APPLICATION OF PDCA CYCLE IN THE MANAGEMENT OF MEDICAL STAFF HAND HYGIENE IN COMMUNITY HOSPITALS

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ABSTRACT

Introduction: In this study, the application of PDCA cycle in the management of medical staff hand hygiene was investigated in community hospitals. PDCA cycle was used to classify and summarize problems in the community medical staff hand hygiene for the preparation of an improved plan.

Materials and methods: The plan was implemented strictly and its results were evaluated in a timely manner, and the medical staff hand hygiene compliance before and after the implementation of measures for the quality improvement was managed by PDCA cycle.

Results: Before the implementation of PDCA cycle, the implementation rate of hand-washing was 38.2% and the pass rate of a hand hygiene knowledge questionnaire was 36.36% in the community medical staff. After the implementation of PDCA cycle, the implementation rate of hand-washing was 67.27% and the pass rate of the hand hygiene knowledge questionnaire was 65% in the community medical staff.

Conclusion: The application of PDCA cycle can improve the medical staff hand hygiene compliance in community hospitals.

Key words: PDCA cycle, Community hospital, Medical staff, Hand hygiene compliance.

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Introduction

Community hospital services focus on the elderly, children, patients with chronic diseases and disabled people, and they belong to the population susceptible to sickness. Contact transmission is one of the most common ways to transmit pathogens in nosocomial infections, and the nosocomial infection caused by hospital staff by hand to transmit pathogens accounts for 30% of infections by all causes. In recent years, although more and more attention has been paid to the management of nosocomial infection in community hospitals, the hand hygiene compliance of medical staff can not meet the requirements of nosocomial infection management to some extent yet. In order to better implement hand hygiene management and effectively improve the hand hygiene compliance of community health workers, the hand hygiene compliance of health workers in community hospitals were managed by PDCA cycle, and some good results have been achieved.

Materials and methods

General information

Two community hospitals in Fengman, Chuanying, Changyi, Longtan, High-Tech districts in Jilin City were selected, respectively, and the investigative subjects included doctors, nurses and laboratory staff.

Doctors, 10 nurses and 2 laboratory staff in each hospital, a total of 220 people, were randomly selected, of which there were 62 males, 158 females; 132 people with junior technical title, 76 people with intermediate technical title and 12 people with senior technical title.
Methods
PDCA cycle was used for the management. The onsite inspection at the departments was performed by the investigators and the professionals responsible for the management of nosocomial infection in the community hospitals. The inspected on-site problems were summarized and the causes were analyzed. Based on the causes affecting the quality, countermeasures against the problems were investigated, corresponding management measures were drawn up, and then the action plans for improvement were proposed. The predetermined plans for the quality improvement were implemented based on the objective, and the actual implementation of the plans was inspected according to the requirements of the plans. The data related to the implementation were compared and analyzed in contrast to those achieved before the implementation.

Statistical analysis
The results were analyzed with SPSS 13.0 software and were examined with $\chi^2$ test. The data were expressed in means ± s. $P <0.05$ was considered significant.

Results

<table>
<thead>
<tr>
<th>Investigation time</th>
<th>Stipulated hand-washing number (n)</th>
<th>Actual hand-washing number (n)</th>
<th>Implementation rates(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI PDCAC</td>
<td>2200</td>
<td>840</td>
<td>38.2</td>
</tr>
<tr>
<td>After PDCAC</td>
<td>2200</td>
<td>1480</td>
<td>67.27</td>
</tr>
</tbody>
</table>

Table 1: Comparison of the implementation rate of hand-washing before and after the implementation of PDCA in medical staff

<table>
<thead>
<tr>
<th>Investigation time</th>
<th>Effective questionnaire (n)</th>
<th>Pass staff (n)</th>
<th>Pass rates(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI PDCAC</td>
<td>220</td>
<td>69</td>
<td>31.36</td>
</tr>
<tr>
<td>After PDCAC</td>
<td>220</td>
<td>143</td>
<td>65</td>
</tr>
</tbody>
</table>

Table 2: Comparison of scores on hand hygiene knowledge before and after the implementation of PDCA in medical staff.

Notes: BIPDCAC: before the implementation of PDCA cycle; AIPDCAC: after the implementation of PDCA cycle; *: compared with BI PDCAC, $P <0.05$.

As shown in Table 1, the implementation rate of hand-washing before the implementation of PDCA cycle was 38.2%, and that after the implementation of PDCA cycle was 67.27% in the medical staff.

As shown in Table 2, the pass rate of hand hygiene knowledge questionnaire was 31.36% before the implementation of PDCA cycle; and the pass rate of hand hygiene knowledge questionnaire after the implementation of PDCA cycle was 65.00%.

Discussion
To our knowledge, there are few studies of nosocomial infection and no research on hand hygiene compliance in multiple community hospitals. PDCA cycle is a management model proposed by Doctor Deming an American statistician, including cycles of 4 stages Plan, Do, Check and Action for management. It is a circular system of quality management standardization and systematization, and is widely used in the management of quality. However, PDCA cycle has not been applied in the management of nosocomial infection in community hospitals yet, so that it is necessary to try to manage the nosocomial infection in community hospitals strictly in accordance with the steps of PDCA cycle.

Plan

Collection of information to find the problems.

We referred to the “medical staff hand hygiene standards” proposed by Ministry of Health of People’s Republic of China, community hospital medical staff hand hygiene questionnaire” It included: (1) General information: gender, position and title; (2) hand hygiene knowledge papers, including: ① definitions related to hand hygiene; ② what are hand hygiene facilities? ③ principles of hand-washing and hand hygiene; ④ principles of surgical hand hygiene; ⑤ requirements for hand hygiene monitoring. 20 points were designed for each question and the full scores were 100 points.

The test of the questionnaires showed that its reliability and validity could meet the requirements, indicating that it should be eligible, and the questionnaires were modified and improved by the pre-investigation. A direct observation was used to monitor the implementation of hand hygiene in the medical staff, namely, hand-washing before and after their operation. The implementation of hand hygiene and the hand hygiene indicators in their medical activities were observed and recorded on-
site in the 220 medical staff. The observation periods were from 9:30 to 11:30 and from 15:00 to 17:00. Before the observation, in order to avoid the impact of the Hawthorne effect, the subjects did not know what was going to happen, and the observers dressed as patients or accompanying relatives to observe in medical waiting areas, corridors and other places from the beginning of the medical activities to the appearance of the 10 hand hygiene indications, in which a total of 220 subjects were observed successfully.

According to the implementation of hand-washing before and after the operation, and the scores on the “Hand Hygiene Knowledge Questionnaire”, problems in the management of hand hygiene were found, including the inconformity of hand-washing number (not hand-washing as an operation) and lack of standardization in six-step hand-washing.

Analysis of the reasons for poor compliance with hand hygiene

Low awareness of hand hygiene

Hospital administrators and medical staff showed a low awareness on the effectiveness of hand hygiene on the control of nosocomial infection. In routine medical care, a lot of work is completed by the hands of medical staff, and the number of various bacteria on the medical staff’s hands is often much more than that of other population: their hands are very susceptible to the contamination of transient flora, and the number of bacteria on the hand skin may increase to 100-1000 during each operation. According to statistics, the strict implementation of proper hand hygiene (a general term of medical staff hand-washing, hygiene hand disinfection and surgical hand disinfection) can reduce 20-30% of diseases caused by nosocomial infections.

Insufficient financial input

The hospital administrators believed that without its direct benefit, they were unwilling to budget the expenditure for the control of nosocomial infection, for example, hand hygiene facilities such as the required equipment, soap or hand sanitizer, rapid hand disinfection liquid, hand-washing facilities - all were included in the cost accounting of hospital and departments.

Imperfect nosocomial infection-related management system

Parts of regulations and standards for the management of nosocomial infection were prepared in accordance with the requirements for those of higher than second-class hospitals, which were too high for these basic hospitals and community hospitals and difficult to meet by these hospitals. Furthermore, there was a hysteresis in the establishment of related systems in the community hospitals.

Insufficient training in hand hygiene knowledge

There was a lack of systematic learning, training and opportunities for improvement in the management of nosocomial infection.

Do

Stage Do included two aspects: ① with the assistance of the department of nosocomial infection management, a second-level management was established. An inspection group in which the department director or head was established to discuss issues of poor hand hygiene compliance, supervise the hand-washing of medical staff consistent with the standards, and regularly inspect and assess the implementation. ② All the staff were trained. The training contents included “medical staff hand hygiene standards”, “hospital disinfection management approach”, “nosocomial infection management practices” and watching simulation exercise videos of the operation procedures of “six-step hand-washing”, to make the medical staff understand the related knowledge and skills.

Check

Referring to “medical staff hand hygiene standards” and “WHO hand hygiene guidelines for medical institutions”, The six-step hand-washing and fast disinfectant hand-washing were taken as the evaluation criteria of hand hygiene, and before and after the implementation of the PDCA cycle, the implementation of hand hygiene was checked regularly and randomly. While they often strengthened the supervision of the medical staff, members of the department management group supervised the implementation of hand hygiene to record the number of hand-washing and qualified hand-washing before and after their operations regularly (once weekly). The director and head nurse inspected it once monthly. The department of nosocomial infection management randomly checked it from time to
time on the wards.

**Action**

The checked results were linked to the personal assessment and performance; all members in the departments were organized to discuss the problems, and put forward feasible corrective measures, and strictly supervise the implementation of the measures.

Problems can be found and solved in the continuous cycle and in-depth process of PDCA cycle; and management by PDCA cycle can strengthen the management at every link, mobilize the enthusiasm of everyone, so that everyone and every link can follow "standard operating procedures" to implement, leading to the elimination of management blind spots. After the implementation of the PDCA cycle, the implementation rate of hand-washing and the pass rate in hand hygiene knowledge were improved significantly in medical staff. The application of PDCA cycle could enable the medical staff to implement the hand hygiene management measures, which were embodied by improved hand hygiene facilities in the departments for the hand cleaning of medical staff; hand hygiene mobilization meeting held in departments, "six-step hand-washing flow chart" on the wall above the hand-washing sink to remind all staff to frequently and correctly wash their hands, and hand hygiene posters, warm reminder words and picture posters put up in the corridor and doorway of wards. These measures can further improve the medical staff’s awareness of the importance of hand hygiene, develop good hand-washing habits, and improve their compliance with hand hygiene, to reduce the incidence of nosocomial infection.

**References**


4) Li Wenli, Pu Rong, Mao Hesen. Study on the medical staff hand hygiene monitoring [J]. China Healthcare-...