and Collect personnel to make the handover and make a waste transfer record.

Inspection stage: (1) inspection and assessment. The members of the operating room medical waste control group in the operating room conduct regular inspections and check them regularly once a week. The head of the operating room and the director of the anesthesiology department conduct monthly inspections, link the results of the examination with the performance appraisal of the department staff, organize discussion and analysis at the general meeting, and propose improvement measures to urge the rectification to be in place. The Hospital Infection Management Section<sup>[19]</sup> conducts random inspections every quarter, and timely reports the results

of the random inspections, and is linked to the performance appraisal of the director and head nurses. (2) Processing stage. The Medical Waste Control Group collects the classification and disposal of medical waste monthly, summarizes the experience, and incorporates the resolved problems into quality control standards and specifications, so that the PDCA cycle can continue to operate<sup>[20]</sup>. For unresolved issues, propose new improvements and move on to the next PDCA cycle.

#### 4. Results

Six months after the implementation of the PDCA cycle method, and conducting medical waste knowledge assessment for 40 people, the qualified rate of knowledge management for classified management of medical waste increased from 75% to 100%, which is shown as tab. 1.

Table 1 Qualified rates of medical waste disposal before and after PDCA

project	Before PDCA(n=40)			After PDCA(n=40)			$\chi^2$	P
	excellent	qualified	Failed	excellent	qualified	Failed		
Medical waste exam	12	18	10	30	10	0	27.33	<0.01

The qualified rate of classified treatment for medical waste increased from 70% to 96%. The result is shown as table 2.

Table 2 qualified rate of classified treatment for medical waste before and after PDCA

project	Before PDCA(n=40)			After PDCA(n=40)			$\chi^2$	P
	excellent	qualified	Failed	excellent	qualified	Failed		
classified treatment for medical waste	12	16	12	27	11	2	29.23	<0.01

## 5. Discussion

a) PDCA raises awareness of the management of medical waste by operating room staff.

Through the secondary training on the medical waste management related regulations and classification management knowledge of medical staff in the operating room, the medical staff's awareness of the social harm caused by medical waste has been improved. The classification and disposal process of medical waste makes the test pass rate reach 100%.

b) Improve the quality of medical waste classification management in operating rooms.

PDCA cycle management strengthens the management of each link, everyone participates in management, mobilizes everyone's enthusiasm, so that everyone and each link can be implemented in accordance with the "standard operating procedures", eliminating the management blind spot. The PDCA circulation management method in the operating room not only improves the qualified rate of medical waste sorting and disposal in the operating room, but also reduces the production of medical waste,

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