

Application of PDCA Cycle in Hand Hygiene Management of Psychiatric Medical Staff

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Abstract: *Objective:* To study the application effect of the plan-do-check-act (PDCA) cycle management in the hand hygiene management of psychiatric medical staff. *Methods:* One hundred and twenty medical staff from a psychiatric hospital from May 2023 to December 2023 were selected and divided into two groups. The control group (May 2023 to August 2023) applied the conventional management model, and the observation group (September 2023 to December 2023) applied the PDCA cycle management. The hand hygiene compliance, hand hygiene knowledge, and hygiene qualifications were compared, including the amount of hand sanitizer used. *Results:* The proportion of medical staff's hand hygiene compliance and hand hygiene knowledge mastery scores in the observation group were higher than those in the control group ($P < 0.05$); the hand hygiene passing rate in the observation group was higher than that of the control group ($P < 0.05$); the daily amount of hand sanitizer per patient bed and the amount of hand sanitizer used was higher than that of the control group ($P < 0.05$). *Conclusion:* The PDCA cycle management model for psychiatric medical staff promoted the improvement of hand hygiene compliance and increased their hand hygiene qualifications. It is suitable for further popularization and application in future clinical practice.

Keywords: Psychiatry; PDCA cycle management; Hand hygiene management; Compliance

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1. Introduction

Psychiatric patients often exhibit characteristics of abnormal behavior, self-injury, and other behaviors, which can easily lead to skin damage and infection. In addition, psychiatric patients are affected by factors such as disease characteristics and adverse drug side effects, which weaken their immunity, making them highly susceptible to pathogens^[1]. Hands are an important route for the spread of pathogens. If the medical staff do not strictly adhere to hand hygiene, it is likely to cause the spread of diseases between patients and medical staff. By implementing an effective management system and improving the hand hygiene compliance of psychiatric medical staff, the risk of infection can be reduced and the quality and safety of medical care can be improved^[2]. The plan-do-check-act (PDCA) cycle is an effective management method that continuously carries out planning, execution, inspection, and improvement through a repeated cycle to improve the effect

and quality of hand hygiene management^[3]. The importance of hand hygiene management among psychiatric medical staff cannot be overlooked. This article explored the application effect of the PDCA cycle in the hand hygiene management of psychiatric medical staff to ensure the health and safety of patients and medical staff.

2. Materials and methods

2.1. Information

A total of 120 research subjects in this study were selected from the in-service medical staff of the psychiatric department of our hospital from May 2023 to December 2023. The medical staff from May 2023 to August 2023 were included in the control group whereas the observation group consisted of medical staff from September 2023 to December 2023. Among the 120 subjects, there were 56 men and 64 women aged 25–55 years old. The average age of the subjects was 36.43 ± 2.11 years old. Among them, 50 were doctors, 45 were nurses, and 25 people were medical technicians. According to academic qualifications, 3 people had a master's degree or above, 105 had a bachelor's degree, and 12 had a college degree or below.

Inclusion criteria: (1) Is a hospital employee; (2) worked for > 3 years; (3) those who consented and actively cooperated with relevant research activities. Exclusion criteria: (1) Patients who dropped out of the study for other reasons; (2) patients who suffered from hand skin diseases.

2.2. Methods

The subjects in the control group were given the conventional management model whereby psychiatric-related medical staff strictly abided by the relevant hand hygiene requirements during medical activities. The observation group was given the PDCA cycle management which mainly includes the following contents:

P (Plan): An in-depth analysis of the hand hygiene issues of psychiatric medical staff was conducted. The results showed that some medical staff have insufficient awareness of hand hygiene and understanding of the importance of hand washing. Due to a busy lifestyle, there was insufficient time and a lower frequency of hand washing. As the department's cleaning staff, interns, and trainees have frequent job changes, their awareness of hand hygiene is relatively weak. The handwashing facilities in some hospitals are still crude, with manually operated faucets, and supplies such as quick hand disinfectants and paper towels are insufficient. Furthermore, there was no reward and punishment system for hand hygiene management, making it challenging to motivate the initiative of medical staff.

D (Do): The hand hygiene publicity weekly activities in the undergraduate department were fully utilized to popularize hand hygiene-related knowledge. In-depth publicity and education were carried out by holding prize-winning knowledge competitions, and educational videos, conducting special lectures, and setting up hand hygiene knowledge display boards to increase the enthusiasm and participation of medical staff. Hand hygiene knowledge training and assessments were carried out to ensure that medical staff mastered hand hygiene knowledge. Relevant knowledge training was held weekly and comprehensive training and assessment plans were formulated. Medical staff who failed the assessment were arranged to retake the training until they passed. The hand-touch faucets in the department were replaced with elbow-touch faucets. At the same time, sufficient hand sanitizer and disposable paper towels were provided in the handwashing area, and post-handwashing method diagrams at corresponding locations were put up as reminders. Quick-drying hand disinfectants were also installed in places such as ward rounds, nursing cars, and ward entrances. Reminder signs next to the department computers and on the operating platform were placed. Medical staff was also encouraged to check on each other to improve the implementation of standardized handwashing behaviors.

C (Check): Daily hand hygiene assessment standards for psychiatric medical staff were formulated, regular

hand hygiene spot checks were conducted, the hand hygiene performance of medical staff in each department was inspected weekly, and hand hygiene knowledge was incorporated into the three basic examination items.

A (Assessment): Hand hygiene assessment items were incorporated into the personal performance appraisal system of medical personnel and those who performed well were notified and praised, while those who did not were warned and criticized. At the same time, the results of each hand hygiene inspection were delivered to relevant management personnel, analyzed, and discussed, where rectification measures were formulated accordingly. Furthermore, the rectification content was included in the next cycle.

2.3. Observation indicators

The hand hygiene compliance status of the two groups of psychiatric medical staff was calculated, including hand hygiene compliance status before aseptic operations, before contact with patients, after contact with body fluids, after contact with patients, and after contact with the surrounding environment.

Hand hygiene knowledge and hand hygiene qualification rate of medical staff were evaluated by organizing hand hygiene assessments, including the seven-step hand washing method, absorption time, disinfection principles, disinfection methods, hand hygiene indicators, etc., with a total score of 5 points. The higher the score, the better the qualification rate. The standard for passing hand hygiene was calculated as the number of bacterial colonies on the hand at 10 cfu/cm² and below, whereas the standard for failing hand hygiene was calculated as the number of bacterial colonies on the hand at 10cfu/cm² and above. The daily amount of hand sanitizer and hand sanitizer used per patient bed in both groups was also observed.

2.4. Statistical processing

Data analysis was carried out using the SPSS 24.0 statistical software. The two measurement data sets were expressed as mean ± standard deviation and the count data were expressed as %. Measurement data were analyzed using a *t*-test, and count data were analyzed using a chi-squared (χ^2) test. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1. Hand hygiene compliance between the two groups

As shown in **Table 1**, the proportion of hand hygiene compliance among medical staff in the observation group was significantly higher than those in the control group ($P < 0.05$).

Table 1. Hand hygiene compliance among two groups of psychiatric medical staff [*n* (%)]

Group	Cases, <i>n</i>	Proportion before aseptic operation	Proportion before contact with patients	Proportion after contact with body fluids	Proportion after contact with patients	Proportion after contact with the surrounding environment
Control group	60	40 (66.67)	36 (60.00)	44 (73.33)	40 (66.67)	44 (73.33)
Observation group	60	60 (100.00)	56 (93.33)	60 (100.00)	60 (100.00)	60 (100.00)
χ^2	-	24.000	18.634	18.462	24.000	18.462
<i>P</i>	-	0.001	0.001	0.001	0.001	0.001

3.2. Comparison of hand hygiene knowledge between the two groups

As shown in **Table 2**, the observation group's medical staff's seven-step handwashing method mastery score, hand hygiene indication mastery score, handwashing time mastery score, disinfection principle mastery score, and disinfection method mastery score were all significantly higher than those in the control group ($P < 0.05$).

Table 2. The hand hygiene knowledge of two groups of psychiatric medical staff ($n = 120$, points)

Group	Seven-step hand washing method mastery score	Hand hygiene indication mastery score	Hand washing time mastery score	Disinfection principles mastery Score	Disinfection method mastery score
Control group	3.31 ± 0.29	3.08 ± 0.15	3.96 ± 0.15	1.76 ± 0.28	3.31 ± 0.42
Observation group	4.43 ± 0.35	4.12 ± 0.43	4.81 ± 0.18	4.06 ± 0.35	4.39 ± 0.51
<i>t</i>	19.087	17.689	28.100	39.748	12.662
<i>P</i>	0.001	0.001	0.001	0.001	0.001

3.3. Hand hygiene passing rates between the two groups

As shown in **Table 3**, the hand hygiene passing rate of patients in the observation group was significantly higher than that of the control group ($P < 0.05$).

Table 3. Hand hygiene qualifications of two groups of psychiatric medical staff [n (%)]

Group	Cases, <i>n</i>	Satisfactory hand hygiene	Unsatisfactory hand hygiene
Control group	60	53	7
Observation group	60	59	1
χ^2	-		4.821
<i>P</i>	-		0.028

3.4. Comparison of the daily amount of hand sanitizer and hand sanitizer used per patient bed between the two groups

As shown in **Table 4**, the daily amount of hand sanitizer and hand sanitizer used per patient bed in the observation group was significantly higher than that of the control group ($P < 0.05$).

Table 4. Comparison of the daily amount of hand sanitizer and hand sanitizer used per patient bed between two groups of psychiatric medical staff ($n = 120$, mL)

Group	Amount of hand sanitizer (mL)	Amount of hand sanitizer/ bed (mL)
Control group	1.52 ± 0.35	5.24 ± 0.87
Observation group	4.02 ± 0.58	8.06 ± 1.16
<i>t</i>	28.586	15.065
<i>P</i>	0.001	0.001

4. Discussion

When affected by factors such as disease characteristics or treatment requirements, psychiatric patients need to be admitted to hospitals or institutions for targeted treatment and intervention. Due to the dense population of the country, the risk of disease transmission is higher [4]. Pathogens are easily transmitted through physical contact. If hand hygiene is not strictly managed, it can lead to patient infection, thus affecting the effectiveness of disease treatment, and increasing the risk of complications. Hence, the hand hygiene management of psychiatric medical staff is of great importance to ensure the safety of patients. In addition, hand hygiene

management is one of the most important components of medical quality management. By implementing correct hand hygiene management methods, pathogens can be effectively eliminated, and the risk of infection can be reduced ^[5]. Good hand hygiene management can reduce the incidence of medical-related infections, improve the quality of medical care, and reduce medical accidents.

The PDCA cycle management is a continuously improved management method that can be used in the hand hygiene management of psychiatric medical staff to effectively improve the quality and effect of hand hygiene management ^[6]. In the “plan” phase, relevant managers ought to formulate hand hygiene standards, operating procedures, and understand the importance of hand hygiene, master correct hand hygiene methods, and develop corresponding training plans to ensure that all medical staff can perform hand hygiene operations correctly. In addition, it is also necessary to develop indicators and methods for monitoring the quality of hand hygiene to facilitate subsequent inspections ^[7]. During the “do” phase, medical staff should perform hand hygiene-related operations by the standards and procedures formulated, through correct hand washing and, the use of hand sanitizers, disinfectants, and other cleaning supplies. At the same time, medical staff must perform hand hygiene before and after contact with patients, and after contact with contaminants. During the “check” phase, the hand hygiene of medical staff must be monitored and evaluated to promptly discover problems or situations that are not up to standards and perform relevant improvements ^[8]. Through continuous improvements, the quality and management effects of the hand hygiene of psychiatric medical staff will be enhanced.

In this study, the hand hygiene compliance, knowledge mastery scores, and hand hygiene qualification rate of medical staff in the observation group were significantly higher than those in the control group, suggesting that the application of PDCA cycle management in the hand hygiene management of psychiatric medical staff effectively improved medical care, personnel’s awareness level of hand hygiene-related knowledge, and their hand hygiene compliance. The daily amount of hand sanitizer and hand sanitizer used per patient bed in the observation group was significantly higher than that in the control group, suggesting that the development of PDCA cycle management can effectively improve the hand hygiene awareness of psychiatric medical staff and increase the amount of hand sanitizer used. This is because PDCA cycle management helps medical staff correctly master hand hygiene methods by formulating standardized hand hygiene standards and operating procedures, organizing training and assessments, etc. Standardized operations can reduce the randomness and subjectivity of hand hygiene management and improve its consistency and reliability ^[9]. If irregularities or substandard hand hygiene operations are discovered, targeted training and education can be carried out, and cleaning supplies can be replenished and replaced promptly. Timely actions should be taken to address any problems and increase the passing rate of hand hygiene of psychiatric medical staff ^[10].

5. Conclusion

Implementation of the PDCA cycle management to the hand hygiene management of psychiatric medical staff significantly improved hand hygiene compliance, knowledge mastery scores, and hand hygiene pass rate. This management plan is worthy of further promotion and application in future clinical applications.

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Disclosure statement

The authors declare no conflict of interest.

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