

## Quality Control Circle Practice in Reducing the Waiting Time for Intravenous Chemotherapy in Day Ward Patients

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**Date:** 2026-03-05T18:07:32+00:00

### Abstract

#### Abstract

**Objective:** To explore the application effect of Quality Control Circle (QCC) activities in reducing the waiting time for intravenous chemotherapy medication among patients in a day ward.

**Methods:** A QCC activity group was established, and “reducing the waiting time for intravenous chemotherapy medication for day ward patients” was determined as the activity theme. Through the formulation of activity plans, grasping the current situation, goal setting, cause analysis, countermeasure formulation and implementation, and effect evaluation, 526 patients who were admitted to the day ward of Zhongshan Hospital Xiamen Branch of Fudan University from April to August 2024 for blood tests and required intravenous chemotherapy were included in the study. Among them, 235 patients from April to May 2024 were categorized as the pre-implementation group, and 291 patients from June to July 2024 were categorized as the post-implementation group. The waiting times for intravenous chemotherapy medication in the day ward before and after the establishment of QCC activities were compared.

**Results:** After the implementation of QCC activities, the average waiting time for intravenous chemotherapy medication for day ward patients was 2.32h, which was lower than the 5.07h recorded before implementation; the goal achievement rate was 101.45%, and the improvement rate was 54.24%. After the QCC activities, the circle members showed improvements in eight aspects: problem-solving ability, personal quality, communication and coordination ability, sense of responsibility, self-confidence, teamwork ability, mastery of QCC techniques, and enthusiasm.

**Conclusion:** The application of QCC activities helps to reduce the waiting time for intravenous chemotherapy medication for day ward patients, alleviate

patient suffering, and improve patient satisfaction and medical service efficiency.

## Full Text

### Preamble

**Practice of Quality Control Circle in Reducing the Waiting Time for Intravenous Chemotherapy in Day Ward Patients** Deng Xu<sup>1</sup>, Wang Baolian<sup>1\*</sup>, Zhang Xiaoyun<sup>1</sup>, Qiu Huaxiu<sup>1</sup> 1. Department of Nursing, Zhongshan Hospital Xiamen Branch, Fudan University, Xiamen, Fujian 361015

**Abstract Objective:** To explore the application effect of Quality Control Circle (QCC) activities on reducing the waiting time for intravenous chemotherapy among patients in a day ward. **Methods:** A QCC activity group was established with the theme “Reducing the waiting time for intravenous chemotherapy in day ward patients.” Following the standard QCC procedures—including activity planning, current situation assessment, goal setting, root cause analysis, countermeasure formulation and implementation, and effect evaluation—a study was conducted on 526 patients admitted to the day ward of Zhongshan Hospital Xiamen Branch, Fudan University, for blood tests and intravenous chemotherapy between April and August 2024. The pre-implementation group consisted of 235 patients (April–May 2024), while the post-implementation group consisted of 291 patients (June–July 2024). The waiting times for intravenous chemotherapy were compared between the two groups. **Results:** After the implementation of QCC activities, the average waiting time for intravenous chemotherapy in the day ward decreased from 5.07 hours to 2.32 hours. The target achievement rate was 101.45%, and the improvement rate was 54.24%. Furthermore, circle members showed significant improvements in eight areas: problem-solving ability, personal quality, communication and coordination, responsibility, self-confidence, teamwork, mastery of QC techniques, and enthusiasm. **Conclusion:** The application of QCC activities effectively reduces the waiting time for intravenous chemotherapy in day wards, alleviates patient suffering, and improves both patient satisfaction and medical service efficiency. **Keywords:** Quality Control Circle; Day ward; Intravenous chemotherapy; Waiting time

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With the advancement of medical technology and the increasing demand for efficient healthcare services, day ward intravenous chemotherapy has rapidly gained popularity worldwide as a convenient model for cancer treatment. This model allows patients to complete chemotherapy within a short timeframe, reducing hospitalization time and medical costs while improving quality of life and optimizing the utilization of medical resources [?, ?]. Furthermore, day wards facilitate the “daytime treatment, nighttime home recovery” model [?]. However, in practice, excessively long waiting times for intravenous chemotherapy remain a common issue that severely impacts service quality and patient satisfaction [?]. As a quality management tool involving all-staff participation,

the Quality Control Circle (QCC) has been increasingly applied in the medical field to enhance service standards [?]. To improve patient satisfaction, optimize resource utilization, and provide a better nursing experience, this study explores the impact of QCC activities on waiting times for chemotherapy.

## 1. Research Subjects

Using a single-blind field survey method, 235 patients admitted for intravenous chemotherapy before the QCC implementation (March–June 2024) were selected as the control group, and 291 patients admitted after the implementation (July–September 2024) were selected as the intervention group. There were no statistically significant differences in the baseline characteristics between the two groups ( $P > 0.05$ ).

**Definitions of Terms:** 1. **Intravenous chemotherapy waiting time:** The total time from admission registration to the start of intravenous administration, primarily including admission processing time, laboratory testing time, and pharmacy preparation time. 2. **Admission processing time:** The time spent waiting for admission procedures. 3. **Laboratory testing time:** The duration from blood collection to the availability of laboratory results. 4. **Pharmacy preparation time:** The duration from the physician issuing the medical order to the start of drug administration.

**Inclusion Criteria:** (1) Confirmed diagnosis of malignant tumor via pathology; (2) Age 18–75 years; (3) Conscious and able to cooperate with clinical nursing; (4) Expected survival  $> 1$  year; (5) Voluntary participation with signed informed consent. **Exclusion Criteria:** (1) Patients with mental illness; (2) Patients with multiple comorbidities unable to tolerate chemotherapy; (3) Patients with severe allergies.

## 2. Methodology

### 2.1 Establishment of the QCC Group

In March 2024, day ward nurses spontaneously formed a circle. Through voting, a senior nurse was elected as the circle leader, and the head nurse served as the counselor. The group consisted of 6 nurses, 1 oncologist, 1 laboratory technician, 1 pharmacist, and 1 financial officer.

### 2.2 Theme Selection

Five potential themes were proposed via brainstorming. Members evaluated them based on “superior policy, importance, urgency, and circle capability” using a 5-3-1 scoring system. The theme “Reducing the waiting time for intravenous chemotherapy in day ward patients” received the highest score and was selected.

### 2.3 Planning

The circle leader developed a Gantt chart to coordinate the schedule. Meetings were held weekly to ensure the activity progressed strictly according to the plan.

### 2.4 Current Situation Assessment

A survey was conducted from April 15 to April 26, 2024. Using a checklist, primary nurses collected data on 424 day ward patients, including 235 chemotherapy patients. The average waiting time was 5.07 hours. A Pareto chart revealed that “long laboratory testing time,” “long pharmacy preparation time,” and “long admission processing time” were the primary factors, accounting for 39.15%, 74.89%, and 84.26% of the issues, respectively. Following the 80/20 rule, these were identified as the focus for improvement.

### 2.5 Goal Setting

The circle capability was assessed at 68.2%. With a baseline value of 5.07h, the target value was calculated as:

$$\text{Target Value} = \text{Current Value} - (\text{Current Value} \times \text{Cumulative Percentage} \times \text{Circle Capability}) = 5.07 - (5.07 \times 79.8\%)$$

The projected improvement rate was  $(5.07 - 2.32)/5.07 = 54.24\%$ .

### 2.6 Analysis

The group utilized brainstorming and fishbone diagrams ([Figure 1: see original paper], [Figure 2: see original paper], [Figure 3: see original paper]) to analyze factors across four dimensions: Man, Machine, Method, and Environment. Using a scoring system (5 for important, 3 for average, 1 for unimportant), factors scoring above 40 were identified as key causes. Verification of 156 patients (May 13-19, 2024) identified six “true causes”: poor communication with auxiliary departments, poor handheld device signals, delayed communication between pharmacy and transport staff, inadequate patient education, delayed telephone answering, and lack of self-service kiosks at the admission desk.

[Figure 1: see original paper] Fishbone analysis: Why is admission processing time too long? [Figure 2: see original paper] Fishbone analysis: Why is laboratory testing time too long? [Figure 3: see original paper] Fishbone analysis: Why is pharmacy preparation time too long?

### 2.7 Countermeasure Formulation

The group proposed several strategies: 1. **Admission:** Simplify processes, innovate registration/payment models, and add self-service facilities. 2. **Laboratory:** Assign dedicated transport staff during peak hours (8:30-10:00), update handheld systems, and stabilize the network. 3. **Pharmacy:** Establish a day ward IV management system, create a delivery coordination group, and enhance

process education. Based on feasibility, economy, and circle capability, six integrated countermeasures were selected for implementation.

## 2.8 Implementation and Evaluation

Key measures included: (1) Installing self-service kiosks and creating instructional videos/flowcharts for admission and discharge; (2) Assigning dedicated personnel for specimen transport during peak hours and improving network coverage to ensure a closed-loop specimen system; (3) Establishing a prioritized delivery system for day ward chemotherapy drugs and utilizing pneumatic tube systems; (4) Updating patient education materials to reduce anxiety and improve cooperation.

## 2.9 Observation Indicators

1. **Waiting Time:** Total time from admission to drug administration.
2. **Comprehensive Capability Score:** Self-assessment across 8 dimensions (problem-solving, teamwork, etc.) on a 1-5 scale.

## 3. Results

### 3.1 Tangible Results

After implementation, the waiting time significantly decreased [Figure 4: see original paper]. The target achievement rate was 101.45%, and the progress rate was 55.03%.

[Figure 4: see original paper] Comparison of waiting times before and after improvement.

### 3.2 Intangible Results

Circle members showed marked improvements in all eight evaluated dimensions, as illustrated in the radar chart [Figure 5: see original paper].

[Figure 5: see original paper] Radar chart comparison of member capabilities before and after the activity.

## 4. Discussion and Conclusion

As hospital models evolve, day wards provide a comfortable environment that optimizes medical resources and reduces cross-infection risks [?, ?]. By applying QCC methodologies, our department reduced waiting times by 55.03%, effectively alleviating patient anxiety and improving the quality of care [?]. The activity fostered teamwork, utilized the “mentorship” model between senior and junior nurses, and enhanced the problem-solving and creative thinking abilities of the nursing staff [?, ?].

**Limitations:** This study is a retrospective analysis with potential selection bias. Future research should include prospective, multi-center studies with larger sample sizes for external validation.

In conclusion, QCC activities are of significant practical value in reducing chemotherapy waiting times. This approach not only ensures safe and efficient treatment but also optimizes resource utilization and provides a replicable model for other medical institutions.

## References

[1-10] (Citations as listed in the original text)

*Note: Figure translations are in progress. See original paper for figures.*

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