Application of PDCA Circulation in Improving the Hand Hygiene Compliance of the Medical Staffs in Department of Burn Surgery

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Received date: January 1, 2015; Accepted date: April 14, 2015; Published date: July 2, 2015

Abstract

In order to improve the compliance of hand hygiene for burns health care workers and reduce the incidence rate of nosocomial infection. The PDCA cycle model was used to manage the hand hygiene compliance of burn health care workers, strengthen the training, guidance, assessment and check so as to find out the problem, to propose measures for improvement and perform the continuous quality improvement in a timely manner. Through a year of the PDCA cycle management, the rate of implementation increased from 86.1% to 97.8% (P<0.05). The use of the management of PDCA cycle model can give full play to the management function of the surveillance system and effectively improve the compliance of hand hygiene and compliance reduce the incidence rate of nosocomial infection.

Keywords PDCA cycle, Hand hygiene, Compliance, Hospital infection
Background

Internal hospital infection caused by germs spreading due to the hand hygiene problems of medical staffs accounts for 30% of all the reasons for it\[^1\], while the pathogenic bacteria in the hands of medical staffs are the major source. The sanitation, cleaning and disinfection of hand is one of the most simple, economic and effective methods for reducing hospital infection. As long as the medical staffs correctly wash their hands, the rate of infection in hospital may reduce by 50.0% \[^2\]. Therefore, whether the hygiene of hand is qualified is the important step for effectively control infection in hospital. Cleaning hand is not only the fundamental guaranteeing for implementation of safe medical practice but also can protect the safety of the medical staffs and the patients to the maximum degree. The basic notions and service tenet of hand hygiene should be sufficiently infuse to every medical staff, the notion of infection controlling should be intensified, the hand hygiene compliance should be improved, the occurrence of hospital infection should be prevented and controlled so as to ensure the quality and safety of medical practice. Our department had introduced the PDCA circulation into the management of hand hygiene of medical staffs and already obtained good effects, which is reported as below:

General materials

During the period from September 1st to 15th, 2013, our department designed a questionnaire independently according to the corresponding requirements in the “Rules on Hand Hygiene of Medical Staffs” (see Table 1) so as to investigate on the hand hygiene compliance of the 36 medical staffs in the Department of Burn Surgery. The statistical results showed that the hand hygiene compliance was 86.14%.

Methods

The quality circle (QC) was established, which was also named as the Group for Continuous Improvement of Quality, and the method of PDCA circulation was taken to solve clinical problems. The group had 12 members and held the principles of voluntary participation and connection between the upper and lower level so as to bring democracy into sufficient play. The head nurse was assigned as the supervisor, and a member having strong ability in organization, coordination, and management among all the participators was elected to act as the leader of the circle who was responsible for the planning and implementation of the quality control of the whole process of the activity, the distribution and coordination of all the various works, and data proofreading, etc. Furthermore, a member was assigned as the secretary responsible for recording all the activities of QC. One to two meetings had been held for discussion, during which all the members reported the status of the completion and existence of various work in addition to discussion on the problems identified in the activities in QC.

Phase of planning (P)

Investigation on the current status

The independently designed questionnaire was adopted by specially assigned staffs to be responsible for conduction of investigation on the hand hygiene compliance of the medical staffs in Department of Burn Surgery, and the results showed the following equation: Compliance=\( \dfrac{\text{Items complied to hand hygiene}}{\text{total investigated items}} \times 100\% \)

Identification of the reasons

The members of QC and the head nurse conducted “brainstorm” to analyze the possible reasons for low
hand hygiene compliance in detail, which were then listed in fishbone diagram. See Figure 1.

Identification of major reason
The members of the group analyzed the various factors and finally identified the following major reasons: ① The methods of washing hands by the medical staffs were not sufficiently standard; ② The medical staffs did not pay enough attention to this issue; ③ The facilities for washing hands were not perfect; and ④ The training on knowledge related to hand hygiene had not been conducted.

Phase of formulating countermeasures and organizing the implementation (D)
To normalize the methods of washing hands by the medical staffs
The “six-step method for washing hands” had been trained to the medical staffs for giving them examples for operation and the key points for washing hands had been stressed. The steps of the “six-step method for washing hands” were summarized to be six simple internal, external, clamp, bow, large, and vertical so as to be convenient for the medical staffs to memorize the sequence for washing hands. The members in the group had set up the standards for examinations on hand hygiene, and examinations were conducted on all the medical staffs so as to ensure the accuracy of hand washing. Syndromes for washing hands had been stressed to the medical staffs so as to render them wash their hands accurately. It should take at least 15 seconds to wash hands. Every day the head nurse will secretly examine the status of hand hygiene and point out problems for improvement.

To strengthen the consciousness of the medical staffs on hand hygiene
The morning meetings and department meetings were utilized to propagandize the importance of hand hygiene. The events of harms caused by hand hygiene were shared to the medical staffs so as to raise the vigilance of the medical staffs. The picture of the operational process of the “six-step method for washing hands” with the indications for washing hands was posted beside the hands washing sink as a warm warning so as to remind the medical staffs to pay attention to the carrying out of hand hygiene. Leaflet for propagandizing hand hygiene had been posted on all medical treatment vehicle and wards.
To improve the hand washing facilities
Sensor faucets had been additionally installed in drug preparation rooms, treatment rooms, and offices after contacting the Department of Supply, and it had been guaranteed that nail clippers, times, and equipment for hand drying had been beside the hand washing sink so as to be convenient for washing hands. Frameworks for putting on quick disinfection solution were installed in all wards, and quick disinfection solutions were equipped on both it and every treatment vehicles.

To intensify the training on knowledge related to hand hygiene
Regular trainings were conducted on the medical staffs according to those relevant requirements in the “Rules on Hand Hygiene of Medical Staffs”. The planning for training on hand hygiene was developed, systematic directing methods were formed, feedback opinions were timely collected, the medical staffs were randomly selected to answer questions on knowledge related to hand hygiene so as to test the degree of their mastering of the knowledge, and theoretical examinations had been done so as to ensure the medical staffs had mastered the related knowledge about hand hygiene.

Phase of examination (C)
Since the implementation of PDCA circulation management, it was the head nurse who was mainly responsible for irregular examination. The examination method was to observe the status of the implementation of hand hygiene of the medical staff or whether they had accurately disinfected their hands according to the designed examination table. The standards for judgement were based on the “Rules on Hand Hygiene of Medical Staffs” enacted by Ministry of Health in 2009 and every time the results of the examination had been recorded. After three months of PDCA circulation management, the hand hygiene compliance of the medical staffs were investigated again and the data obtained from this investigation had been analyzed with the SPSS 16.0 statistical software for analysis, and the x2 test was adopted, and the difference was P<0.05, showing statistical meaning. It could be seen from Table 2 that the implementation rate and accuracy rate of hand hygiene compliance of the medical staffs in the Department of Burn Surgery had risen by 98.7%, and the differences were of statistical meaning (P<0.05).

Phase of treatment (Action,A)
After the completion of every examination, analysis was conducted on the identified problems, and measures for correcting and improving the problems had been proposed, which were then continuously implemented or modified during the process of the management according to the status of the implementation of the measures so as to drive the next circulation and thus the preset goal could be developed in order under a status of effective controlling. In the meanwhile, information feedback was conducted through on-site oral communication and submission to the regular class meeting for collective discussion, and the existing problems, analysis on reasons, and results of continuous quality improvement were publicized to all the medical staffs of the department.

Discussion
It has been proved by some domestic researches that to improve the hand hygiene compliance may effectively reduce the rate of the occurrence of hospital infection\(^3\sim5\), but higher compliance could not ensure the effectiveness in controlling hospital infection unless it is based on accurate hand hygiene\(^5\). Therefore, in order to enhance the implementation rate and accuracy rate of hand hygiene of the medical staffs in the Department of Burn Surgery of this hospital, we introduced the PDCA circulation model into the management on the hand hygiene compliance of the medical staffs in the Department of Burn Surgery in September 2013 and began with the locating of the potential dangerous factors of hand hygiene compliance to utilize “brainstorm” to analyze all the possible reasons for hand hygiene compliance in a detailed way and conduct training, instruction, assessment, and examination by targeting major reasons. Once problems were identified, treatment, feedback, and
improvement were conducted in time. This kind of circulation could raise the quality of the work in every step and effectively improved the compliance of hand hygiene of medical staffs, reduced infections on the patients so that they could recover earlier as well as some unnecessary disputes between the patients and the doctors, relieved the pains of the patients, enhanced the recovery rate of the patient, and even was able to improve the satisfaction of the patients.

Acknowledgement

None.

Competing Financial Interests

The authors declare no competing financial interests.

References


<table>
<thead>
<tr>
<th>Items needing washing or disinfection of hands</th>
<th>Total number of the items under spot examination</th>
<th>Times of compliance</th>
<th>Times of incompliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before and after contacting the patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move from the polluted part to the clean point of the same patient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before sterile operation, before and after contacting clean and sterile articles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After contacting the environment and articles surrounding the patient</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Items | Total number of the items under spot examination | Times of compliance | Times of incompliance
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Before the configuration of drug or food

Before and after putting on the isolation gown, after getting off the gloves

Before and after contacting the mucosa, broken skin or wounds of the patients

After contacting the polluted articles

Before diagnosing, treating, and nursing the patient with low immunity

Before and after entering or leaving the isolation ward or the burn ward

Items needing first washing hand and then conducting hand hygiene and disinfection

After contacting the blood, body fluid, secretions, and the articles polluted by infectious pathogenic microorganism of the patient

After directly examining, treating, nursing the patients with infectious diseases or after treating the dirty articles from the patient with infectious diseases

Total

Hand hygiene compliance

Factors you think may affect the medical staffs to wash or disinfect hands:

Table 1 Questionnaire on the hand hygiene compliance of medical staffs
(Principles of hand washing: 1. When there is pollution visible to eyes on hand like blood or other body fluids, hands should be washed with soap (soap fluid) and flowing water. 2. If there are no visible pollutions on hand, it is appropriate to sterilize the two hands with alcohol-based hand rub instead of washing hands).
<table>
<thead>
<tr>
<th>Time</th>
<th>Total number of the Examined items</th>
<th>Times of compliance</th>
<th>Times of incompliance</th>
<th>Compliance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the activity</td>
<td>368</td>
<td>317</td>
<td>51</td>
<td>86.14</td>
</tr>
<tr>
<td><em>After the activity</em></td>
<td>368</td>
<td>360</td>
<td>8</td>
<td>97.82</td>
</tr>
<tr>
<td><em>In total</em></td>
<td>736</td>
<td>677</td>
<td>59</td>
<td>91.98</td>
</tr>
</tbody>
</table>

Table 2 Comparison of the compliance before and after the activity