Effectiveness Evaluation of Quality Control Circle in Reducing Inpatient Intravenous Infusion Steel Needle Usage Rate

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Abstract

Objective: Explore the effect of Quality Control Circle (QCC) on reducing inpatient intravenous infusion steel needle usage rate. Methods: Conduct QCC, investigate and analyze current condition of inpatient intravenous infusion steel needle usage rate, adopt countermeasure corresponding to the problems. Compare the difference of inpatient intravenous infusion steel needle usage rate, the satisfaction of inpatients with the intravenous infusion, nurses' satisfaction with their work before and after QCC, as well as the ability of QCC members. The paretio analysis was used to analyze the effect of QCC on reducing inpatient intravenous infusion steel needle usage rate. Results: After QCC, the inpatient intravenous infusion steel needle usage rate in our hospital dropped from 52.3% to 14.3% ($p = 0.0000$), satisfaction of inpatients with the intravenous infusion statistically increased ($p < 0.01$), nurses' satisfaction with their work increased from 64.59% to 78.07% ($p < 0.01$). Conclusion: QCC could efficiently decrease inpatient intravenous infusion steel needle usage rate, increase inpatients and nurses' satisfaction, promote harmony between nurse and inpatients, and improve QCC members' ability.

Keywords

QCC; Inpatients; Intravenous Infusion Needle; Usage Rate.

1. Introduction

Intravenous infusion treatment is an important method for the inpatients treatment, and one of the common nursing operations in Clinics. The choice of intravenous infusion tools will affect the prognosis of inpatients' veins. In 2014, the Ministry of Health intravenous infusion occupation standard emphasized that scalp steel needle should be used in short time or single time intravenous infusion, corrosive drugs intravenous infusion should not use scalp steel needle, nurses should choose intravenous infusion tools strictly according to the Ministry of Health requirement [1]. Scalp steel needle has been used widely because of its cheap and easy usage characteristics [2]. Recently, with the deepening of "no steel needle" intravenous treatment concept, reducing steel needle usage rate become one aim of nursing work. Therefore, The Nursing Department in our hospital conducted the Quality Control Circle (QCC) activity, reduced inpatient intravenous infusion steel needle usage rate by PDCA management mode. The followings are the details.

2. Materials and Methods

2.1 Materials

According to the Intravenous Treatment Nursing Guideline and Operation Rules and Regulations as well as the 2014 Ministry of Health intravenous infusion occupation standard about the scalp steel needle usage guideline, scalp steel needle should be used in short time or single time intravenous infusion less than 4 hours, continuous infusion less than 3 days. Steel needle can be used if satisfied the above three conditions, otherwise, indwelling needle puncture or PICC puncture should be used [3]. We conducted a cross-section study on the infusion tools given to the inpatients admitted during April 2015 (except ICU and newborns) strictly according to the above criteria. Investigation method: On 15 April 2015, nursing department issued Inpatient intravenous infusion tools cross-sectional

survey to every ward. Every ward assigned one nurse in charge to summarize the infusion condition during 8am 15 April and 8am 16 April 2015, including total number of inpatients, number of intravenous infusion inpatients, number of infusion inpatients using scalp steel needle (excluding scalp steel needle eligible infusion inpatients), number of inpatients using peripheral catheter and number of inpatients using PICC catheter.

2.2 Methods

2.2.1 Set up QCC – "protect vein circle"

QCC members consist of 8 volunteers. One is senior nurse in charge, 4 are senior nurses, and 3 are nurses, circle ability evaluated as 72.5%. Circle members use brainstorming to determine the circle emblem circle name, activity cycle (April 2015 – April 2016), and activity objective (reduce inpatient intravenous infusion steel needle usage rate).

2.2.2 Prevalence study

Circle members designed questionnaire about reasons for Inpatient not using intravenous catheter. The questionnaire included the bad experience of using intravenous catheter, inpatients cognition about intravenous catheter, practical nurse technology and infusion cycle etc.

2.2.3 Set goals

Before the improvement of the current finding status, the steel needle usage rate is 52.3% in our hospital. According to pareto analysis, the first three items account for 98%. The steel needle usage rate after improvement (target value) = current usage rate (52.3%) – (current usage rate 52.3% × improvement emphasis 98% × circle ability 72.5%) = 15.1%.

2.2.4 Implementation countermeasures

Strengthen inpatient intravenous catheter health education Firstly, make brochure with words and figures in ward to let inpatients know the advantage and disadvantage of scalp steel needle and intravenous catheter, increase relevant knowledge. Secondly, organize special seminar on intravenous infusion tools selection, explain the peripheral venous catheter related knowledge. Thirdly, carry out peripheral intravenous catheter health education service by peer education approach [4].

Increase nurse intravenous catheter infusion operation level. Nursing department hire intravenous therapy specialist nurses to give lectures and organize watch videos about intravenous catheter infusion operation, operation competition, strengthen relevant assessment, improve nurse intravenous therapy knowledge and operation level.

Strengthen advocacy of the "no steel needle" intravenous therapy concept, change the nurse concept about intravenous therapy. Enhance communication among every intravenous therapy group members at every department, set up intravenous therapy We iChat group, the difficult problems feedback in intravenous therapy by every department was guided by intravenous therapy specialist nurse. In the meantime, strengthen the intravenous catheter maintenance inspection in every department, and correct the irregularities in the maintenance.

Measures implementation and review According to PDCA procedure, QCC hold analysis meeting, continuously improve measures, and put effective measures into standardized management content.

2.3 Evaluation method

Compare the inpatient intravenous infusion steel needle usage rate before and after activity, estimate whether achieved goals or not.

Compare inpatient satisfaction with intravenous infusion before and after activity. Interview 120 inpatients about their satisfaction with intravenous infusion before and after activity using self-designed questionnaire. The satisfaction was categorized as extremely satisfied, satisfied and dissatisfied. In addition, we randomly interviewed 200 inpatients about their satisfaction with infusion during April 2015 and March 2016.

Compare ward nurses satisfaction with their work before and after activity. We interviewed ward nurses about their satisfaction with their work before and after activity using self-designed questionnaire during April 2015 and March 2016.

3. Results

Inpatient intravenous infusion steel needle usage rate before and after QCC

The inpatient intravenous infusion steel needle usage rate dropped from 52.3% to 14.3% after the positive efforts of circles members, measures correction and improvement by the PDCA management model in the activity. We achieved our goals. The difference of steel needle usage rate before and after activity is statistically significant ($p = 0.0000$). Details are shown in table 1

Table 1 Inpatient intravenous infusion steel needle usage rate before and after QCC

Time	Intravenous infusion tools selection (No.)		Total (No.)
	Steel needle usage	Not steel needle usage	
Before activity	188	171	359
After activity	60	354	414
Total	248	525	773

Inpatient satisfaction with intravenous infusion before and after QCC

We interviewed 200 inpatients about their satisfaction with intravenous infusion before and after activity separately (April 2015 and March 2016). Questionnaires returned 100%, effective questionnaire 100%. Inpatient satisfaction with intravenous infusion significantly increased after activity comparing with that before activity ($p < 0.01$ with Wilcoxon test).

Ward nurse satisfaction with their work before and after QCC

We interviewed ward nurses about their satisfaction with work before and after activity separately (April 2015 and March 2016). Questionnaires returned 100%, effective questionnaire 100%. The ward nurses satisfaction increased from 64.59% to 78.07% after activity ($p < 0.01$ with Wilcoxon test).

Interventions standardization The circle members made peripheral vein catheter health education manual and completed intravenous catheter operation procedure during 12 months QCC activity. In the meanwhile, the circle members promoted the use of intravenous catheter in every department of our hospital, ensured patient infusion safety, protected patients' vein, reduced steel needle injuries, and improved the quality of intravenous therapy.

Intangible outcomes QCC activity improved the circle member's ability of using PDCA management mode, strengthened team spirit, enhanced the ability to solve problems, and aroused the enthusiasm of circle member's learning initiative.

4. Discussions

QCC is a group of volunteers in the same workplace who work together to solve problems, and breakthrough work performance, they use the statistical analysis suggested by QCC to solve problems in workplace and then achieve the goal of improved work performance [5]. Recently, QCC was widely used in clinical nursing work with very good results [6].

By using the idea and methods of QCC, this activity reduced the inpatient intravenous infusion steel needle usage rate from 52.3% to 14.3% in our hospital (excluding ICU and newborn room), achieved the anticipated goals, and made SOP in the meantime, which brought convenience to nurses' work in

our hospital. QCC could reduce inpatient intravenous infusion steel needle usage rate. QCC applications should be promoted in the future work.

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