

Hand Hygiene practices in inpatient mental health ward:

Action Research Study

Dissertation submitted to Selinus University of Sciences and Literature, in
partial fulfillment of the requirements for the award of the degree of
PHILOSOPHY DOCTORATE IN HEALTH STUDIES

Submitted by:

MALVIS IDENEKPOMA (STUDENT ID: UNISE786IT)

DECLARATION

“I do hereby attest that I am the sole author of this project/thesis and that its contents are only the result of the readings and research I have done”. The dissertation titled “Hand Hygiene practices in inpatient mental health ward: Action Research Study” Submitted for the Award of Doctorate in Health Studies at University of Selinus; is my original work and the dissertation has not formed the basis for the award of any degree, associateship, fellowship or any other. The material borrowed from similar titles other sources and incorporated in the dissertation has been duly acknowledged. The research papers published based on the research conducted out of the course of the study are also based on the study and not borrowed from other sources.

Date: 8 March 2019

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ACKNOWLEDGEMENT

I am thankful to University of Selinus for giving me an opportunity to pursue this Doctorate in Health Studies. I also express my deep sense of gratitude to the almighty God, my family members, friends & colleagues who have directly and indirectly supported me during this study.

Signature of Student :*MIdenekpoma*

STUDENT ID:

Hand Hygiene practices in inpatient mental health ward: Action Research Study.

Abstract:

Hand hygiene is considered a very important factor and practice of infection prevention practice, but previous studies demonstrate that healthcare workers have not fully complied with adhering to this practice. The aim of the research was to examine mental health care workers' practice and perspectives of hand hygiene, exploring their perceptions as healthcare professionals, so as to identify strategies to improve compliance.

This will be three-year action research study with data collected over one year on an inpatient mental health ward in a mental health hospital. The study will be composed of three phases: baseline data collection, implementation of intervention, and evaluation of change.

Nineteen healthcare workers were observed using both a WHO's hand hygiene questionnaire for health care workers (HCW). The purpose of the questionnaire will be to assess the hand hygiene knowledge, practice and belief of healthcare workers in the study ward

Observation in the form of naturalistic or participant observation was employed with a two-fold purpose:

- i) to validate and complete the data gathered through self-report questionnaires; and ii) to facilitate and describe the process of change.

Opportunities for hand hygiene and adherence was observed using the hand hygiene observation tool (HHOT) by Fuller C et al. Steering group was also used as the decision-making agent for the implementation of the nursing process

These same HCW, were interviewed individually to elicit their views. Data from the 10 interviews and field notes were analysed qualitatively. Observations demonstrated high levels of hand hygiene compliance for high risk and medium risk activities, with low levels of compliance for low risk activities. Study revealed a strong belief by healthcare workers in the value of hand hygiene. Compliance with hand hygiene by HCW is dependant on perceived levels of risk. The findings, conclusion and recommendations of the research study have significant implications for addressing the shortfalls of the hand hygiene agenda in clinical practice and for the engagement of mental health care workers.

1. Introduction

In the UK, the Department of Health (DH 2006), the Health Protection Agency (HPA) defined healthcare acquired infections (HAI) as “infections acquired in hospital” or “as a result of healthcare interventions. HAI is also called nosocomial infection which is a term commonly used in the USA.

HAI present economic burden to the health service (Dixon, 1978, French and Cheng, 1991), creating substantial expense to the health service (Rubenstein, Green, Nolan et al, 1982) and inconvenience and distress to patients.

HAI are not present or incubating when a patient is admitted to hospital. Study shows that 9 % of patient in hospital have a HAI infection at any given time and this affects the patient’s wellbeing and could also result in more disability or even death. (Emmerson et al 1996).

HAI are caused by different factors, with micro-organisms being the primary cause.

Microorganisms are all living things, which are invisible to the naked eye (Gross et al 1995). They have a direct impact on human life and are either helpful or harmful. HAI can be caused by different micro-organisms such as bacteria, virus, fungi, protozoa and prions. (Wilson 2006), with bacteria causing majority of the infection. (Emmerson et al 1996). Infection normally occurs after a microorganism invades a susceptible host.

Every hospital must have policies in place to ensure the control and prevention of hospital acquired infection. Health care workers including nurses are likely to be aware of infection control policies regarding infection control practices such as hand hygiene, use of protective clothing, and safe disposal of sharps (NAO, 2004).

Hand hygiene (HH) practice among health care workers is considered to be the single most effective method of preventing hospital-acquired infection in hospital settings (Barret & Randle, 2008;)

Hand hygiene practices could be either through traditional hand washing including the use of soap and medicated agents or the use of alcohol hand rubs. (Larson and Lusk 1985).

Some laboratory studies have suggested that medicated agents is more useful in bactericidal terms (Ayliffe, Babb and Davies, 1990) but choice of hand washing agents may be dictated by costs with expensive agents reserved for recognized high risk areas such as intensive care and theatres. (Steere and Mallison 1975),

Although several studies has highlighted the importance of hand hygiene compliance in preventing hospital acquired infections, the level of hand hygiene compliance still remains low worldwide, and it was termed “unacceptably poor” by a public health authority in London, United Kingdom. Different reasons for poor compliance has been suggested including lack of

facilities,(Harris et al. 2000), dislike of hand decontamination which has deleterious effects on skin (Zimakoff et al. 1992)., lack of knowledge and poor motivation (Bartzokas and Slade, 1991).

Research still concludes that hand hygiene compliance remains poor, although different Interventions to improve compliance, such as provision of an educational programme (Gould & Chamberlain 1997), a motivational programme (Simmons et al. 1990), automated sinks facilities (Larson et al. 1997), and patient educational programmes (McCuckin et al. 1999), have been implemented in different health care settings.

Although infection control practices are of the same principles in theory, the type of healthcare service could also have an impact on the practice among healthcare professionals. For example; nurses in a Mental health rehab ward have closer engagement in terms of relationship building and contact with service users than nurses in a general acute ward.

Most of the research and policies concerning hand hygiene practices and Infection control are related to acute services.

There is much literature on infection control generally, but little concerning mental health and none concerning infection control in mental health inpatient settings. (Sarah Freeman 2011)

This study will contribute to the resources and information available regarding Infection control in mental health hospitals.

This research study will focus on Hand hygiene practices as a method of preventing Hospital acquired Infections in an inpatient mental health ward.

1.1 Research aims of Study:

- To facilitate the implementation of hand hygiene practices in a mental health care home
- To contribute to knowledge development regarding factors facilitating or inhibiting implementation of hand hygiene in a mental health ward.

1.2 Research questions:

- Does an action research approach facilitate the implementation of hand hygiene practices
- What factors contribute to implementation of hand hygiene practices on study ward?

1.3 Search Methodology

A systematic approach was used to review the literature. Initial searches were conducted using combinations of keywords, which are relevant to the research question.

In the beginning, the keyword “Hospital acquired infection (HAI) and Nosocomial infection (NI) were used and then they were combined with infection control practices, factors”.

Additional search words and phrases such as HAI/NI in various combinations with prevention, control, link nursing, hand washing, Hospital acquired infection and hand washing, Healthcare acquired infection and hand washing, Hand washing, mental health, psychiatric, Infection control, psychiatric, Healthcare associated infection, psychiatric were used in order to shape to narrower topic.

Literature was selected from databases including British Nursing Index (BNI), Medline, PubMed, Nursing and Allied Health Literature (CINAHL), ScienceDirect, the Centers for Disease Control and Prevention (CDC), Health Protection agency (HPA), Department of Health (DH).

A search was carried out using Medline, CINAHL, E-Journal database via EbsCohost, Nursing times and Science Direct.

Below are results that were initially generated from EbsCohost search combining Medline, CINAHL, E-Journal in the search:

Hospital Acquired Infection / Infection control practices: 55 literatures

Hospital Acquired Infection / Infection control factors: 8 literatures

Nosocomial/ Infection control practices: 530 literatures

Hospital Acquired Infection / hand washing: 38 literatures

Hospital Acquired Infection / hand washing/inpatient: 2 literatures

Nosocomial / hand washing/hospital: 199 literatures

Nosocomial / hand washing/hospital: 26

Nosocomial / hand washing/mental health:1 literature

Hospital Acquired Infection / Infection/ mental health: 1 literature

Infection control/ mental health: 211 literatures

Infection control/ mental health: 5 literatures

Infection control/ psychiatric: 233 literatures

Hand washing /psychiatric: 13 literatures

Hand washing/ mental health: 10 literatures

All the papers were analysed and the ones that had unrelated title and Abstracts were excluded and dropped the number to 117.

Literatures related to infection control study was hand picked and this dropped the number to 56, which were further analysed for the study.

2: Literature Review

According to The Centers for Disease Control and Prevention (CDC 2010), Health care associated infection is “infections acquired during the course of receiving treatment for other conditions within a healthcare setting”. The CDC have used the generic term “healthcare-associated infection” or “HAI” instead of “nosocomial” since 1988 (Horan and Gaynes 2004). HAI are known as infections developed in hospital, or a systemic condition resulting from an adverse reaction to an infectious agent(s) or its toxin(s) after 48 hours of hospitalization (Siegal and Grossman 2008).

Infections spread through different means which include from person to person, originating from patients own flora while others could be acquired from environmental contamination. (COI 1985)

The second national prevalence survey of infection in hospitals by Emmerson 1996 reports different hospital acquired infections with Urinary tract infections as the most common type of hospital acquired infection and blood stream infections having the highest associated mortality.

This is in line with the Hospital acquired urinary tract infection study by Kalsi J et al 2003, which states that nosocomial urinary tract infections (UTIs) account for up to 40% of all hospital-acquired infections.

2.1 Infection in the hospital environment

The hospital environment differs from the home or community environment in different ways such as having a higher concentration of microbes, a higher proportion of bacteria that are, or can easily become, resistant to antibiotics and a higher proportion of susceptible hosts. Today's hospitals are modern, large, complex institutions containing a high concentration of patients with an infection and compromised individuals at risk of acquiring infection. The staff and patients in the hospital serve as the principal sources of infection, although there are many locations in hospitals that may be contaminated with potential microbial pathogens (Inglis 1996).

2.2 Impact of HAI

In January 2000, the London school of hygiene and tropical medicine and public health service published a report on a study to develop a model to cost the social economic impact of HAI. (Plowman et al 2000). This report shows that Patients with infections incurred costs on average 2.8 times greater than uninfected patients, with an average of additional cost of £2,917 per case (ranging from £1,122 for urinary tract infections to £6,209 for bloodstream infections). They also remained in hospital on average 2.5 times longer than uninfected patients, which on average is equivalent to 11 extra days.

Hospital acquired infections could be costing the NHS as much as 1 billion a

year. (Plowman et al 2000) The direct costs of treating hospital acquired infections has increased due to factors such as increased length of stay and additional antibiotic therapy and, where necessary, the need for repeat surgery.

HAI cause a significant annual financial loss to a country's economy and a far-reaching impact on healthcare in the world. This is estimated as approximately €7 billion in Europe, reflecting 16 million extra days of hospital stay and approximately US\$ 6.5 billion in the USA. (WHO factsheet 2010)

In 2004 in the United States, HAI accounted for approximately 99,000 deaths, affecting 1.7 million patients, with a total cost of \$6.5 billion to the healthcare system (Pittet D *et al* 2009)

There is difficulty in reporting worldwide impact of HAI due to the limitation in gathering reliable diagnostic information particularly from developing countries. It is estimated that more than 1.4 million patients worldwide in developed and developing countries are affected at any time.(WHO 2009),

There is different rate of infection between different countries and this also differs within the same country and depends on resources, carers and health staffs' involvement and patients' socioeconomic situation (Hambraeus 2006).

For instance, the global point-prevalence studies reported by Chawla (2008) revealed that HAI rates ranged from 6.1% to 15%, while a study from China found that the overall patient HAI rate was 26.8% or 51.0 per 1000 patient

days (Ji-Guang Ding et al 2009). A prevalence survey of all patients in Europe, Australia and North America found that 5-10% of all patients on admission will acquire HAI (Weston 2008; Breathnach 2009). This suggests that there is a substantial difference of the rate of HAI between developed countries and the china report.

The rate of HAI could also depend on the type of hospital unit or specialty. A study by (Glenister et al 1992) examined the incidence of hospital acquired infection after patient where admitted to different units which include medical, surgical, urology, gynecology and orthopedic units at one district general hospital during a thirteen month period. Although the overall incidence was 9.2% but there was variations in infection rates between the different hospital units ranging from 7.2 % in medical unit to 13% in orthopaedic unit. (Glenister et al 1992)

Studies also suggest that infection control practice compliance varies with professionals. In a study by Maheshwari V et al 2014, A total 160 respondents including residents and nurses were studied about their knowledge and attitude towards hand hygiene practices. The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses (62.5%) as compared to residents (21.3%) . This also suggests that the rate of HAI could also be related to the different professionals.

2.3 Infection control team

According to the Department's 1995 guidance, every hospital in the UK should have an infection control team comprising an infection control doctor and infection control nurse(s). This team has the primary responsibility for and reporting cases of infection prevention and control to the Hospital chief executive.

To improve infection control practices in Hospitals, the role of infection control nurses is becoming important especially in the development of infection control protocols but their intervention become limited unless supported by nurses and other healthcare workers directly responsible for patient care.

According to Larson 1983 peer pressure can have an influence in infection control practices, which suggest that infection control nurses can make an impact to the practices of nurses on the ward.

The ratio of infection control nurses to bed varies in different NHS trust.

A number American studies in the 1970s recommended that there should be one infection control nurse to every 250 beds. This was strongly supported by the comprehensive SENIC study (Haley et al 1985), which concluded "essential components of effective programs included conducting organised surveillance and having a trained, effectual infection control physician, an infection control nurse per 250 beds, and a system for reporting infection rates to practicing surgeons. Programs with these components reduced their hospitals infection rates by 32 per cent".

In UK NHS trust, the 1/250 has been widely quoted in business cases requesting additional staff resources partly due to the absence of any UK guidelines or benchmarks.

There are concerns if the infection control team in the NHS has the sufficient number of nursing staff to deal with the infection control requirement.

A survey of infection control team staffing reports a wide variation in the ratio of infection control nurses to beds with the average ratio of infection control nurses' time to beds in NHS Trusts being one infection control nurse to 535 beds (the median is 1: 472) and eighty seven per cent of NHS Trusts with ratios higher than the 1: 250 (NAO 2010)

Some NHS trust has adopted the use of Link nurses system. Link nurses are ward-based nurses who act under the supervision of the Infection control nurses. They are normally expected to have enough clinical experience and authority with managers and colleagues. Link nurses supports to increase infection control awareness in wards and could also be trained to collect surveillance data.

Report by NAO 2010 suggested that of the 128 NHS trust were Link nurses was being used, at least half reported that they found it successful in improving infection control especially in terms of awareness.

2.4 Infection Control In Psychiatric hospital:

Only very few studies have been executed to examine infection control practice in psychiatric facilities (Mailyn ott and Rachel French 2009)

Most of the current literature relates to infection control within an acute patient population that requires physical care. Psychiatric facilities often have fewer resources, fewer diagnostic measures, and fewer personnel to implement infection control measures and therefore infection control is often ignored (Cheng et al., 2007).

People with mental health illness do not maintain proper hygiene condition. They do not care for themselves, bathe or clean themselves because of their illness.

Infection control in a mental health setting is challenging, considering the health, ability, and behaviors associated with people with mental health illness. (Leggett &Williams, 2000).

There might be different factors, which affect Infection control practices in a mental health hospital such as practices of the healthcare workers, duties, knowledge about infection control issues and availability of infection control facilities.

Research evidence suggests that some mental health nurses lack knowledge about infection control issues. The study by Bennett and Manseu 2004 exploring the extent to which 543 registered nurses understood standard

infection control precautions, reports that 26 per cent said their knowledge was 'inadequate'. Forty per cent of these were mental health nurses and 50 per cent were learning disability nurses.

The study by Sarah Freeman 2011 reports that Charge nurses in an inpatient mental health hospital changed their infection control practice and knowledge after attending a cleanliness Champions training. They reported improved knowledge and practice. As nurses were from a mental health background, where infection control is not a core business, they did not expect to have a change in their knowledge and practice which eventually changed after their training programme.

This suggests that infection control practices among nurses in a mental health hospital could be improved by training although the study was among charge nurses who are less involved in most direct patient contact compared to junior nurses. It would be more useful to understand how this will also impact on infection control practices in junior nurses.

HAIs in Mental health patients have become an increasing concern worldwide because of their potential to cause physical health illness to patient who have mental illness.

Patients in psychiatric facilities have unique characteristics that differentiate them from patients in acute medical facilities. They usually have fewer comorbidities and indwelling devices in place than patients admitted to intensive care units or medical floors and are able to walk and mingle freely

on many wards. The stay for long periods of time in care and engage in group activities with peers such as recreational therapy. Their unique characteristics such as not cooperating with hygienic measures or health preventive measures, such as maintaining good personal hygiene could make implementation of infection control practices difficult. There is often limited use of alcohol hand rub in psychiatric facilities because of concerns about ingestion by patients with a history of substance abuse. Psychiatric patients have a high incidence of chronic infection related to substance abuse and socioeconomic factors, including human immunodeficiency virus (HIV) infection, hepatitis B and C, and tuberculosis. (Golf DC et al 2005)

Study by Ebner W *et al* on MRSA on closed psychiatric ward suggests that transmission of MRSA can be averted by the strict observance of standard hygienic measures, above all thorough regular hand disinfection after physical contact with MRSA-patients.

The inspections carried out in 2009 by the Regulation and Quality Improvement Authority (RQIA) on 21 Acute mental health hospitals across Northern Ireland noted that six wards achieved an overall compliance score, nine were partially compliant and six were minimally compliant to infection control practices which suggest that infection control is a concern in mental health hospitals.

From my experience in a psychiatric facility, health care professional engage with mental health patient in a great deal involving medical and therapeutic

treatment and its highly important to maintain infection control practices. There is obvious lack of research into infection control practices in psychiatric facilities.

With this research, I aim be able to contribute knowledge to the development of policies and initiate practices that will improve infection control practices in Mental health facilities.

2.5 Infection Prevention Strategy:

In December 2003, the Department of Health (DH 2003) distributed an infection prevention and control strategy, entitled Winning Ways, to be used as a standard guideline for infection control in the UK. In line with this, NHS trusts are compelled to develop and implement plans for reducing HAI, particularly MRSA.

Healthcare professionals working with patient need to maintain standard and basic principles to prevent Healthcare acquired infection

These include the following:

- a.) Hand hygiene, including alcohol-based hand rubs, antimicrobial hand washes and liquid soap.
- b.) Environment hygiene, including standard cleanliness, massive cleanliness, isolated management, and visitor management
- c.) The use of personal protective equipment, including facemask, gloves,

caps, protective cloth (gown), and apron

d.) The safe use and disposal of sharps

A. Hand hygiene

Hand hygiene practice among health care workers is considered to be the single most effective method of preventing nosocomial infection in hospital settings (Barret & Randle, 2008;) and has been recognized as early as the 1800s as a factor for reducing infection.

“Improper hand hygiene by healthcare workers (HCWs) is responsible for about 40% of nosocomial infections resulting in prolonged illnesses, hospital stays, long-term disability and unexpected high costs on patients and their families, and also lead to a massive additional financial burden on the health-care system”. (Maheshwari V 2014).

Although several studies has highlighted the importance of hand hygiene compliance in preventing hospital acquired infections, the level of hand hygiene compliance still remains low worldwide, and it was termed “unacceptably poor” by a public health authority in London, United Kingdom.

There are several studies supporting the notion that hand hygiene is associated with significant reductions in the incidence of HAI (Larson et al 2009; Backman et al 2008; Flores 2007; Chompook 2006). This is not surprising since most infections in hospitals and other healthcare settings are

caused by direct contact, usually via the hands of healthcare staff (Gould et al 2009; Allegranzi and Pittet 2009).

Cheng et al. (2007) suggest that potential transmission of infections between patient can be interrupted by engaging in hand washing using alcohol hand rub. Healthcare workers must take responsibility in supporting mentally ill patient to engage in hand washing practices before and after meal and at regular scheduled intervals. Alcohol hand rub was shown to have potent bactericidal and virucidal activity against a wide range of nosocomial pathogens in the control of outbreak of human metapneumovirus infection in Psychiatric inpatient.(Cheng VC et al 2007).

An audit of the hand hygiene equipment on 23 wards in Broadmore psychiatric hospital showed that there were significant deficits in the supply of hand hygiene equipment on the wards. This agrees with Staff survey carried out by East London NHS Foundation trust (mental health services) in 2013 which reveals that staff are not confident about availability of hand hygiene facilities with only 35% of staff stating that hand washing materials are always available in comparison with 37% in 2012. (Carol S 2014).

Study carried out by Anargh V, 2013 to assess knowledge and practices regarding hand hygiene among HCWs of a tertiary health care facility, reports that Heavy workload (38%), non availability (52%) and inaccessibility (9%) of hand hygiene facilities were the common reasons for non-compliance. This is supported by Tenna A et al 2013 study involving HCWs at 2 university

hospitals in Addis Ababa, Ethiopia which reports that barriers for performing hand hygiene included lack of hand hygiene agents (77%), sinks (30%), and proper training (50%) as well as irritation and dryness (67%)

Tenna A et al 2013 also reports that only 30% of HCWs stated that clinical supervisors emphasize the importance of hand hygiene suggesting the need to change the culture of supervision and place a strong emphasis on infection control ownership and leadership, which is key for a successful infection control programme. This is also supported by Erasmus 2009, which states that example set by senior staff in a hospital is very important for hand hygiene compliance.

Previous research has stated that different health care professional in the same hospital could have different attitude and beliefs about infection control practices. According to Erasmus 2009 on studying the potential determinant of hand hygiene compliance, physicians mainly mentioned the protection of the patient as important advantages of hand hygiene, whereas nurses and medical students primarily mentioned self-protection.

In a study by Maheshwari V 2014, A total 160 respondents including residents and nurses were studied about their knowledge and attitude towards hand hygiene practices The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses as compared to residents

Although Maheshwari V, 2014 reports hand hygiene practice as better than other professional, a staff survey conducted by Ahmed 2010 using a questionnaire designed to assess awareness, training and hand decontamination practice among nursing staff identified a need to increase awareness of the hand hygiene policy and the appropriate timing of hand decontamination procedures as there was need to increase infection control practice compliance among nurses.

In healthcare, evidence based practices is becoming increasing important and also from study by Erasmus 2009, Physicians mentioned that their noncompliance was associated with their belief that there was no enough evidence that hand hygiene is effective in the prevention of hospital-acquired infection.

Infection control practices in mental health facilities are particularly challenging as hand hygiene protocols are more specific to acute care facilities (Cheng et al., 2007). There is likely less intimate contact between patients and healthcare workers that would typically require hand washing (Whitby & McLaws, 2006). The risk of hand hygiene products to the patient population and the availability of single rooms for isolation are factors present in a psychiatric setting. (Leggett & Williams, 2000)

The use of gloves for infection control has also been recommended by different studies. This study by Gonzalo Bearman 2013 which sought to

assess whether a mandatory gloving policy implemented in a pediatric units reduced the risk of other health care-acquired infections suggests that mandatory gloving resulted in reduction of any healthcare-acquired infection (HAI) risk by 25% in gloving period compared to non gloving period.

It has become important as part of ward policies for healthcare workers to use glove during clinical practices to reduce HAI.

Although the use of gloves has its own importance, it does not replace hand-washing practices.

B. Environment and isolation management

Maintaining a good healthcare environment is necessary for good infection control (IC) management and also promotes the image of the hospital. Poor cleanliness not only impacts on IC difficulties, but also leads to increased public awareness.

According to Dancer (2009) the hospital environment is associated with an increase in several pathogens, including methicillin-resistant *Staphylococcus aureus*, *C. difficile*, norovirus, and *acinetobacter* and removal with or without disinfectants seems to be linked with reduced infection rates in patients. In addition, a lack of maintenance, poor ventilation and overcrowding can promote cross infection between patients. This report also suggests that hand-touch sites are regularly contaminated with hospital pathogens, which are subsequently transferred to patients via the hands.

C. Protective equipment use

The Use of personal protective equipment, including the use of personal protective cloth (PPC), aprons, masks and gloves, is of utmost importance in the prevention and control of HAI.

PPE reduces the risk of infection occurring by preventing the Transmission of micro-organisms to the patient via the hands of staff or visa versa. PPE includes items such as gloves, aprons, masks, goggles or visors.

The use of gloves should not replace hand hygiene and it is therefore important for gloves to be worn only when necessary and also hand hygiene should be performed following removal of gloves.

It is necessary for gloves to be worn whenever contact with blood and body fluids, mucous membranes or non-intact skin may occur. It should be worn before the task is performed and discarded after procedure is completed.

The Control of Substances Hazardous to Health Regulations (2002) require employers to wear gloves when there is a risk of exposure to substances hazardous to health, including biohazards within blood and fluids.

The use of disposable plastic aprons provides a physical barrier between clothing/skin and also prevents contamination. Aprons also prevent clothes and uniforms from becoming wet during bathing/washing or equipment cleaning.

The use of apron is also important when there is a risk of contamination of uniforms or clothing with blood and body fluids and when a patient has a known or suspected infection.

D. The safe use and disposal of sharps

The disposal and safe use of sharps is a very important in healthcare facilities in maintaining personal and environment standard precautions. Failure to observe proper procedures can cause injury both to healthcare staff and patients. In the UK, sharp injuries account for approximately 17% of all reported healthcare injuries (National Audit Office 2003).

Sharp instruments are also agents for the transfer of HAI. Researches reports that the handling and disposal of sharp instruments such as needles and scalpels by healthcare workers is often careless (Band et al, 1990) and could result in HAI.

3.0 Infection Outbreaks in Psychiatric facility.

According to Yuriko et al 2013, the three most common infection outbreak in a Psychiatric facility are Respiratory tract infection, Gastrointestinal infection and Skin infection.

3.1a Respiratory Tract Infection

Respiratory tract infection such as Respiratory syncytial virus, Adenovirus, Human metapneumovirus, Influenza virus, Group A streptococci account for most outbreak in mental health or psychiatric units.

Below are some of the respiratory tract infection records in a psychiatric unit.

Respiratory Syncytical Virus

Respiratory syncytial virus, or RSV, is a respiratory virus that infects the lungs and breathing passages. Its symptoms include mild, cold-like symptoms, which recover in a week or two. But RSV can be serious, especially for infants and older adults. In addition, RSV is being recognized more often as a significant cause of respiratory illness in older adults and in children.

In August 2005, An outbreak of nosocomial RSV infection with fever and upper respiratory symptoms occurred in a psychiatric ward of an acute tertiary care hospital in central Taiwan and affected 12 people which include 8 patient (5 with schizophrenia and 3 with dementia) and 4 healthcare workers. (Huang

FL 2009)

Adenovirus

Adenoviruses are common viruses that can cause illness in humans with most illness not serious. It most often causes respiratory illness. The viruses may also cause fever, diarrhea, pink eye, bladder infection (cystitis), or rash illness. Anyone can get infected with adenoviruses. Adenovirus can be transmitted by having close contact with people who are infected these viruses or those who are sick.

An outbreak of adenovirus type 35 infection occurred in a chronic psychiatric care facility in Rhode Island in 1995. Crowding and poor hygienic behaviors probably facilitated transmission among residents. (Sanchez et al 1997)

Human metapneumovirus

Human metapneumovirus (hMPV) is a recently identified member of a family of viruses, which was identified in 2001 in the Netherlands, although it most likely has been causing respiratory illness worldwide. Human metapneumovirus can cause upper and lower respiratory tract infections in people of all ages. Upper respiratory tract infections include colds, while lower respiratory tract infections include pneumonia or bronchitis.

Most people with hMPV infection have mild symptoms. But some people have more severe illness, with wheezing, difficulty breathing, hoarseness, cough,

pneumonia, and a flare-up of asthma. HMPV can cause more serious illness in children younger than 1 year of age, the elderly and people who have weak immune systems.

In 2005, a large psychiatry department in Hong Kong experienced 6 nosocomial outbreaks 4 of which were likely related to a respiratory viral infection, including hMPV, influenza A virus, and rhinovirus.(cheng et al 2007).

Influenza virus

Influenza virus causes influenza commonly known as flu. Symptoms can be mild to severe and include high fever, runny nose, muscle pain, headache, coughing, sore throat, and feeling tired. There are two main types of influenza (flu) virus: Types A and B. The influenza A and B viruses that routinely spread in people (human influenza viruses) are responsible for seasonal flu epidemics each year. Influenza A viruses can be broken down into sub-types depending on the genes that make up the surface proteins.

There have been several studies that have reported influenza outbreaks in psychiatric units.

Influenza A outbreak occurred in a 26-bed locked adult behavioral health unit in a Veterans Affairs hospital in 2006. In 1992 and 1993 there was a large influenza outbreak caused by influenza A and B viruses in Japan in a 230-bed residential facility for mentally handicapped people.

Group A streptococci

Group A *Streptococcus* (GAS) is a bacterium that can cause a wide range of infections. It sometimes exists on the skin or in the throat and presents no symptoms of illness. Most GAS infections are relatively mild illnesses such as "strep throat," or impetigo (a skin infection). Occasionally these bacteria can cause severe and even life-threatening diseases. These bacteria are spread through direct contact with mucus from the nose or throat of people who are sick with a GAS infection or through contact with infected wounds or sores on the skin. Dworkin et al reports GAS outbreak in a 251-bed residential facility for medically handicapped people in Illinois. There were 67 cases of infection including residents (57) and staff (10) reported.

During a pneumococcal disease outbreak in a pediatric psychiatric unit in a hospital in Rhode Island, USA, 6 (30%) of 20 patients and staff were colonized with *Streptococcus pneumoniae* serotype 15A. Enhanced infection control measures including Hand hygiene were implemented to subdue outbreak. (Katherine Fleming-Dutra et al 2012),

Tuberculosis

TB is a disease caused by a bacterium called *Mycobacterium tuberculosis*. The bacteria usually attack the lungs, but can also attack any part of the body such as the kidney, spine, and brain and could be fatal if not treated properly. In a long-term care facility in France, 6 (40%) of 15 mentally handicapped

HIV-seronegative patients developed culture-positive pulmonary tuberculosis.
(Lemaître *et al* 1996)

3.1b Gastrointestinal infection

This include Norovirus, Salmonella spp, Hepatitis A, parasites,
Gastrointestinal infection is the second most common outbreak in psychiatry
units.

Norovirus

Noroviruses are a group of viruses that cause gastroenteritis which is an
inflammation of the lining of the stomach and intestines, causing an acute
onset of severe vomiting and diarrhea. Norovirus illness is usually brief in
people who are otherwise healthy. Young children, the elderly, and people
with other medical illnesses are most at risk for more severe or prolonged
infection.

Norovirus infections spread very rapidly. Healthcare facilities and other
institutional settings (e.g., daycare centers, schools, etc.) are particularly at-
risk for outbreaks because of increased person-to-person contact. The
symptoms of norovirus illness usually include nausea, vomiting, diarrhea, and
some stomach cramping. Sometimes people also have a low-grade fever,
chills, headache, muscle aches, and tiredness. (CDC). There are several
studies, which have reported the outbreak of Norovirus infection in psychiatric
facility.

There was four norovirus outbreaks which occurred during a 3-year period (2005-2007) in an 445 bed in-patient psychiatric care unit in Taiwan. A total of 184 patients were affected which included 172 hospitalized patients, seven healthcare workers (HCWs) and five psychiatric nursing-home residents (Tseng et al 2011).

Gilbride et al 2009 also reported an incidence in Canada in 2006 in a 42-bed acute care psychiatry area in acute care hospital which affected 25 people including patient and staff.

Salmonella Species

Salmonellosis is an infection with bacteria called *Salmonella*. They were discovered by an American scientist named Salmon, for whom they are named and has been known to cause illness for over 100 years.

“Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons, the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness” (CDC gov). *Salmonella* species causes a lot of outbreak in UK.

Evans et al 1996 reported a 1 week outbreak in a 300-bed hospital for mentally handicapped patients. Outbreaks occurred through close person-to-person contact

Goh 1992 reports an outbreak of typhoid was reported in a large psychiatric institution in Singapore. A total of 95 (4.8%) of the 1965 inmates were infected, 47 with symptoms and 48 asymptomatic. Transmission was through close person-to-person contact and not through contaminated food or water. The source of infection could not be established. Environmental sanitation was one of the interventions used to control outbreak.

3.1c SKIN INFECTION

Skin Infection is the third most common infection outbreak in Psychiatric units.

Scabies

Acute care facilities and long-term care facilities haven been reported to have outbreak of scabies (vorou et al 2007). In Japan in 2002, 26 patients in a closed psychiatric ward of a psychiatry facility developed scabies.

Methicillin-Resistant Staphylococcus aureus (MRSA)

MRSA has caused infection outbreak in different healthcare settings over the years. An outbreak of MRSA infections occurred in institutionalized adults with developmental disabilities in a psychiatry facility in Israel, which affected 20 of

28 residents. The victims developed infectious episodes, including skin and soft-tissue infections, conjunctivitis, and external otitis, but no invasive disease. (Borer A 2002).

4. 0 Infection prevention, detection and control measures:

The Department's guidance (DH 1999) and the Standards in Hospital Infection Control (Infection control 1993) have identified the following as the main infection prevention, detection and control measures:

- Surveillance
- Education and training
- Policies and Procedures
- Monitoring and audit of hospital hygiene
- Clinical audit of infection control measures
- Contributing to decisions on purchase of equipment and facilities management
- Arrangements for dealing with infections including outbreak control, targeted screening and isolation of patients

Surveillance

“Surveillance is an essential component of the prevention and control of infection in hospitals. It consists of the routine collection of data on infections among patients and staff, its analysis and dissemination of results to those who need to know so that appropriate action can be taken.”

The main objectives of surveillance is :

- _ to prevent and detect outbreaks early for timely investigation and control;
- _ for the assessment of infection levels over time to help determine the need for preventative or control measures and also measure the effect.

A comprehensive five year study of infection control in over 300 hospitals in the United States of America (the SENIC project - Haley et al, 1985) showed that infections was reduced by an average of 32 per cent in hospitals with infection control programmes which included surveillance and feedback to clinicians while hospitals with an infection control programme that excluded surveillance reduced rates by 6 per cent over a five years study period. This research concluded that even the most rigorous infection control policies are unlikely to be fully successful without organised routine surveillance systems.

Education and training

This can be a powerful tool for reducing HAI.

Hospital has a duty to provide infection control trainings to its staffs. This is usually embedded as part of the staff induction process and a recommendation of periodic refresher training.

Although reports suggests that effective education and training is a key measure in the prevention of hospital acquired infection but the current

provision falls below the basic requirement indicated in the Departmental guidance, which recommends that all staff should be provided with education in infection control procedures. (NAO 2010)

The Department of health's 1995 guidance places responsibility on infection control teams to ensure that they establish an education programme for all employees and students with priority given to staff who have direct contact with patients.

A direct observational prospective study of hand hygiene effectiveness prior to training and immediately after training by Hautemaniere A et al 2010 demonstrate that an educational program can significantly improve the proper practices for using hand rub and hand washing compliance.

Policies and procedures

The Departmental guidance on controls assurances (DH 1999) reaffirms the need for every hospital to have written policies, procedures and guidelines for the prevention and control of infection, and that they are reviewed regularly.

Reports suggest that not all NHS Trusts had comprehensive written policies and procedures for the prevention of infection.

This could have an impact on the infection control practice of health workers.

5. Methodology

This was a three-year Action research (AR) study with data collected over one year on an inpatient mental health ward of a Private Mental health Hospital. The study composed of three phases: baseline data collection, implementation of intervention, and evaluation of change (see Figure 1 below).

Action research is based on societal models with its origins in the 1940s when Lewin (Lewin K 1946) solved social problems in participative ways. (AR) is increasingly becoming more popular within health care (East and Robinson, 1994). It comprises a useful methodological approach which is able to facilitate changes within health care settings and also support health service delivery development (Hampshire, 2000; Tanna NK, 2005).

AR focuses on facilitating action and generating knowledge about that action (Meyer, 2000), unlike other research approaches aimed only at generating knowledge and understanding of specific problems. AR attempts to bridge the gap between theory and practice (Holter and Schwartz-Barcott, 1993; Rolfe, 1996), is problem-focussed (Hart and Bond, 1995) and informed by the reality of practice (Waterman et al. , 1995).

Action research is very appropriate for nursing as a method of narrowing the theory–practice gap (Rolfe G.1996), because of its focus on processes

(Badger TG 2000) and because of the similarity of the action research cycle to the nursing process (East L 1994). AR have two key element which are the cyclical process and the collaborative element (Waterman et al., 2001).

In AR, researcher and practitioners works closely in every stage of the process, to systematically identify issues and problems and to improve professional practice and quality of care (Waterman et al., 2001).

The cyclical process of AR includes problem identification – planning of action – implementation of action – evaluation and reflection (Waterman et al., 2001).

In AR both quantitative and qualitative approaches can be employed, although the majority of AR experiences utilize a qualitative approach.

According to Denscombe (Denscombe M 1998),, AR has four characteristics which are participatory, practical, cyclical and change-promoting. It is participatory because participants are collaborators rather than subjects, practical because it is connected with the problems of daily nursing practice. Its cyclical aspect refers to the spiral of action research developed by Kemmis (Kemmis S. 1988) and the promotion of change has been described as an essential part of the process.

5.1 Study Design

This was a three-year action research study with data collected over one year on an inpatient mental health ward in a mental health hospital. The study will be composed of three phases: baseline data collection, implementation of intervention, and evaluation of change (see Figure 1). These three phases were interrelated and constitute a unity. Nevertheless, as each phase had its own data collection methods, the data from each phase were analysed separately.

The AR method for this research will be in 3 phases described below:

Phases	Phase 1	Phase 2	Phase 3
	Base line data collection	Implementation of intervention	Evaluation of change
Action research stages	Planning	Action	Evaluation
Data collection methods	<ul style="list-style-type: none"> Nurses and staff structured self report questionnaires 	<ul style="list-style-type: none"> Participants observation Steering group(meeting 	Same as phase 1

	<ul style="list-style-type: none"> • Participation observation • Interviews 	s)-minutes	

The sample for this research study is a 18 bedded male Mental health Acute ward. Researcher decided to use a male ward as it appeared to be calmer than a female ward. According to the research study by Hawley et al on the "Effect of single sex ward on mental health", Staff described differences emerging between the male and female wards, with the male ward becoming calmer, while the female ward became more disruptive after mixed ward was changed to single sex ward.

In selecting the ward, the following criteria was applied.

- that no previous research related to hand hygiene had been conducted on the ward;
- ward size should be maximum of 20 beds in order to keep data collection manageable.

The study ward staffing level includes ward manager, 11 Band 5 staff nurses, 3 Band 6 Clinical practice lead nurse, 4 healthcare assistants, 1 ward doctor, 1 occupational therapist, 2 domestic staff.

PHASE 1 STUDY:

Phase 1 took place for five months. In this phase, baseline data regarding hand hygiene practices in the study ward will be gathered both to inform decisions for the implementation of hand hygiene practices and to allow for evaluation of the Changes later on.

The role of the researcher during phase I will be that of 'observer as participant. The main purpose of the researcher's role will be to gather the baseline data necessary for the implementation of the hand hygiene practices. The researcher will also gather information about the ward and its organization through informal talks with the ward manager, staff nurses and other healthcare workers.

In line with the experimental approach to action research, participants will not be involved in data collection nor data analysis,

The health care workers participation during this phase will consist of their participation in the interview, and filling in a self -report questionnaire.

Questionnaire:

During this phase 1 study, researcher visited ward and hand over questionnaire to all healthcare workers and also use the same opportunity to answer any question that HCW might have.

The reasons for using questionnaire to collect data is :

1. the belief that health care workers are an important source of information regarding their own practice;
2. and the fact that there was an already developed tool, which was validated and reliable.

The purpose of the questionnaire was to assess the hand hygiene knowledge, practice and belief of healthcare workers in the study ward.

The Knowledge was assessed using the WHO's hand hygiene questionnaire for health care workers. This proforma of 25 questions includes multiple choice and "yes" or "no" questions.

The knowledge of hand hygiene was scored as follows: each correct response was given one (1) point and each wrong response given a score zero (0). The maximum score will be 25 marks. The total score for each respondent was expressed as a percentage of the maximum score. Respondents were then categorized into those with poor knowledge (<50%), fair knowledge (50-69.9%) and good knowledge (>70%).

All HCW completed a consent form to participate and the researcher also confirmed their willingness to participate in the study verbally. They were told they could answer the questionnaire either on the ward or at home and to leave it in the researcher pigeonhole on the ward once completed.

It is relatively cheap and quick to gather data using a questionnaire, although they have the disadvantages of a potential low response rate and the wording could be less understood by participants (Murphy- Black, 2000). Using a questionnaire as a tool also allows for anonymity and facilitate rapid analysis using computerised statistical packages (Muhall, in Roe & Webb, 1998).

According to Muhall the use of questionnaire could cause a risk of bias caused by respondents' desire to give expected answers or by the inaccurate reporting of events or behaviours. These potential problems will be addressed in this research by using methodological triangulation to compensate for the limitations of subjective data.

Semi-structured interviews

The researcher aimed was to conduct 10 audio-taped interviews during phase 1 with 10 different members of the organization across the different professions. The average time for each interview was 30- 45 minutes and

they will take place in a relaxed but professional atmosphere.

Before starting the interviews the researcher assured each interviewee of the confidentiality and anonymity of the data. In addition to audio-taping the interviews, notes relating to the content and the context, such as interruptions will be taken.

One of the advantages of using interviews as opposed to self-report questionnaires is that data are gathered immediately and directly and also allowing the interviewee to ask question clarification and for interviewers to probe or request more detailed information if needed (Pontin, 2000a). Another important strength of this data collection method is the richness of data that can be obtained (Gilham, 2000).

Observation:

Observation in the form of naturalistic or participant observation was employed with a two-fold purpose:

i) to validate and complete the data gathered through self-report questionnaires; and ii) to facilitate and describe the process of change.

Opportunities for hand hygiene and adherence will be observed using the hand hygiene observation tool (HHOT) by Fuller C et al.

Opportunities for hand hygiene was measured at the chosen field of view, which will be Hallway (close to bedrooms), Treatment room, and Dining room. Hand hygiene taking place outside of this area, and therefore not seen, is assumed not to have taken place

The HHOT records the five moments for hand hygiene , associated hand hygiene behaviors and the type of Healthcare Worker.

The five moment of hand hygiene recorded by the HHOT are:

- i. Before patient contact
- ii. After patient contact
- iii. After contact with patient surroundings (i.e. space within curtains or patient's side room)
- iv. Before an aseptic task
- v. After body fluid exposure risk

The hand hygiene behavior measured by the tool are classified as:

- i. Alcohol hand rub (AHR) (use of AHR)
- ii. Soap (use of soap and water)
- iii. No action (clearly observed to do neither)
- iv. Unknown (no hand hygiene behavior seen before/after an unobserved moment & AHR is behind curtains.)

HCW will be categorized into four categories namely Doctors, Nurses, Healthcare assistants, and others (OT, psychologist, phlebotomist, auxiliary staff (domestic staffs, kitchen assistant)).

For the observation, “Before” is defined as: The point at which an opportunity begins during a patient contact episode and “After” is defined as: The period immediately after a break in a contact episode.

Hand hygiene moment would not be double counted. If a HCW is observed moving directly from one hand hygiene moment to another, without any intervening contacts this should will be classified as one “after” moment and not as an “after” and as a “before” moment.

Overall compliance hand hygiene compliance will be measured with the formulae below:

Overall compliance (%):

$$\frac{\text{(Number of soap + AHR behaviors)}}{\text{(Number of soap + Number of AHR + Number of no actions)}} \times 100$$

To test whether compliance varied across HCW type being observed, ward, time of day, and type of opportunity, chi-square tests will be used.

An important consideration when using observational methods is the potential problem of reactivity, that is, the change of behavior in participants as a

consequence of the presence of the observer (Polft & Hungler, 1995).

WHO guidance recommends observation for 20 minutes (+10 minutes if necessary) (WHO 2009).

Findings indicate that observation periods should be either 20 minutes or one hour, since these periods may be the least reactive. However, the number of hand-hygiene moments observed over 20 minutes from study by Fuller C et al was unlikely to provide enough observations (at least 15) to meet the observational tool's inter-rater reliability criteria (McAteer J, 2008).

The period of observation for this research study is set at one hour which is the same as the optimal period of observation for the FIT trial (McAteer J, 2008).

To avoid reactivity by HCW, observations will be carried out on different days and shifts.

Regarding the descriptive data that will be obtained, the researcher will follow a content analysis framework (Polit & Hungler, 1995).

There were two objectives to phase 1 data collection:

- i) to evaluate the current level of implementation of hand hygiene on the ward; and
- ii) to explore the readiness of the study ward for the improved hand

hygiene practice. (by 10 interview).

PHASE 2 STUDY:

Phase 2 was conducted immediately after phase 1 and for a period of six months.

1). During this phase the implementation of hand hygiene on the study ward will take place.

In this phase, the researcher will act as 'participant as observer' both facilitating the change and collecting data regarding the change process.

Steering group was the decision-making agent for the implementation of the nursing process.

The Steering groups were set up just before the end of phase 1.

In order to set up the steering group, the researcher informed all HCW of the aims of the group and emphasize the importance of reflection, discussion and planning within the group. The HCWs will also be reminded of the importance of their representation in this group.

The Steering group comprised of ward manager, band 6 nurse, Staff nurse, support worker, one other HCW, domestic staff and researcher.

A voting system will be used to select the members of the steering group.

Prior to voting, all HCW will be encouraged to put their names forward as possible candidates

The meetings took place during the six months of Phase 2 data collection period, mostly on a weekly basis. Each meeting will last approximately 1.5 hours

The researcher's role in the steering group will be as an integrated member but providing theoretical expertise and facilitating group dynamics. As facilitator, the researcher will foster other members' participation in the decision-making; and as expert she spontaneously contributed through her personal knowledge and expertise.

The main data collection method during phase 2 will be Field notes collected from steering group meetings and the researcher's fieldwork on the ward. Tape recordings of the steering group meetings will also take place during meetings.

In general, the discussions at the steering group will be open and all members will have equal opportunity to intervene.

To facilitate the collaboration of other ward HCW, the steering group members will hold informal and formal meetings with the HCW on the study ward.

In these meetings information will be passed to the HCW regarding aspects discussed and decisions achieved by the steering group.

In order for information to be effectively transmitted from steering group

members to other HCWs, the researcher will elaborate a bullet point summary at the end of each meeting and give copies to each member.

During the first steering group meetings, the researcher will share the findings from phase I with the members.

In order to work more closely with the HCW on the study ward, the researcher will spend some time each week working with them on the implementation of hand hygiene practices.

At the same time, information regarding the process of change will be gathered.

PHASE 3 STUDY

Phase 3 of the study will evaluate both the process of change and the degree of implementation of the hand hygiene following phase 2.

The same structure used in phase 1 will be used to present phase 3 (6 weeks duration).

The data collection tool used for phase 1 (Self directed questionnaire, semi structured interview and observation) will also be used for Phase 3 study with some alteration to fit purpose.

There are two objectives to phase 3 data collection:

- i) to measure the degree of implementation of hand hygiene practice on the study ward reached after the implementation phase; and
- ii) to know the participants' opinions regarding the process and outcome of change.

The purpose of the semi-structured interviews in phase 3 will be different from the purpose in phase 1. While in phase I the objective was to explore the readiness of the study ward for the implementation of improved hand hygiene, in phase 3 the purpose was to know participants' opinions regarding the process and effectiveness of the intervention. For this reason, a different sample will be used for interviews in phases I and 3.

Data from phase 3 will follow the same analysis procedure as in phase 1. Data from each tool will be analyzed individually. The findings from the questionnaire will be compared to the findings obtained from the observation recording tool, and, when appropriate interview data.

In addition, comparisons between data gathered in phase 1 and 3 for each tool will be carried out in order to study the changes obtained. The comparisons will be conducted through different procedures depending on the data collection tool and the type of data. For some data, statistical test will be applied to evaluate whether there were significant differences between phase I and 3 samples.

5.2 Access:

Once official permission to carry out the study was given I approached the selected ward to seek their permission and agreement to be involved in the study. I spoke with the ward manager and he was happy to be involved in research.

Staff free choice to participate is essential when using an action research approach as it is not possible to carry out this research method without the involvement and collaboration of participants

(Hart & Bond 1995; Holter & Schwartz-Barcott 1993). I will try to encourage participants by explaining the study and the advantages that it could bring to them, but without using any kind of coercion. This will be done individually or in a small group.

The objectives of the research study; a brief summary of the benefits of improved hand hygiene practices together with the possible benefits of participating in an action research project will be explained. The phases of the study and the data collection methods, such as observation, questionnaires and evaluation of nursing records will also be explained.

5.3 Ethical issues:

Ethical approval was obtained from the management of Jamadia Hospital. Written informed consent was obtained from participants and confidentiality was ensured throughout the study.

Problems with informed consent

In PAR, there are Ethical issues concerning informed consent such as informing participants, right to withdraw, giving of consent, consent to the unknown and 'joiners' in the research.

Free choice about participation in a study is based on accurate information (Salinas Mulder S 2000).

The participants will be informed about the research and also given a written information leaflet, in which they will be told that they could withdraw at any time.

As the action research process cannot be determined accurately in its initial phase, participating in the research is 'a step into the unknown' and means giving consent to unknown changes (Meyer JE 1993). At the beginning of study, it will be pointed out that changes concerning the process and the schedule might occur, but that the staff would have control over the changes

as participants in the process.

5.4 Confidentiality and anonymity

It is necessary to take the protection of the identity of all participants and confidentiality of interviews into account in PAR.

It is easier to protect the identity of an individual practitioner in traditional research than in action research, where the recognition of the views of individual participants may be possible owing to the small number of research participants (Waterman H 1995).

The findings will be shared with the participants after the evaluation of the study. The participants will be asked to comment on the findings before the final report and these comments will taken into account.

Another possible problem is the identification of a particular role, which could only be carried out by one individual (Lathlean J 1996). This issue could be taken into account in this study by reporting the findings of whole focus group instead of mentioning each participant's specific occupation. I will also request consent for the recording of focus group interviews before each session. In presenting any comments from staff, all names will have to be changed to provide anonymity.

In the information leaflet, the confidentiality of the interviews will be explained to the participants, as well as the fact that the interviews would be recorded and used solely for research purposes. However, each participant will be asked individually for consent to the recording of the interview. The anonymity of the participants will be guaranteed, and it will be impossible to identify the answers of participants after the data had been analysed.

5.5 Protecting an individual from harm

Almost all research that has to do with human subjects will involve some type of intrusion into their lives (Polit DF, 1993).

According to Kerr (Kerr D. 1996), changes make large emotional, physical and social demands on all involved, and all changes should take place slowly. For this study, I will take the expected changes into consideration by discussing it with participants from the onset.

As much as possible, discussion will be held to resolve different issues with the nursing staff at time most convenient for them. The study will also progress on their terms.

The role of the researcher

According to researchers, involvement in action research has been characterized to either 'insider' or 'outsider' models (Le May A et al 2001). The insider 'combines the roles of actor (clinical leader with authority for initiating change), change agent and researcher,' while the outsider is

'someone from outside the setting (no authority), who does not initiate or carry out the change.'

The participants' and researcher's abilities are important in choosing the model which is most appropriate for the change.

For this study, my involvement will be as an outsider and Insider. I will be an outsider because I am from outside the setting and as an insider, in the sense of initiating the change process in cooperation with other participants, as well as being the change agent.

In nursing, it is possible for action researchers to be insiders because they share occupational status with participants.

Department of health (2006) The Health Act 2006: Code of Practice for Prevention and Control of Health Care Association Infection. London, Department of Health.

6.0 Results:

Characteristics of Respondents':

A total of 22 healthcare workers filled out the questionnaire, the majority of which 16 (72.7%) were healthcare assistants, 6 (27.8%) were nurses. Majority (19) were within the 20-29 age-group and 18 were females and 4 were males. Majority (20) had 1-5 years of working experience and more than half of the respondents' (18) have had training in hand hygiene.

Knowledge on Hand Hygiene by Respondents' :

Table below demonstrates knowledge on hand hygiene by respondents' using the WHO hand hygiene questionnaire for healthcare workers. Only 5 of the respondents' knew that 20s is that the minimal time needed for alcohol-based hand rub to kill germs. 17 of the respondents' knew that hand hygiene should be performed before and after touching a patient. Also 16 respondents knew that hand rubbing is not more effective against germs than handwashing. Less than half of the respondents' were aware of the hand hygiene method needed after making a patient's bed. 14 respondents were aware that the following should be avoided as is associated with increased likelihood of colonisation of hands with harmful germs: wearing jewellery, damaged skin and artificial fingernails. The overall knowledge score computed showed that 29.5% of the respondents had poor knowledge, 51.2% had fair knowledge and 19.3% had good knowledge.

	Staff no with correct answers
1.Which of the following is the main route of cross transmission of potentially harmful germs between patients in a health-care facility? (Health-care workers hands when not clean)	19
2.What is the most frequent source of germs responsible for health care- associated infections? (Germs already present on or within patient)	15
Which of the following hand hygiene actions prevent transmission of germs to the patient? 3.Before touching a patient (Yes)	17
4.Immediately after risk of body fluid exposure (Yes)	14
5.Immediately before a clean/aseptic procedure (No)	12
6.After exposure to the immediate surroundings of a patient (Yes)	16
Which of the following hand hygiene actions prevents transmission of germs to the healthcare worker? 7.After touching a patient (Yes)	17
8.Immediately after risk of body fluid exposure (Yes)	19

9.Immediately before a clean/aseptic procedure (No)	9
10.After exposure to the immediate surroundings of a patient (Yes)	16
Which of the following statements on alcohol-based hand rub and handwashing with soap and water are true 11.Hand washing is more rapid for hand cleansing than hand washing (True)	12
12.Hand rubbing causes skin dryness more than hand washing (false)	12
13.Hand rubbing is more effective against germs than hand washing (false)	8
14.Hand washing and hand rubbing are recommended to be performed in sequence (false)	11
15.What is the minimal time needed for alcohol-based hand rub to kill most germs on your hands? (20 seconds)	5

Which type of hand hygiene method is required in the following situations? 16.Before palpation of the abdomen (rubbing)	8
17.Before giving an injection (rubbing)	8
18.After emptying a bedpan (washing)	9
19.After removing examination gloves (rubbing/washing)	9
20.After making a patients bed (rubbing)	12
21.After visible exposure to blood (washing)	18
Which of the following should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs? 22.Wearing jewellery (Yes)	11
23.Damaged skin (Yes)	12
24.Artificial fingernails (Yes)	11
25.Regular use of a hand cream (No)	7

Observation:

Healthcare workers were observed washing their hands:

- i. Before patient contact
- ii. After patient contact
- iii. After contact with patient surroundings (i.e. space within curtains or patient’s side room)
- iv. Before an aseptic task
- v. After body fluid exposure risk

Majority of the HCW washed their hand after body fluid exposure risk, suggesting that hand hygiene compliance was more with evident infection risk. Less than half of the team washed their hands after contact with their patient surrounding.

Observation Form

Facility:		Period Number*:		Session Number*:	
Service:		Date: (dd/mm/yy)	/ /	Observer: (initials)	
Ward:		Start/End time: (hh:mm)	: / :	Page N°:	
Department:		Session duration: (mm)		City**:	
Country**:					

Prof.cat			Prof.cat			Prof.cat			Prof.cat		
Code			Code			Code			Code		
N°			N°			N°			N°		
Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action
1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves
2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves

3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves
4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves
5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves
6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> missed ○ gloves
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* To be completed by the data manager.

** **Optional**, to be used if appropriate, according to the local needs and regulations.

General Recommendations

(refer to the Hand Hygiene Technical Reference Manual)

1. In the context of open and direct observations, the observer introduces him/herself to the health-care worker and to the patient when appropriate, explains his/her task and proposes immediate informal feed back.
2. The health-care worker, belonging to one of the main four following professional categories (see below), is observed during the delivery of health-care activities to patients.
3. Detected and observed data should be recorded with a pencil in order to be immediately corrected if needed.
4. The top of the form (header) is completed before starting data collection (excepted end time and session duration).
5. The session should last no more than 20 minutes (\pm 10 minutes according to the observed activity); the end time and the session duration are to be completed at the end of the observation session.
6. The observer may observe up to three health-care workers simultaneously, if the density of hand hygiene opportunities permits.
7. Each column of the grid to record hand hygiene practices is intended to be dedicated to a specific professional category. Therefore numerous health-care workers may be sequentially included during one session in the column dedicated to their category. Alternatively each column may be dedicated to a single health-care worker only of whom the professional category should be indicated.
8. As soon as you detect an indication for hand hygiene, count an opportunity in the appropriate column and cross the square corresponding to the indication(s) you detected. Then complete all the indications that apply and the related hand hygiene actions observed or missed.
9. Each opportunity refers to one line in each column; each line is independent from one column to another.
10. Cross items in squares (several may apply for one opportunity) or circles (only a single item may apply at one moment).
11. When several indications fall in one opportunity, each one must be recorded by crossing the squares.
12. Performed or missed actions must always be registered within the context of an opportunity.
13. Glove use may be recorded only when the hand hygiene action is missed while the health-care worker is wearing gloves.

Short description of items

Facility:	to complete according to the local nomenclature	
Service:	to complete according to the local nomenclature	
Ward:	to complete according to the local nomenclature	
Department:	to complete according to the following standardized nomenclature:	
	medical, including dermatology, neurology, haematology, oncology, etc.	surgery, including neurosurgery, urology, EENT, ophthalmology, etc.
	mixed (medical & surgical), including gynaecology	obstetrics, including related surgery
	paediatrics, including related surgery	intensive care & resuscitation
	emergency unit	long term care & rehabilitation
	ambulatory care, including related surgery	other (to specify)
Period N°:	1) pre- / 2) post-intervention; and then according to the institutional counter.	
Date:	day (dd) / month (mm) / year (yy)	
Start/end time:	hour (hh) / minute (mm).	
Session duration:	difference between start and end time, resulting in minutes of observation.	
Session N°:	attributed at the moment of data entry for analysis.	
Observer:	observer's initials (the observer is responsible for the data collection and for checking their accuracy before submitting the form for analysis).	
Page N°:	to write only when more than one form is used for one session.	
Prof.cat:	according to the following classification:	
	1. nurse / midwife	1.1 nurse, 1.2 midwife, 1.3 student.
	2. auxiliary	
	3. medical doctor	3.1 in internal medicine, 3.2 surgeon, 3.3 anaesthetist / resuscitator / emergency physician, 3.4 paediatrician, 3.5 gynaecologist, 3.6 consultant, 3.7 medical student.
	4. other health-care worker	4.1 therapist (physiotherapist, occupational therapist, audiologist, speech therapist), 4.2 technician (radiologist, cardiology technician, operating room technician, laboratory technician, etc), 4.3 other (dietician, dentist, social worker and any other health-related professional involved in patient care), 4.4 student.
Number:	number of observed health-care workers belonging to the same professional	

	category (same code) as they enter the field of observation and you detect opportunities.	
Opp(ortunity):	defined by one indication at least	
Indication:	reason(s) that motivate(s) hand hygiene action; all indications that apply at one moment must be recorded	
	bef.pat: before touching a patient	aft.b.f: after body fluid exposure risk
	bef.asept: before clean/aseptic procedure	aft.pat: after touching a patient
		aft.p.surr: after touching patient surroundings
HH action:	response to the hand hygiene indication(s); it can be either a positive action by performing handrub or handwash, or a negative action by missing handrub or handwash	
	HR: hand hygiene action by handrubbing with an alcohol-based formula HW: hand hygiene action by handwashing with soap and water	Missed: no hand hygiene action performed

Observation Form – Basic Compliance Calculation

Session N°	Facility:			Period:			Setting:			Total per session					
	Prof.cat.			Prof.cat.			Prof.cat.								
	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)
1															
2															
3															
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16															
17															
18															
19															
20															
Total															
Calculation	Act (n) =			Act (n) =			Act (n) =			Act (n) =			Act (n) =		
	Opp (n) =			Opp (n) =			Opp (n) =			Opp (n) =			Opp (n) =		
Compliance															

$$\text{Compliance (\%)} = \frac{\text{Actions}}{100} \times 100$$

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.
2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.
3. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.
4. Results per professional category and per session (vertical):
 - 4.1 Sum up recorded opportunities (opp) in the case report form per professional category: report the sum in the corresponding cell in the calculation form.
 - 4.2 Sum up the positive hand hygiene actions related to the total of opportunities above, making difference between handwash (HW) and handrub (HR): report the sum in the corresponding cell in the calculation form.
 - 4.3 Proceed in the same way for each session (data record form).
 - 4.4 Add up all sums per each professional category and put the calculation to calculate the compliance rate (given in percent)
5. The addition of results of each line permits to get the global compliance at the end of the last right column.

Observation Form – Optional Calculation Form (Indication-related compliance with hand hygiene)

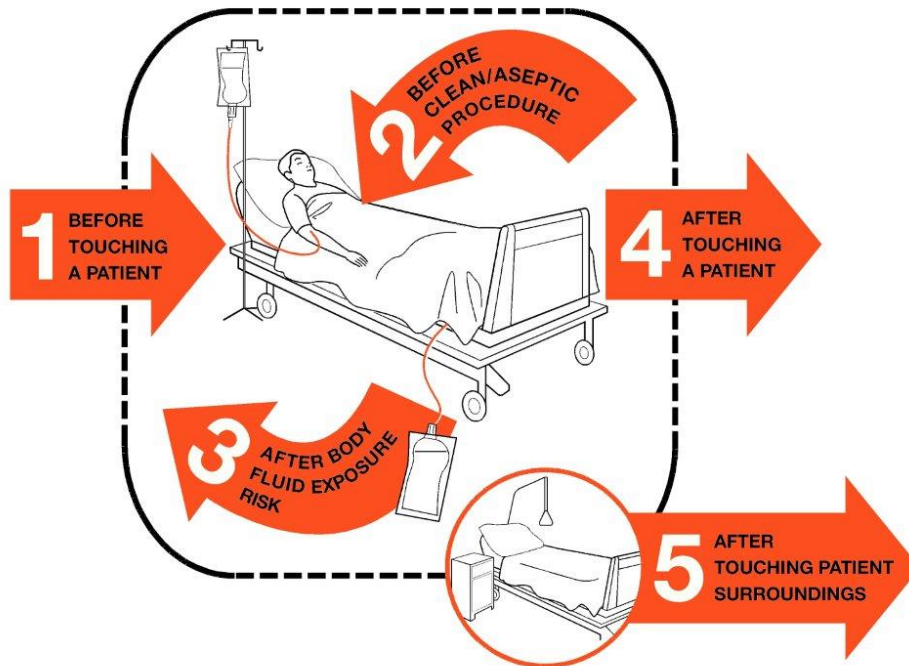
	Facility:						Period:			Setting:					
	Before touching a patient			Before clean/aseptic procedure			After body fluid exposure risk			After touching a patient			After touching patient surroundings		
Session N°	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)
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16															
17															
18															
19															
20															
Total															
Calculation	Act (n) =			Act (n) =			Act (n) =			Act (n) =			Act (n) =		
Ratio act / indic*	Indic1 (n) =			Indic2 (n) =			Indic3 (n) =			Indic4 (n) =			Indic5 (n) =		

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.
2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.
3. If several indications occur within the same opportunity, each one should be considered separately as well as the related action.
4. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.
5. Results per indication (indic) and per session (vertical):
 - 4.1 Sum up indications per indication in the observation form: report the sum in the corresponding cell in the calculation form.
 - 4.2 Sum up positive hand hygiene actions related to the total of indications above, making the difference between handwash (HW) and handrub (HR): report the sum in the corresponding cell in the calculation form.
 - 4.3 Proceed in the same way for each session (observation form).
 - 4.4 Add up all sums per each indication and put the calculation to calculate the ratio (given in percent)

***Note:** This calculation is not exactly a compliance result, as the denominator of the calculation is an indication instead of an opportunity. Action is overestimated according to each indication. However, the result gives an overall idea of health-care worker's behaviour towards each type of indication.

Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN? Clean your hands before touching a patient when approaching him/her. WHY? To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ASEPTIC PROCEDURE	WHEN? Clean your hands immediately before performing a clean/aseptic procedure. WHY? To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN? Clean your hands immediately after an exposure risk to body fluids (and after glove removal). WHY? To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN? Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side. WHY? To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN? Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched. WHY? To protect yourself and the health-care environment from harmful patient germs.



World Health Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES
Clean Your Hands

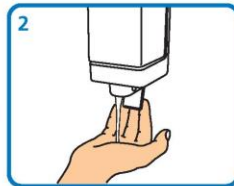
All reasonable precautions have been taken by the World Health Organization to verify the information contained in this document. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use. WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

Hand-washing technique with soap and water



1 Wet hands with water



2 Apply enough soap to cover all hand surfaces



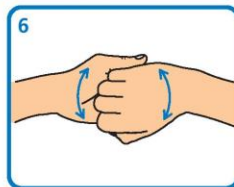
3 Rub hands palm to palm



4 Rub back of each hand with palm of other hand with fingers interlaced



5 Rub palm to palm with fingers interlaced



6 Rub with back of fingers to opposing palms with fingers interlocked



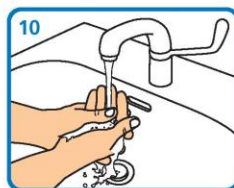
7 Rub each thumb clasped in opposite hand using a rotational movement



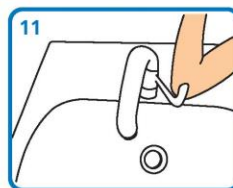
8 Rub tips of fingers in opposite palm in a circular motion



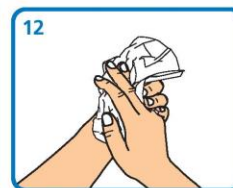
9 Rub each wrist with opposite hand



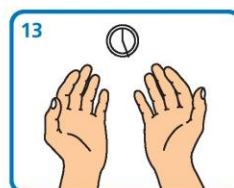
10 Rinse hands with water



11 Use elbow to turn off tap



12 Dry thoroughly with a single-use towel



13 Hand washing should take 15–30 seconds



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Adapted from World Health Organization *Guidelines on Hand Hygiene in Health Care*



7.0 Discussion:

There are different factors which determine HH practice success and our participants identified many elements affecting compliance which are common among Healthcare workers.

The study also confirms that Environmental factors were major barriers to HH compliance. This is in line with the WHO report on the importance of HH resources, such as accessibility to water, soap and ABHR, for compliance.

Hand hygiene compliance was improved by education. Participants believed that continuous and ongoing training by hospital management should be repeated at specified times. They also noted that training should contain encouraging posters, reminders and other training support required,

In this study, HCWs expressed adequate HH knowledge. Past Studies have found that compliance to HH practice is not fully dependent on an HCW's attitude. The level of HH compliance was not at its best, which supports the belief that low compliance exist despite knowledge and a positive attitude toward HH. This finding does not agree with that of Pittet et al. studies that reported that HH compliance was linked to positive attitudes

In this study it was difficult to arrange interviews with busy HCW. However, our investigation reveals that adherence to HH policies can be improved with increased resources, the application of peer pressure to change social norms and the emphasis that all patients deserve high HH compliance.

All observations occurred at a single mental health institution. However, there is reason to believe that the results of our study also reflect practices in many other mental health hospitals. Furthermore, our results are comparable with other studies and reports.

We measured an average of 1 hand-hygiene applications per shift per staff member. In our study, staff was unaware of the presence of an observer which may explain why the rate is slightly lower. This study illustrates that adherence to hand-hygiene guidelines by HCW staff is extremely low, which potentially exposes patients to microbial transmission and increases the risk of HCAs. An increase in hand-hygiene awareness is needed, coupled with organizational interventions that promote and facilitate the application of hand hygiene and reduced HCAI risk.

8.0 Conclusion

This study highlight the urgent need for introducing measures in order to increase the knowledge, attitudes, practices of HCW in Mental health institutions, which may play a very important role in increasing hand hygiene compliance among the staff and reducing cross transmission of infections among patients.

9.0 References:

Ahmed K. (2010). Audit of hand hygiene at Broadmoor, a high secure psychiatric hospital. *J HOSP INFECT.* 75 (2): 128-31.

Anargh V; Singh H; Kulkarni A; Kotwal A; Mahen A,(2013). Hand hygiene practices among health care workers (HCWs) in a tertiary care facility in Pune ,*Medical Journal, [Med J Armed Forces India]*,69 (1); 54-6;

BACKMAN, C., ZOUTMAN, D. E. & MARCK, P. B. (2008) An integrative review of the current evidence on the relationship between hand hygiene interventions and the incidence of health care associated infections. *American Journal of Infection Control*, 36; 333-348.

Badger TG. (2000).Action research, change and methodological rigour. *J Nurs Manage*; 8: 201–7.

BREATHNACH, A. S. (2009) Nosocomial infections. *Medicine*, 37; 557-561.

Bennett G, Mansell I (2004) Universal precautions: a survey of community nurses' experience and practice. *Journal of Clinical Nursing.* 13,4; 413-421.

Bearman G.,(2013)Mandatory gloving in acute care paediatric units associated with decreased risk of hospital-acquired infections Division of Infectious Diseases, VCU Medical Center, Richmond, Virginia, USA

Borer A, Gilad J, Yagupsky P, et al. (2002).Community-acquired methicillin-resistant *Staphylococcus aureus* in institutionalized adults with developmental disabilities. *Emerg Infect Dis*, 8:966–970.

Carol Shannon. Infection Prevention and Control Annual Report 13/14 and Annual Work Programme 2014/15

CHOMPOOK, P., TODD, J., WHEELER, J., VON SEIDLEIN, L., CLEMENS, J. & AND CHAICUMPA, W. (2006) Risk factors for shigellosis in Thailand. *International Journal of Infectious Diseases*, 10; 425-433.

Cheng VC, Wu AK, Cheung CH, et al. (2007).Outbreak of human metapneumovirus infection in psychiatric inpatients: implications for directly observed use of alcohol hand rub in prevention of nosocomial outbreaks. *J Hosp Infect*, 67:336–343.

Committee of Inquiry into the Outbreak of Legionnaires Disease in Stafford in April 1985 First Report Chairman Sir John Badenoch. Cmnd 9722. London HMSO.

DANCER, S. J. (2009) The role of environmental cleaning in the control of hospital-acquired infection. *Journal of Hospital Infection*, 73, 378-385.

Day M(2007). Chief medical officer names hand hygiene and organ donation

as public health priorities. *BMJ*, 335:113.

Department of Health (1999). Controls Assurance Guidelines supplementing HSC 1999/123). London: Department of Health.

Department of health (2006) The Health Act 2006: Code of Practice for Prevention and Control of Health Care Association Infection. London, Department of Health.

Denscombe M.(1998). The Good Research Guide for Small-scale Social Research Projects. Open University Press, Buckingham.

Dutra F,K,, Mbaeyi C, Gelles R,L, Alexander N, Guh A, Forbes E, Beall B, Winchell J,M, Carvalho M,G, Pimenta F, Kodani M, Vanner C, Stevens H, Brady D, Grimes M,C, Bandy U, and Moore, M,R.(2012)Streptococcus pneumoniae Serotype 15A in Psychiatric Unit, Rhode Island, USA,. *Emerging Infectious Diseases*;18

DING J,G, SUN Q,F, LI K,C, ZHENG, M,H, & MIAO X,H, (2009) Retrospective analysis of nosocomial infections in the intensive care unit of a tertiary hospital in China during 2003 and 2007. *BMC Infectious Diseases*,115.

Doyal L. (1997).Journals should not publish research to which patients have not given fully informed consent – with three exceptions. *Br Med*

J; 314: 1107–11.

East L, Robinson J. (1994). Change in process: bringing about change in health care through action research. *J Clin Nurs*; 3: 57–61.

Evans MR, Hutchings PG, Ribeiro CD, Westmoreland D. (1996) A hospital outbreak of salmonella food poisoning due to inadequate deep-fat frying. *Epidemiol Infect*; 116:155–160.

Emmerson A M, Enstone J E, Griffin M, Kelsey M C, Smyth E T M (1996). The second national prevalence survey of infection in hospitals – overview of results. *Journal of Hospital Infection* 32: 175-190.

FLORES, A. (2007) Appropriate glove use in the prevention of cross-infection. *Nursing Standard*, 21, 45-48.

Fuller C, Besser S, Savage J, McAteer J, Stone S, Michie S. (2014). Application of a theoretical framework for behavior change to hospital workers' real-time explanations for noncompliance with hand hygiene guidelines. *American Journal of Infection Control* (42).106-10

Glenister H M, Taylor L J, Cooke E M, Bartlett C L R (1992). A study of surveillance methods for detecting hospital infection. *Public Health Laboratory Service*.

Gilbride SJ, Lee BE, Taylor GD, Forgie SE (2009). Successful containment of a norovirus outbreak in an acute adult psychiatric area. *Infect Control Hosp Epidemiol* ;30:289–291.

GROSS, T. (1995) *Introductory microbiology*, London, Chapman & Hall.

Gould D. & Chamberlain A. (1997) The use of a ward based educational teaching package to enhance nurses' compliance with infection control procedures. *Journal of Clinical Nursing* 6, 55–67.

GOULD, D. J., DREY, N. S., MILLAR, M., WILKS, M. & CHAMNEY, M. (2009) Patients and the public: knowledge, sources of information and perceptions about healthcare-associated infection. *Journal of Hospital Infection*, 72, 1-8.

Goh KT, Teo SH, Lam S, Ling MK. Person-to-person transmission of cholera in a psychiatric hospital. *J Infect* 1990;20: 193–200.

Goh KT, Teo SH, Tay L, Monteiro EH (1992);. Epidemiology and control of an outbreak of typhoid in a psychiatric institution. *Epidemiol Infect* 108:221–229.

Harris A., Samore M., Nafziger R., DiRosario K., Roghmann M. & Carmeli Y. (2000) A survey on hand-washing practices and opinions of health care workers. *Journal of Hospital Infection* 45, 318–321.

HAMBRAEUS, A. (2006) Lowbury Lecture 2005: infection control from a global perspective. *Journal of Hospital Infection*, 64, 217-223.

Hampshire AJ. (2000) What is action research and can it promote change in primary care? *J Eval Clin Pract.* 6(4):337-43.

Hart E, Bond M. (1995) *Action research for health and social care: a guide to practice.* Buckingham, Philadelphia: Open University Press.

Haley RW, White JW, Culver D H, Meade Morgan W, Emori T G, Munn V P, Hooton T M (1985). The efficacy of infection surveillance and central programs in preventing nosocomial infections in US hospitals (SENIC). *American Journal of Epidemiology* 121: 182-205.

Hautemaniere A; Cunat L; Diguio N; Vernier N; Schall C; Daval MC; Ambrogi V; Tousseul S; Hunter PR; Hartemann P, (2010) Factors determining poor practice in alcoholic gel hand rub technique in hospital workers. *Journal Of Infection And Public*, 3 (1); 25-34;

Hawley, Chris J; Palmer, Maria; Jefferies, Kiri; Gale, Tim M; Vincent, Jacky; (2013). "Effect of single sex ward on mental health", *Nursing Times*, 109(48): 20-22.

HUANG, H., WEINTRAUB, A., FANG, H. & NORD, C. E. (2009) Antimicrobial resistance in *Clostridium difficile*. *International Journal of Antimicrobial Agents*, 34, 516-522.

HORAN, T., AND GAYNES, R. (2004) Surveillance of nosocomial infections. INCG, M. (Ed.) Hospital epidemiology and infection control. Philadelphia, Lippincott Williams & Wilkins.

Hospital infection control: guidance on the control of infection in hospitals. (1995) HSG(95)10. London: Department of Health.

Kalsi J; Arya M; Wilson P; Mundy A,(2003). Hospital-acquired urinary tract infection. International Journal of Clinical Practice, 57 (5): 388-91.

Kemmis S.(1988) Action research. In Education Research, Methodology and Measurement: An International Handbook (Keeves JP ed.), Pergamon, Oxford, 42–48.

Larson E., Bryan J., Adler L. & Blane C. (1997) A multifaceted approach to changing hand-washing behaviour. American Journal of Infection Control 25(1), 3–10.

LARSON, E. (2009) WHO Guidelines on Hand Hygiene in Health Care. IN ORGANISATION, T. W. H. (Ed.). WHO.

Lathlean J. (1996). Ethical dimensions of action research. In Nursing Research: An Ethical and Legal Appraisal (de Raeve L ed.), Baillie`re Tindall,

London, 32–41.

Le May A, Lathlean J.(2001) Action research: a design with potential (including commentary by Meyer). *J Nt Res*; 6: 502–10.

Lemaître N, Sougakoff W, Coëtmeur D, Vaucel J, Jarlier V, Grosset J (1996). Nosocomial transmission of tuberculosis among mentally-handicapped patients in a long-term care facility. *Tuber†Lung†Dis* , 77:531–536.

Lewin K. (1946).Action research and minority problems. *Journal of Social Issues*; 2: 41–56.

Maheshwari V; Kaore NC; Ramnani VK; Gupta SK; Borle A; Kaushal R, (2014). A Study to Assess Knowledge and Attitude Regarding Hand Hygiene amongst Residents and Nursing Staff in a Tertiary Health Care Setting of Bhopal City. *Journal Of Clinical And Diagnostic Research*, 8 (8); 04-7;

Mailyn ott and Rachel French. (2009) Hand Hygiene Compliance Among Health Care Staff and Student Nurses in a Mental Health Setting. *Issues in Mental Health Nursing*, 30:702–704,.

McAteer J, Stone S, Fuller C, Charlett A, Cookson B, Slade R, et al. (2008). Development of an observational measure of healthcare worker hand-hygiene behaviour: the hand-hygiene observation tool (HHOT). *J Hosp Infect*, 68: 222-9.

5.

McCuckin M., Waterman R., Porten L., Bello S., Caroso M., Juzaitis B., Kurg E., Mazer E. & Ostrawski S. (1999) Patient education model for increasing hand-washing compliance. *American Journal of Infection Control* 27(4), 309–314.

Mclean SAM.(1997) No consent means not treating the patient with respect (commentary). *Br Med J*; 314: 1076.

Meyer JE. (1993).New paradigm research in practice: the trials and tribulations of action research. *J Adv Nurs*; 18: 1066–72.

Mulhall, A. (2003) In the field: notes on observation in qualitative research. *Journal of Advanced Nursing* 41, (3), 306-313.

Murphy-Black, T. (2000) Questionnaire. In Cormack, DF. (Ed) (4th edn) *The research process in nursing*. Oxford. Blackwell Science Ltd.

Inglis, TJJl. (1996)*Microbiology and Infection* Churchill Uvingstone

Pittet D, Allegranzi B, Boyce J (2009). The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. *Infect Control Hosp Epidemiol* 30:611– 622.

Plowman R, Craves N, Griffin M, Roberts J, Swan A, Cookson B, Taylor L

(2000). The socio economic burden of hospital acquired infection. London: Public Health Laboratory Service.

Polit DF(1993). Hungler BP. Nursing Research: Principles and Methods, 2nd edn. J. B. Lippincott, Philadelphia.

Polit, D. & Hungler, B. (1995) Nursing Research: Principles and Methods. (5th edn). Philadelphia. J. B. Lippincott Company.

Pontin, D. (1997) The effect of primary nursing on the quality of nursing care. Action research study of nursing development work. Unpublished PhD. Manchester University.

Pontin, D. (2000a) Interview. In Cormack, DF. (Ed) (4th edn) The research process in nursing. Oxford. Blackwell Science Ltd.

Pontin, D. (2000b) Observation. In Cormack, DF. (Ed) (4th edn) The research process in nursing. Oxford. Blackwell Science Ltd.

Kerr D.(1996) The use of action research as an appropriate method of introducing and evaluating change in nursing care in an accident and emergency unit in Durban. Part 1. Curationis; 19: 12–16.

Rolfe G.(1996)Going to extremes: action research, grounded practice and the theory–practice gap in nursing. *J Adv Nurs*: 24: 1315–20.

Salinas Mulder S, Rance S, Serrate Sua´rez M, Castro Condori M. (2000). Unethical ethics? Reflections on intercultural research practices. *Reprod Health Matters*; 8: 104–12.

Sanchez MP, Erdman DD, Torok TJ, Freeman CJ, Matyas BT (1997). Outbreak of adenovirus 35 pneumonia among adult residents and staff of a chronic care psychiatric facility. *J Infect Dis*; 176:760–763.

SIEGAL, J., AND GROSSMAN, L. (2008) Pediatric infection prevention and control. IN LONG, S., PICKERING, L. & PROBER, C. (Eds.) *Principle and Practice of Pediatric Infectious Diseases*. Elsevier.

Simmons B., Bryant J., Neiman K., Spence L. & Arheart K. (1990) The role of handwashing in prevention of endemic intensive care unit infections. *Infection Control Hospital Epidemiology* 11, 589– 594.

Tanna NK. (2005). Action research: a valuable research technique for service delivery development. *Pharm World Sci.* ;27(1):4-6.

Tenna A, Stenehjem E, Margoles L, Kacha E, Blumberg H, Kempker (2013) *Infection Control Knowledge, Attitudes, and Practices among Healthcare*

Workers in Addis Ababa, Ethiopia. Infection control and hospital epidemiology. vol. 34, no. 12

The Infection Control Standards Working Party (1993). Standards in Infection Control in Hospitals. Chairman: Dr Barry Cookson. London: HMSO.

Tseng CY, Chen CH, Su SC, et al (2011). Characteristics of norovirus gastroenteritis outbreaks in a psychiatric centre. Epidemiol Infect, 139:275–285.

van de Mortel, TF 2009, 'Development of a questionnaire to assess health care students' hand hygiene knowledge, beliefs and practices', Australian Journal of Advanced Nursing, vol. 26, no. 3, pp. 9-16.

Vorou R, Remoudaki HD, Maltezou HC (2007). Nosocomial scabies. J Hosp Infect ;65:9–14.

Waterman H. (1995). Distinguishing between 'traditional' and action research. Nurse Researcher; 2: 15–23.

WESTON, D. (2008) Infection prevention and control : theory and clinical practice for healthcare professionals, West Sussex, John Wiley & Sons, Ltd

WHO 2010. The Burden of Health care associated infection worldwide.

WHO Patient Safety. (2009): A World Alliance For Safer Health Care. SAVE LIVES: Clean your hands. Hand hygiene technical reference to be used by health-care workers, trainers and observers of hand hygiene practices. Geneva: WHO.

Winter R. (1996). Some principles and procedures for the conduct of action research. In *New Directions in Action Research* (Zuber- Skerritt O ed.), Falmer Press, London.

WILSON, J. (2006) *Infection Control in Clinical Practice*, London, Elsevier Ltd.

Yin J, Reisinger HS, Vander Weg M, Schweizer ML, Jesson A, Morgan DJ, Forrest G, Graham M, Pineles L, Perencevich EN. (2014). Establishing evidence-based criteria for directly observed hand hygiene compliance monitoring programs: a prospective, multicenter cohort study. *Infect Control Hosp Epidemiol.* 35(9):1163-8

Zimakoff J., Kjelsberg A., Larsen S. & Holstein B. (1992) A multi- center questionnaire investigation of attitudes toward hand hygiene, assessed by the staff in fifteen hospitals in Denmark and Norway. *American Journal of Infection Control* 20, 58–69.

Jenner EA, Fletcher BC, Watson P, Jones FA, Miller L, ScottGM. Discrepancy between self-reported and observed handhygiene behaviour in healthcare professionals. *J Hosp Infect* 2006;63:418—22.

Creedon SA. Healthcare workers' hand decontamination practices: compliance with recommended guidelines. *J Adv Nurs* 2005;51:208—16.