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RESEARCH

Hand hygiene: a review of understanding and attitudes of healthcare professionals

Higienização das mãos: uma análise do entendimento e atitudes dos profissionais de saúde

Higiene de mano: la revision del entedimento de las atitudes del profesionales de la salud

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ABSTRACT

Objective: Evaluate hand hygiene performed by health professionals in a public hospital and identify non-adherence factors for the correct technique. **Methods:** The professionals were submitted to a questionnaire, testing their knowledge of hand hygiene compliance for health professionals and were observed while hand washing. **Results:** 62.5% received training either during undergraduation course, or by the hospital, while 37.5% did not know how to do the technique. Regarding the reason for the noncompliance of proper hygiene techniques, 61.1% of professionals said that excessive professional activity, and insufficient time are the main causes. 44.4% mentioned the lack of priority of the institution as to the procedure and 16.6% lack the time to perform the technique. **Conclusion:** It appears that most of the professionals interviewed did not obey the rules recommended hand hygiene and the main reason is no time due to excessive workload. **Descriptors:** Infection, Hand hygiene, health professionals.

RESUMO

Objetivo: Verificar a higienização das mãos feita por profissionais de saúde em um hospital público e identificar os fatores para a não adesão à técnica correta. **Método:** Foi aplicado o questionário de teste de conhecimento a respeito da higienização das mãos para profissionais de saúde e feita a observação da lavagem das mãos. **Resultados:** 62,5% receberam treinamento ou na graduação, ou por parte do hospital, enquanto 37,5% desconheciam como fazer a técnica. Em relação ao motivo da não adesão correta das técnicas de higienização, 61,1% dos profissionais responderam que o excesso de atividade profissional, e o tempo insuficiente são as principais causas. 44,4% mencionou a falta de prioridade da instituição quanto ao procedimento e 16,6% esqueceu naquele momento de realizar a técnica. **Conclusão:** A maioria dos profissionais entrevistados não obedecem às regras preconizadas de higienização das mãos e o principal motivo é o excesso de atividade profissional. **Descritores:** Infecções, Higienização das mãos, Profissionais de saúde.

RESUMEN

Objetivo: Evaluar la higiene de manos realizado por profesionales de la salud en un hospital público e identificar los factores de la falta de adherencia a la técnica correcta. **Métodos:** Se administró el cuestionario para poner a prueba los conocimientos de la mano de cumplimiento de higiene para profesionales de la salud e hizo la observación de lavado de manos. **Resultados:** El 62,5% recibieron capacitación o graduación, o por el hospital, mientras que el 37,5% no sabe cómo hacer la técnica. En cuanto a la razón de la falta de cumplimiento de las técnicas adecuadas de higiene, el 61,1% de los profesionales dijo que la actividad profesional excesivo y la falta de tiempo son las principales causas. 44.4% mencionó la falta de prioridad de la institución en cuanto al procedimiento y el 16,6% se perdió en el momento de realización de la técnica. **Conclusión:** Parece que la mayoría de los profesionales entrevistados no obedecer las reglas de higiene recomendadas y la razón principal es el exceso de actividad profesional. **Descriptores:** Infección, Higiene de las manos, Profesionales de la salud.

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INTRODUCTION

Hand hygiene despite being a simple procedure that should be performed regularly by all health professionals, often it is overlooked or performed incorrectly.

Nosocomial infection (NI) is becoming a serious public health problem, due to the increase in patient with a longer time of hospitalization, with a higher risk of mortality generating more socioeconomic cost. Approximately 70% of hospital infections occurs by an imbalance between the microbiota and the natural human host defense mechanisms, thus making hand washing essential.^{1,2}

The hands, in addition to serving as a shelter, these are the main vehicle of transmission of microorganisms that are deposited on the skin surface, mostly coming from external sources. Thus, the adoption of measures such as the Hand Washing (HH) with water and liquid soap or by the use of alcohol at 70% has proven highly effective in the prevention and control of infections.³

The technique of HH is being recognized with a compulsory practical for health professionals since 1846. Thus the high rate of infection generates concern on the part of many researchers, leading to the realization of studies aimed at monitoring the adherence of professionals, which has as a challenge to the proposition of strategies that encourage greater adherence and maintenance of optimal levels of this recommendation.⁴

HH should occur before and after contact with the patient, before putting on gloves and after removing them, between one patient and another, between one and another procedure, or on occasions where there may be transfer of pathogens to patients and / or environments,

Hand hygiene: a review of understanding... between procedures with the same patient and after contact with blood, bodily fluid, secretions, excretions and contaminated items or equipment.⁵

Although the washing of hands is a simple act and practiced since childhood, as an action, self-care, towards health professionals, it aggregates products and techniques that are aimed at expanding its effectiveness, because studies indicate a low HH adherence for health professionals.⁶

Opposite to what has been stated above this study's objective is to verify the hand washing procedure performed by health professionals in a public hospital of Parnaíba/PI, Brazil, as well as assess their knowledge on the subject.

METHODOLOGY

Quantitative descriptive Study, developed in the public hospital of Parnaíba-PI, Brazil. Participated in the survey 24 health professionals, several categories that exerted their activities in morning and afternoon shifts, during the period of data collection, and voluntarily agreed to participate in the study. They were submitted to a questionnaire and were observed during their work routine. Both the data collection questionnaire, as well as the observation form were developed by the National Health Surveillance Agency (ANVISA), and can be found on on there website, and are in Annex A and B.

After the authorization of the hospital and the approval of the ethics Committee in Research of the Federal University of Ceara- COMEPE, accredited by CONEP- National Health Council / MS, under protocol number 317/11, authorized onNovember 17, 2011. The data were obtained by means of a questionnaire and observation by the researchers. The search occurred from April 2013

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Professionals in the healthcare area, which were randomly chosen, depending on the availability of their and who had signed the Informed Consent and agreed to participate in the study. The health professionals were; doctors, nurses, technicians and nursing assistants, physical therapists, X-ray technicians. All staff members of the hospital, acting in the various areas, Clinical Medicine, Obstetrics, Pediatrics, Surgical Clinic, ICU- Intensive Care Unit, Nursing wards.

As an instrument of data collection, a questionnaire with closed questions was used, being composed of a session identification of subjects and followed by questions directed to the topic, and an observation form, where this phase of the research was developed by the researchers themselves, where they checked whether health care professionals from the hospital practiced in their day-to-day the hand hygiene (HH) correct procedure.

RESULTS AND DISCUSSION

The research was conducted in two phases; the first was applying a questionnaire to 24 health professionals who worked within the framework of the hospital in order to verify their knowledge on Hand Hygiene (HH). The second was the direct observation by the researchers for a period of 3 consecutive days of the same professionals observing the frequency that they were performing the HH.

The professionals are in the age group of 30 years or over 31 years, with an average age of 34.3 years (standard deviation 5.7 years), 25% were male and 75% were female. The professions exercised 12.5% were nurses, 54.2% technical / nursing assistant, 16.7% were doctors and 8.3%

Hand hygiene: a review of understanding... were technicians or therapists. With regard to the sector of each professional at the time of the application, 16.7% were from the surgical clinic, 37.6% from the Intensive Care Unit (ICU), 16.7% medical clinic, 8.3% from obstetrics and 12.5 from pediatrics (Table 1).

Table 1: Association of sociodemographic variables of professionals who worked in the Public Hospital of Parnaíba/PI (n= 24).

Variables	N	%
Age Group		
Up to 30 years	05	20.8
31 and over	19	79.2
Gender		
Male	06	25.0
Female	18	75.0
Profession		
Nurse	03	12.5
Technician / nursing assistant	13	54.2
Doctor	04	16.7
Technician	02	8.3
Therapist	02	8.3
Department		
Surgical Clinic	04	16.7
ICU	09	37.5
Medical / surgical clinic	04	16.7
Emergency Unit	02	8.3
Obstetrics	03	12.5
Pediatric	02	8.3

Average= 34.3; standard Deviation= 5.7; Min and Max: 23 and 48. Source: Direct research, 2013.

With applied questionnaires about 62.5% received some technical training or graduation or by the hospital on correct hand hygiene, while 37.5% did not know how to do the technique. Of the professionals interviewed 95.8% reported that the institution has alcoholic preparation available to perform the hygiene. About the time that is needed to use the correct technique, the World Health Organization (WHO) (2007) claims to be 15 seconds, 20.8% answered 10 seconds, 20 seconds 41.7% and 37.5% 1 minute, which causes concern to the agencies in relation to cross-infection (Table 2).

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Table 2. Aspects related to knowledge (n= 24).

Variables	N	%
Received some training in hand hygiene		
Yes	15	62.5
no	09	37.5
There is some alcohol preparation available for hand hygiene in their institution		
Yes	23	95.8
no	01	4.2
Which of the following is the main transmission route for the crossing of potentially pathogenic micro-organisms among patients in Health services		
The health professional	24	100.0
Hand's when they are not hygienic		
What is the most frequent source of microorganisms responsible for infections related to healthcare		
Micro-organisms in the hospital's water system	04	16.7
Microorganisms in the hospital's air	20	83.3
What is the minimum time necessary for the alcohol preparation to destroy the majority of micro-organisms on your hands		
10 Seconds	05	20.8
20 Seconds	10	41.7
1 Minute	09	37.5

Source: Direct research, 2013.

In the study where the practice of hand hygiene by healthcare professionals in recreational and educational activities was observed, it was observed that over 80% of the professionals who participated in the study used higher than recommended (15 seconds) it was certainly in accordance with the researchers this longer time is due to the fact that the procedure has not been carried out spontaneously, but in terms of being targeted by study.⁷ In a study which evaluated the washing of hands made by professionals from a neonatal intensive care unit, it was noted that the time spent for the sanitization of the hands was of 11 and 20 seconds, where the technicians and nursing assistants were seen, with 22.9% of them using a time that ranged from 11 to 20 seconds. However, 21.1% of nursing assistants and technicians uses a time from 0 to 10 seconds in the execution of hand washing, considered inadequate for the elimination of dirt and transient microbiota, this perhaps by accumulation of tasks to carry out, and the low number of staff.⁸ In this study the results showed that, great part of the interviewees stated that the time of 1 minute is correct, which in accordance with the existing legislation is incorrect, but the World Health J. res.: fundam. care. online 2013. dec. 5(6):142-150

Hand hygiene: a review of understanding... Organization (WHO) and the National Health Surveillance Agency (ANVISA) recommends a time from 15 to 20 seconds.

When asked if the alcoholic preparation should cover all surfaces of the hands, 87.5% said that the statement is true and 12.5% said it is false (Table 3). The alcoholic preparation should be used whenever the hands are visibly dirty, and that the same should cover all surfaces of the hands, in order to have a better applicability. 25% of the respondents reported that could dry their hands after the use of the preparation alcohol and 75% said they did not.⁹

Table 3: Aspects related to knowledge (n= 24).

Variables	True n(%)	False n(%)
Which of the following statements about techniques for hand hygiene with alcohol preparation are "True"?		
The alcohol preparation must cover all surfaces of both hands	21(87.5)	03(12.5)
The hands must be dried before use	18(75.0)	06(25.0)
You can dry your hands with a paper towel after rubbing of hands with the alcoholic preparation	06(25.0)	18(75.0)
Which of the following items should be avoided because they are associated with the possibility of colonization of the hands	Yes	no
Use of jewelery	24(100.0)	-
Damaged Skin	22(91.7)	02(8.3)
Artificial Nails/ inserts	24(100.0)	-
Regular Use of hand cream	08(33.3)	16(66.7)

Source: Direct research, 2013.

By observing Table 3, we note that 100% of professionals reported that the use of jewelry associated with colonization of the hands, 91.7% responded that this colonization may be because of damaged skin by 100% artificial nails, 33 3% by the regular use of hand creams.

The work carried out in an intensive care unit with 60 nurses, a multivariate analysis of risk factors showed that the rings were the only factor to wash gam-negative bacilli and *S. aureus* and that the concentration of microorganisms is related to the quantity of rings used ³.

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Antiseptics are associated with detergents and these are intended to antiseptic hand hygiene and skin antiseptic. It is indicated in cases of contact precautions recommended for patients with multiresistant microorganisms in cases of outbreaks, preoperatively, before any surgical procedure and prior to invasive procedures. In a study¹⁰ on the quality of hand hygiene by active professionals in primary healthcare units, demonstrated that the observed professionals who performed the hand antisepsis used the following products: 70% alcohol, chlorhexidine or povinil pyrrolidone iodine (PVP-1), a soap with antiseptic or soap or other products. What justifies the results, where 79.2% answered that the true use of alcoholic preparation of soap and water for hand washing. Moreover, 66.7% reported that the alcoholic preparation is more effective against microorganisms.¹¹

The World Health Organization (WHO) and the Centers for Disease Control *and Prevention* recommend that the washing of hands (HH) occur: before the contact with the patient, before invasive procedures, after contact with body fluids, after contact with inanimate surfaces next to the patient, after removing gloves, when hands are visibly dirty, after exposure to spores or pathogens, as well as when there is no change of a contaminated site of a patient to another site on the same patient.⁴

It is recommended the use of soap and water when hands are visibly dirty or contaminated with blood and other body fluids, to start the work shift, after going to the toilet, before and after meals, before food preparation, before preparation and handling of medicines. And that the alcoholic preparations along with soap and water are indicated before the contact with the patient, after the counted with the patient, before performing invasive procedures, before handling devices.¹¹

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About the knowledge of these professionals

on the use of soap and water and alcoholic preparations. The majority to answer questions showed that they have knowledge that the use of soap and water is essential in all situations, the professionals 62.5% responded that the arrive in the unit after the lunch hygiene must be done with soap and water, 66.7%, after applying injection, 79.2% after the removal of gloves.

Similar Results were found in a quantitative study on hospital infection control, where it was noted that the health professionals when they are asked which products used for the washing of hands, responded that 92% used soap and water, 32% alcohol gel and 4% anti-germ.¹²

Still, when monitoring adherence of professionals to Hand Hygiene (HH), the World Health Organization (WHO) advises that the observations occur in five primordial moments ("My Five Moments for Hand Hygiene"): before contact with the patient before performing clean procedure after risk of contact with body fluids, after touching the patient and after touching surfaces near the patient.⁴

With the percentages presented in Table 4, when being observed, it is noted that all professional groups perform at least using some material for HH, enabling patient safety. 66.9% performed hygiene with soap and water before patient contact. It calls attention to the percentage of professionals who do not use of any preparation after contact with surfaces and objects near the patient (72.7%), while only 24.2% make the use of soap and water and 12.1% alcohol.

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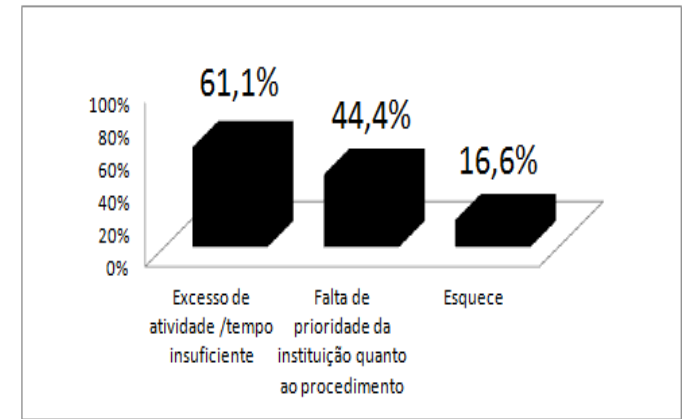
Table 4: Aspects related to the observation form (n= 33).

Variables	Rubbing alcohol	Water and soap	None
What type of hand hygiene is necessary in the following situations	n(%)	n(%)	n(%)
Before contact with the patient	05(13.2)	22(66.9)	08 (24.5%)
Before the completion of an aseptic procedure	07(21.2)	19(57.6)	09(27.3)
After risk of exposure to bodily fluids	09(30.0)	12(40.0)	11(36.7)
After contact with the Patient	07(21.2)	26(78.8)	06(18.2)
After contact with the surfaces and object s near the patient	04(12.1)	08(24.2)	24(72.7)

Source: Direct research, 2013.

After the researchers finished observing the professionals they were approached and questioned on why they did not perform the correct hand hygiene (HH) technique. 61.1% Responded that the excess of activity, and the insufficient time is the main cause. 44.4% mentioned the lack of priority of the institution as to the procedure and 16.6% forgot at that time to perform the technique (Figure 1).

Figure 1. Factors that interfere with hand hygiene (n= 18).



Source: Direct research, 2013.

In a study where it was seen the differences between the practice and the idealized on hand hygiene, where a bibliographic review was analyzed that the lack of time, insufficient resources, physical structure and the lack of priority of the institution, are not factors by adherence of hand sanitization.⁶ It is believed that the low adherence to this practice is the result of several factors such as, lack of materials, lack of J. res.: fundam. care. online 2013. dec. 5(6):142-150

Hand hygiene: a review of understanding... time (related to the sector and work overload), tolerance to repeated use of soap or alcohol solution, lack of information, use of sleeve then washing the hands, increasing the risk of dermatitis. Whereas hands with some skin irritation increases the risk of colonization by various microorganisms.²

It is believed that the promotion of permanent education, aiming at the control of infections in health establishments should be assumed by the CCIH/SCIH in search of means to promote efficient change. More under the professional point of view, the adherence is a voluntary act and depends on the decision of each professional, and is influenced by careful that each professional has.¹³

In a study to better understand the practice of nosocomial infection control, a questionnaire was given to 261 health professionals from two hospitals. It was concluded that train health professionals about the importance and practice of appropriate hand hygiene, along with an improvement in options of hand sanitizers may improve the safety of patients. In addition, an improved infrastructure is needed to improve the control of practices of infection control against tuberculosis.¹⁴

In order to be is to be efficient practices for decontamination of the hands of health professionals, efforts to improve compliance to the hand-washing hands should be multifaceted. Alcohol gel (with emollients) need to be made available next to the bed of each patient and issues relating to skin irritation of workers should be forwarded for urgent discussion.¹⁵

When investigating the compliance of health professionals with the manual for hand hygiene in four hospitals and to examine the factors that contributed to non-compliance, the results indicate that variations in organizational

Sousa JRM, Santos LFD, Cavalcante AAC *et al.* support and hospital culture may influence the results.¹⁶

When examining the perception of hand hygiene practices of nursing students in clinical situations, the findings showed that the interviewees emphasize the importance of inserting this practice in the clinical area and to insert models in the obedience of hand hygiene.¹⁷

A review of the literature indicates that the alcohol gel reduces the microbial load, are less irritating to the skin of the health workers and are more easily accessible than conventional methods of hand washing. The study also indicates that the use of alcohol gel increases the rate of compliance to the hand hygiene manuals by 25%.¹⁸

When we observe the behavior of hand hygiene and evaluation of the effect of alcohol-based disinfection and flushing with pure liquid soap in microbial flora, it has been demonstrated that the disinfecting alcohol base is a robust method of hand hygiene with many advantages in an environment that is very practical and feasible for use in hospital services¹⁹.

When performing a program of multi-center intervention to increase adherence to the recommendations for hand hygiene and the use of gloves to reduce the incidence of antimicrobial resistance, it has been demonstrated that the program increased adherence to hand hygiene recommendations, especially the use of alcohol gel. Concomitantly, there was in a hospital a reduction in the incidence of resistant bacteria to antimicrobial agents among the clinical culture isolates.²⁰

CONCLUSION

Health professionals are still negligent in relation to the adherence of hand hygiene. These professionals have a good theoretical and practical

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Hand hygiene: a review of understanding... knowledge on the subject, but when performing the technique they did not follow the steps recommended by the protocol, the main reason given was excess of professional activity. Decrease in excess of the work load of professionals and stimulus for correct practice of hand washing should be priority measures in the control of nosocomial infections.

REFERENCES

1. Martinez MR, Campos LA, Nogueira PCK. Adesão à técnica de lavagem de mãos em Unidade de Terapia Intensiva Neonatal. Rev Paul Pediatr. 2009; 27(2):179-85.
2. Pinto FOP, Baptista MA. Higienização das mãos: hábitos, obstáculos, e a técnica desenvolvida pelos discentes do 6º ano de medicina e do 4º ano de enfermagem de um hospital escola. Arq Ciênc Saúde. 2010 Jul-Set; 17(3): 117-21.
3. Tipple ACFV, Sá AS, Mendonça KM, Sousa ACSE, Santos SLV. Técnica de higienização simples DAS mãos: a prática entre acadêmicos da enfermagem. Ciencia Enferm. XVI. 2010; 16(1): 49-58.
4. Oliveira AC, Paula AO. Monitoração da adesão à higienização das mãos: uma revisão de literatura. Acta Paul Enferm. 2011; 24(3): 407-13.
5. Barreto RASS, Rocha LO, Souza ACS, Tipple AFV, Suzuki K, Bisinoto SA. Higienização das mãos: a adesão entre os profissionais de enfermagem da

Sousa JRM, Santos LFD, Cavalcante AAC *et al.* sala de recuperação pós-anestésica. Rev Eletr Enf. 2009; 11(2): 334-40.

Hand hygiene: a review of understanding... de infecção hospitalar: um estudo quantitativo. V Eletr enferm. 2011; 21(1): 1-12.

6. Cruz EDA, Pimenta FC, Palos MAP, Silva SRM, Gir E. Higienização de mãos: 20 anos de divergências entre a prática e o idealizado. Ciência Enferm XV. 2009 Apr; 15(1): 33-38.

13. Neves ZCP, Tipple AFV, Souza ACS, Pereira MSP, Melo DS, Ferreira LR. Higienização das mãos: O impacto de estratégias de incentivo à adesão entre profissionais de saúde de uma unidade de terapia intensiva neonatal. Ver. Latino de Enfermagem. 2006; 14(4): 546-52.

7. Scheidt KLS, Carvalho M. Avaliação Prática da Lavagem das Mãos pelos Profissionais de Saúde em Atividades Lúdico- Educativas. Rev Enferm UERJ. 2006 Apr-Jun; 14(2):221-5.

14. Tenna A, Stenehjem EA, Margoles L, Kacha E, Blumberg HM, Kempker RR. Infection Control Knowledge, Attitudes, and Practices among Healthcare Workers in Addis Ababa, Ethiopia. Infect Control Hosp Epidemiol. 2013 Dec; 34(12): 1289-96.

8. Mendonça AP, Fernandes MSC, Azevedo JMR, Silveira WCR, Souza ACS. Lavagem das mãos dos profissionais de saúde em uma unidade de terapia intensiva neonatal. Act Scientiarum. 2003; 25(2): 147-53.

15. Creedon SA. Healthcare workers' hand decontamination practices: compliance with recommended guidelines. J Adv Nurs. 2005 Aug; 51(3): 208-16.

9. Organização Mundial de Saúde. Controle de infecções hospitalares. São Paulo (SP); 2007.

16. Creedon SA. Hand hygiene compliance: exploring variations in practice between hospitals. Nurs Times. 2008 Dec; 104(49): 32-5.

10. Locks L, Lacerda JT, Gomes E, Tine ACPS. Qualidade da higienização das mãos de profissionais atuantes em unidades básicas de saúde. Rev Gaúcha Enferm. 2011; 32(3): 569-75.

17. Barrett R, Randle J. Hand hygiene practices: nursing students' perceptions. J Clin Nurs. 2008 Jul; 17(14): 1851-7.

11. Ministério da Saúde (BR). Agência Nacional de Vigilância Sanitária. Higienização das mãos em serviços de saúde. Brasília: Anvisa, 2007.

18. Bissett L. Can alcohol hand rubs increase compliance with hand hygiene? Br J Nurs. 2002 Sep; 11(16): 1074-7.

12. Coelho MS, Arruda C, SIMÕES FSM. Higienização das mãos como estratégia fundamental no controle

Sousa JRM, Santos LFD, Cavalcante AAC *et al.*
19. Tvedt C, Bukholm G. Alcohol-based hand disinfection: a more robust hand-hygiene method in an intensive care unit. J Hosp Infect. 2005 Mar; 59(3): 229-34.

Hand hygiene: a review of understanding...

20. Trick WE, Vernon MO, Welbel SF, Demarais P, Hayden MK, Weinstein RA. Multicenter intervention program to increase adherence to hand hygiene recommendations and glove use and to reduce the incidence of antimicrobial resistance. Infect Control Hosp Epidemiol. 2007 Jan; 28(1): 42-9.

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