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Faculty of Community and Health Sciences, School of Nursing

**Knowledge, attitudes, and practices of nurses towards hand washing at a
selected Psychiatric Hospital in the Western Cape, South Africa**

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List of acronyms and abbreviations

HCWs	Health care workers
SPSS	Statistical Package for the Social Sciences
STD	Standard deviation
WHO	World Health Organization



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Abstract

Background: Studies have shown that no great emphasis has been put on hand washing practices in psychiatric health facilities, despite the fact that nosocomial infection outbreaks have been reported for decades. Most studies have focused on hand washing practices among general health personnel; however, little is known about hand washing practices among nurses working at psychiatric hospitals.

Aim: The study aimed to investigate the knowledge, attitudes and practices of nurses towards compliance with hand washing in a selected psychiatric hospital in the Western Cape.

Method: The study employed a quantitative research approach with a descriptive survey design. The target study population comprised all categories of nurses (registered nurses, enrolled nurses, auxiliary nurses, enrolled nurse assistants) permanently employed at the selected psychiatric hospital. A total of 381 nurses were working at this psychiatric hospital. Random sampling was used to select the study sample (n= 195). A self-administered questionnaire was used to collect the data. Data were analysed using the IBM Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to present the frequency, mean values, and standard deviations of observations. A Chi-square test was conducted to determine the association between categorical variables.

Results: A discrepant level of knowledge, attitudes and hand washing practices was identified between genders, with males having slightly more knowledge (mean score 92.5) than females (91.41). Female nurses had a better attitude (mean score 96.06) than male nurses (95.09), and a higher level of hand washing practice (mean score 95.63) than male nurses (94.66). Registered nurses had slightly more knowledge and more positive attitudes than the other categories of nurses. Educational level had an impact on knowledge of hand washing,

but less impact on attitudes and practices. No statistical significance was found in the associations between demographic variables and knowledge, attitudes and practices on hand hygiene.

Conclusion: The study findings demonstrate that despite correct responses on hand hygiene knowledge, attitudes, and practice scales, knowledge gaps were identified among respondents on various aspects of hand hygiene. Variations in attitude level were noted among nurses in terms of age, gender, rank, work experience and educational level. Moreover, it was noted that there was possible overestimation of hand hygiene practice and knowledge by the respondents.

Recommendations: Catch up meetings in different wards at least once monthly, for update on nosocomial infections also emphasis on the role of hand washing in infection transmission and prevention as a top measure for infection control. Continuous monitoring and evaluation should be put in place with the aim of converting knowledge into action, changing attitude into positive behaviour, and promoting/maintaining correct hand washing techniques. This is crucial in order to maintain standards for the level of knowledge and attitude and consistent correct practices of hand washing procedures throughout nurses' professional lives.

Keywords: Attitude, Compliance, Hand Hygiene, Hand washing practice, Knowledge, Nurses, Psychiatric hospital

Declaration

I declare that ‘Knowledge, attitudes, and practices of nurses towards hand washing at a selected Psychiatric Hospital in the Western Cape, South Africa’ is my own work, and has not been submitted before for any degree or examination in any other University, and that all of the sources that I used have been indicated and acknowledged as complete references.

Signed



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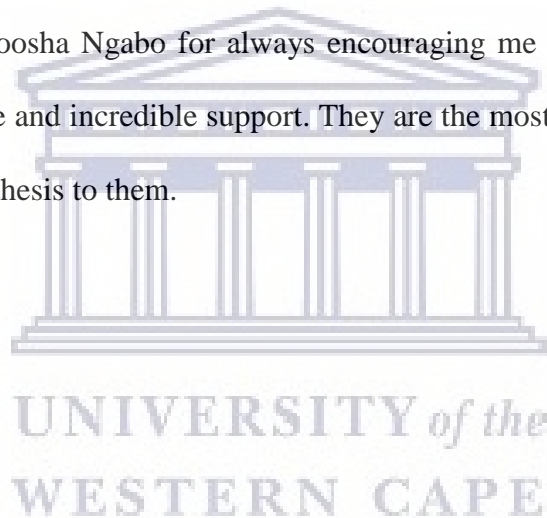
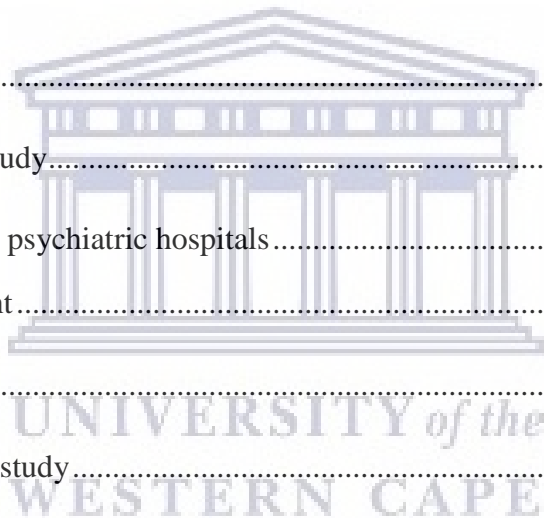
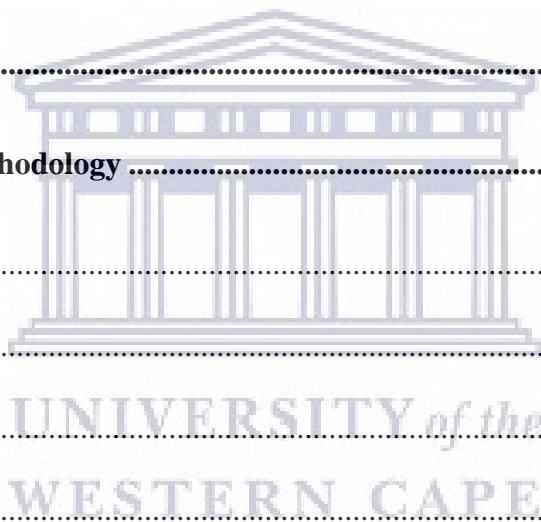


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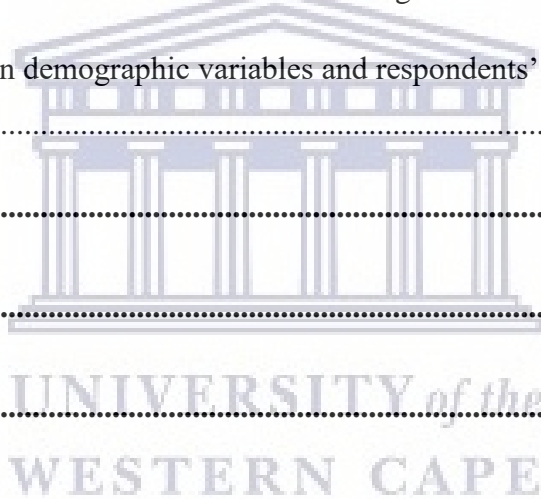
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Chapter one

Orientation and background to the study

1.1 Introduction

This chapter provides the background to this study related to the hand washing/hand hygiene practices of health professionals as the primary source of infection in general hospitals and in psychiatric institutions in particular. It presents the problem statement, aim and objectives of the study, as well as the significance of the study, a definition of terms relevant to the study. Finally, it outlines the thesis chapters, followed by the conclusion of the chapter.

1.2 Background to the study

Hand washing, known as hand hygiene, is basically the act of cleaning the hands during important occasions in order to get rid of dirt, soil, and visible or non-visible harmful germs/microorganisms, without damaging one's own skin, by using clean water and soap as well as other approved liquids such as hand hygiene products (Mohesh & Dandapani, 2014; Nabavi, Alavi-Moghaddam, Gachkar, & Moeinian, 2015; Dreidi, Alrimawi, Saifan, & Batiha, 2016; Zakeri, Ahmadi, Rafeemanesh, & Salehl, 2017; Awoke, Geda, Arba, Tekalign, & Paulos, 2018). In this study hand washing stands for both methods of washing the hands, by use of clean water and soap as well as other available products scientifically proven to be effective in keeping hands free of visible or nonvisible harmful materials that can be a potential safety risk in healthcare settings. Hand washing and hand hygiene are used interchangeably in this study.

In the 1840s the hands of healthcare workers (HCWs) were discovered by Semmelweis to be a vehicle for various types of microorganisms (Pittet & Allegranzi, 2018). Semmelweis

discovered that the increased mortality rate due to postpartum sepsis was caused by cadaverous particles carried on the hands of doctors; thus guidelines for hand hygiene practices were developed to be implemented, which resulted in a drastic decrease in maternal mortality (Pittet&Allegranzi, 2018). Guidelines for hand hygiene/hand washing are of great significance in health institutions worldwide to ensure patients' safety, but adherence to these guidelines remains inadequate (Foote& El-Masri, 2016).

In healthcare facilities healthcare-related infections are primarily transmitted via contaminated hands (Zakeri et al., 2017). These acquired infections are caused by pathogens received from infected or draining wounds, colonised areas of patients' skin, patients' gowns, bed linen, and bedside furniture, including other objects in the patient's immediate environment (Zakeri et al., 2017). Pathogens such as *Staphylococcus aureus*, *Clostridium difficile*, *acinetobacterspp*, *enterococci*, *klebsiellaspp.*, and *Proteus mirabilis* play a significant role in healthcare-related infections, and thus hand hygiene stands out as the main route to prevent acquired infections as well as further transmission of such infections (Zakeri et al., 2017). However, according to Pineles, Robinson and Morgan (2017) and Nabavi et al. (2015), despite hand washing having been a primary practice to avoid transmission of deadly and costly infections in clinical as well as community settings for decades, adherence to this simple practice still below 50% globally. Hand washing is the cheapest and single most effective act that significantly reduces the rate of infectious diseases in both community and healthcare settings (Contzen&Mosler, 2015). Research by Contzen & Mosler (2015) indicated that despite high social awareness (71% –84%) of the significance of hand washing, only a minority of 14% –31% of people wash their hands regularly.

Regular appropriate hand washing after using the toilet prevents illnesses such as diarrhoea and cholera that are transmitted through the faecal-oral route (Fukuta & Muder, 2013; Scott,

2013). Respiratory diseases such as influenza or the common cold can be prevented by simple hand washing after contact with body secretions such as mucous and sputum, and hand hygiene during handling of food remains crucial in the clinical setting as well as in the general public environment (Fukuta & Muder,2013; Scott, 2013). Skin and respiratory infections, including other contagious diseases, can all be prevented by simple hand washing (Mada,Saldana, Castano, Malus,&Adley, 2018). The outbreak of corona Virus-19 in China, has been declared in early 2020 by WHO to be a global health emergency as it became inevitably a pandemic disease (Rothan & Byrareddy, 2020), hand washing remains an outstanding health behaviour for both preventive and intervening measures to reduce risk of corona Virus-19 infection (Niu, , Wang, Hu, Mei & Tang, 2020).

According to Sarani, Balouchi, Masinaeinezhad & Ebrahimitabs (2014) prevention of nosocomial infections requires a close look at the knowledge, attitudes and practices of HCWs and significant others in healthcare settings. Nosocomial infections or hospital-acquired infections are infections that occur during patient health care in a hospital or any other healthcare facility within 48hours or more of admission or within 30 days of discharge from hospital(Haque, Sartelli, McKimm& Bakar, 2018).The hands of health personnel, specifically of the nurses, can become contaminated by different types of pathogens, even during ‘clean’ activities such as taking vital signs, lifting a patient, or touching a patient’s hand, shoulder, or groin (Awoke et al., 2018).

As mentioned above, the hand hygiene of the nurses is the most common and simplest way of preventing nosocomial infections in both general and psychiatric healthcare facilities (Foote& El-Masri, 2016; Pittet, Boyce, & Allegranzi, 2017). Best hand hygiene practices are known to be the most important option to prevent or decrease transmission of pathogens to patients, nurses and the environment in healthcare settings (Dreidi et al., 2016; Gluyas, 2015;

Abdraboh, Milaat, Ramadan, Al-Sayes, & Bahy, 2016; Pittet et al., 2017; Al Ra-awji et al., 2017, Awoke et al., 2018).

However, although hand hygiene is the main preventative measure against nosocomial infections, studies have shown that HCWs' adherence to hand hygiene remains low and there is low sustainability of efforts for improvement (Gluyas, 2015; Foote & El-Masri, 2016).

According to the World Health Organization (WHO) hospital-acquired infections are ranked among the top ten causes of hospital deaths every year (Dreidi et al., 2016). A previous study by Foote and El-Masri (2016) indicated that in Canada treatment of infections caused by pathogens such as *C. difficile* and methicillin-resistant *S. Aureus* cost \$46.1 million and \$36.3 million annually, respectively, and that the risk of potential death resulting from *C. difficile* infection is 6%. Sepsis is known to be a global health issue as it is life-threatening, and often results from complicated nosocomial infections, as reported at the 70th WHO Assembly in 2017 (Saito et al., 2018).

Khan, Baig and Mehboob et al. (2017) reported that one out of 25 hospitalised patients can acquire at least one type of hospital-acquired infection a day regardless of significant infection prevention measures in place. It is therefore vital to have infection control programmes against these infections at health institutions, whereby health personnel including all individuals visiting the hospitals own accountability for the prevention of hospital-acquired infections (Khan et al., 2017).

According to Foote and El-Masri (2016) approximately 30% of HCWs reported signs and symptoms of dermatitis as a result of their hands becoming contaminated after healthcare activities. An additional 85% of HCWs reported a history of suffering from skin problems resulting from performance of healthcare activities (Foote & El-Masri, 2016). Literature on

physical comorbidities due to nosocomial infections specifically in psychiatric healthcare facilities is scarce the world over.

A previous study reported certain infection outbreaks, such as epidemic kerato-conjunctivitis, among 11 patients and two HCWs in a closed psychiatric ward in the United States of America (USA), which cost up to 830 Euros per patient to treat (Novakova, Cantero-Caballero, Zoni, Plá-Mestre, del Carmen Olmedo-Luceronet al., 2013). Respiratory tract infections are reported to be the most common outbreaks in psychiatric units (Mada et al., 2018). In 2018 Mada et al. reported the influenza season to be worse than in previous years which lead to outbreaks of influenza A or B virus in psychiatric units; they started with two patients and also affected some of the staff members such as the healthcare manager and psychiatric physician, suggesting the need for timely interventions to decrease the burden. In Korea an H1N1 outbreak was reported to affect 53% of patients in a psychiatric ward; after regular infection control measures the incidence reduced to 18% (Kim& Lee, 2017). Hepatitis A virus causes an acute liver infection in humans and is known to be transmissible from person to person via the faecal-oral route (Croker et al., 2018). Hepatitis A virus was reported in Los Angeles in the USA among adult patients in a mental health hospital (Croker et al., 2018).

According to Fox et al. (2015) about 2.5 million people are affected by nosocomial infections yearly in the USA, and are related with 90 000 avoidable deaths of patients and financial costs to the nation was more than 4.5 billion dollars yearly. As a global public health burden in developing countries 25% of all hospital infections are nosocomial (Langoya & Fuller, 2015). Parasitic diseases are regular in poor countries and are related to nearly 200 000 deaths annually and high prevalence of intestinal parasitic infections has been reported among psychiatric facilities (Duedu, Peprah, Anim-Baidoo, & Ayeh-Kumi, 2015). It is estimated that

more than 200 000 Canadians are infected by nosocomial infections each year, resulting in 8000 deaths (Jones, Martello, Biron& Lavoie-Tremblay, 2017).

Nosocomial infections are known to be a global public health burden (Muller, 2016; Sahile, Esseye, Beyene, &Ali, 2018). These infections affect 5-10% of inpatients in developed countries and 20% of those in developing countries (AlRa'awji et al., 2018).Vermeil et al. (2019) stated that despite preventative measures,5% of inpatients are subjected to nosocomial infections. Hundreds of millions of patients worldwide acquire infections during health care each year, leading to high mortality and significant financial losses to the healthcare system and economy (Al Ra'awji et al., 2018; Awoke et al., 2018; Vermeil et al., 2019). These nosocomial infections and related deaths are connected to by poor hand hygiene among health personnel (Abdraboh et al., 2016; Martischang, Pires, Masson-Roy, Saito, & Pittet, 2018).

Seven out of 100 admitted patients in a developed country and ten out of 100 admitted patients in developing countries experience one hospital-acquired infection (Khan et al., 2017). In low- and middle-income countries the frequency of nosocomial infections is even higher. The detrimental effect of hospital-acquired infections is common in all healthcare settings, and this also includes infections that develop up to 30 days after the discharge of patients (Khan et al., 2017; Pittet et al., 2017). Recent studies have shown that increased length of stay related to nosocomial infection varied between 5 and 29.6 days in low- and middle-income countries (Pittetet al., 2017). Annual directly related medical costs in the USA range between \$36 billion and \$45 billion, of which between\$25 billion and\$32 billion dollars could be avoided by preventing 70% of nosocomial infections (Pittet et al., 2017).

From a South African perspective, data on nosocomial infections/outbreaks in psychiatric hospitals are very limited. A study by Sondlane et al. (2016), revealed a high prevalence of

active hepatitis B virus among HCWs in hospitals in Gauteng. Nosocomial infections lead to a significant amount of mortality and prolonged hospital stay related to morbidity, causing costs that exceed the allocated resources for healthcare services (Pittet et al., 2017; Awoke et al., 2018).

Data relating to nosocomial infections in South Africa are scarce (Lowman, 2016). Brink et al (2006) reported that lower urinary tract, post-surgical, lower respiratory tract and, bloodstream infections account for up to 80% of nosocomial infections, that at least one out of seven patients entering a South African hospital is likely to be infected. However, there is a lack of national standardised infection control surveillance in South Africa (Pittet et al., 2017). According to Lowman (2016) surveillance of nosocomial infections is neglected and poorly resourced in South Africa, although they are well known to be a public health burden, and that there are limited analyses and reports in this regard. The lack of data from South Africa serves as a measure of the inadequacy of the South African healthcare system, and serious concerns are on the rise (Lowman, 2016).

Very limited data are available in South Africa and other low- and middle-income countries to assess the impact of nosocomial infections at national level (Pittet et al., 2017, p. 1). However, anecdotal evidence confirmed the incidence of four cases of chickenpox on 3 August 2017 at the psychiatric hospital in this study. The WHO 'Save Lives: Clean Your Hands' campaign was established in 2009 to promote guidelines of hand hygiene in healthcare settings (WHO, 2009; Saito et al., 2018), and attempts to prevent and control nosocomial infections are ongoing (Saito et al., 2018). The campaign holds yearly conferences that aim to bring people together in support of improvements in hand hygiene to promote interventions for the prevention of hospital-acquired infections and their complications (Saito et al., 2018).

The WHO urges health facility leaders, infection prevention control leaders, ministries of health, health workers, as well as patients' advocacy groups to take action on hand hygiene, and health facilities are invited and encouraged to take part in the global campaign to demonstrate commitment to hand hygiene and infection prevention control (Saito et al., 2018).

Nurses' knowledge, perceptions and attitudes about hand hygiene have been recognized as a significant influence on hand hygiene performance (Oh, 2019). It is important to note that *Middle East respiratory syndrome coronavirus (MERS-CoV)* *MERS-CoV* may be fatal especially when patients have physical comorbidities (Alfahan, Alhabib, Abdulmajeed, Rahman, & Bamuhair., 2016). This stresses the need for effective measures in healthcare settings for infection control, hand washing in particular (Alfahan et al, 2016).

Literature has focused on the hand hygiene of nurses and nosocomial infections in general hospitals, but little is known globally about the hand hygiene knowledge, attitudes and practices of the nurses in psychiatric healthcare settings in particular. A recent study by Li, Wang, Tan, Lee and Yang (2019) indicated that nosocomial infections also occur in psychiatric hospitals; unfortunately, to date very few studies have addressed infection control and prevention at psychiatric institutions. To date no study has been found in South Africa regarding the knowledge, attitudes and practices of hand hygiene by nurses in psychiatric healthcare settings.

1.3 Hand washing in psychiatric hospitals

In the pursuit of the global agenda of reducing nosocomial infections to save lives, hand hygiene is known to be the single most effective method of infection prevention and control in healthcare settings (Piai-Morais et al., 2015). Data on hand hygiene in mental healthcare

facilities is very scarce. A study by Piai-Morais et al. (2015) in psychiatric healthcare facilities in Brazil discovered very low compliance with hand hygiene by the nurses before and after procedures, as well as non-adherence to other infection control standard protocols.

Research by Ott and French (2009) indicated that hand washing behaviour is multifaceted. Taking into account the fact that hand hygiene is challenging in psychiatric settings (Ott & French, 2009), individual beliefs and attitudes have to be considered, including satisfying involvement and level of commitment at institutional level and rigour; these are crucial as they are key to motivating change in hand hygiene practices by nurses in mental healthcare facilities (Ott & French, 2009).

1.4 Problem statement

Many previous studies have confirmed safety and health risks as negative outcomes following non-compliance with hand washing practices in healthcare settings (Fox et al., 2015; Sahile et al., 2016; Diwan, Gustafsson, Klintz, Joshi, Joshi, et al., 2016 ; Zil-e-ali, Cheema, Wajihullah, Ghulam, & Tariq, 2017). Despite all the scientific evidence for various interventional measures implemented to improve the situation and compliance of the nurses and HCWs in general, the detrimental effects continue since compliance with hand hygiene practices is generally low and inadequate to ensure the safety of patients (Zil-E-Ali et al., 2017; Piras, Lauderdale, & Minnick, 2017; Awoke et al., 2018).

The first report in a psychiatric institution in Ghana by Duedu et al. (2015) revealed that asymptomatic carriage of parasitic pathogens among patients increased with duration of admission. It appears that HCWs adhere to hand washing when the need and sense of self-protection arise, and that they often miss opportunities for hand washing out of limited knowledge or forgetfulness, when they don't see or feel the need for it (Chuc et al., 2018).

The nurses in psychiatric health settings may have a tendency to perceive the healthcare environment as more therapeutic and free of risk of infectious diseases, as patients do not manifest clear symptoms of physical illness yet physical comorbidities and outbreaks occur in psychiatric settings (Duedu et al., 2015; Croker et al., 2018; Mada et al., 2018), similar to in general ward settings.

Recent study in China by Xiang, Zhao, Liu, Li, Zhao et al, 2020, reported 50 inpatients cases of COVID 19 outbreaks and 30 cases of health professionals diagnosed with COVID19 due lack of precautions in major mental health hospital in Hubei province in China. Strict measures for suppressing further transmission of COVID 19 included hand hygiene for patients, nurses as well as families. Infection outbreaks specifically in psychiatric facilities are limited globally, and in South Africa are very scarce (Pittet, Boyce & Allegranzi, 2017). Anecdotal evidence at the selected psychiatric hospital raised a concern of ineffective support from nurse leaders for infection prevention personnel regarding the hand hygiene campaign, thus highlighting a negative attitude of nurse leaders towards hand hygiene. The nurse leaders being important referents for the rest of nurses, it is clear that hand hygiene agenda/campaigns could be taken for granted by most of the nurses, as their behaviours are influenced by those of their leaders (Kingston, Slevin, O'Connell, & Dunne, 2017).

In addition, in psychiatric facilities inadequate resources, limited diagnostic measures and fewer personnel to deal with infection control, as well as inadequate support for infection prevention, indicate less attention to precautions for infection control, particularly hand washing (Kim & Lee, 2017; Li et al., 2019). A study by Lowman (2016) indicated that in South Africa there might be either general negligence or poor resources for nosocomial infection surveillance. Furthermore, serious issues keep on arising from the fact that there is a

lack of data from South Africa, which is a major concern in the South African healthcare system (Lowman, 2016).

Globally many studies have focused on hand hygiene in general healthcare settings; however, very few have looked at hand hygiene practices of nurses in psychiatric health facilities. There was limited previous studies has been found on hand washing practices in South Africa. Hence, this study was aimed to investigate the knowledge, attitudes, and practices of hand hygiene among the nurses at a selected psychiatric hospital in the Western Cape.

1.5 Aim of the study

The aim of this study was to investigate nurses' knowledge, attitudes and practices towards hand washing at a selected psychiatric hospital in the Western Cape.

1.6 Objectives of the study

The objectives of this study were as follows:

1. To describe the knowledge of nurses on hand washing at the selected psychiatric hospital.
2. To examine the attitudes of nurses towards hand washing at the selected psychiatric hospital.
3. To examine the practices of nurses regarding hand washing at the selected psychiatric hospital.

1.7 Significance of the study

The findings of this study will provide an opportunity to reflect on the current knowledge, attitudes and practices of nurses towards hand washing in accordance with WHO guidelines, and then assist in identifying the knowledge needs of all categories of the nurses at the

selected psychiatric hospital regarding hand washing. The study could therefore also be of much use to the psychiatric management and Department of Health, since it may utilise the results to update training for nurses regarding hand washing and fill the gaps in knowledge that are identified, as well as improving interventional measures aimed to bring about attitudinal change in the direction of reaching or sustaining an optimal level of compliance with hand hygiene practices. Other psychiatric hospitals can utilise the results of the study to address similar challenges or to conduct a comparative study. The findings can be forwarded to the training institutions responsible for short courses and curriculum development for mental health nurses.

1.8 Operational definitions of key concepts

Hand washing/hand hygiene: Refers to washing hands with plain or antimicrobial soap and clean water or with disinfectant liquid/alcohol-based hand rub (Yadav & Giri, 2018). In this study the terms hand washing and hand hygiene are used interchangeably, and they stand for both washing hands with soap and water or disinfectant/alcohol-based hand rub as outlined by hand hygiene standards.

Nurse: A person registered in a category under section 31(1) in order to practice nursing or midwifery according to the Nursing Act, 2005 (South African Council of Nurses, (SANC, 2005, p. 6). In this study nurse refers to all categories of nurses practicing nursing that work in a selected psychiatric hospital.

Compliance: The extent to which behaviour matches the recommendations or guidelines (Johnston, Gregory & Smith, 1997). In this study, compliance refers to the extent and level of quality at which hand washing is practiced appropriately and meets standard guidelines.

Knowledge: Understanding something, such as facts, information, descriptions, or skills, acquired from experience, education, or discovering or learning (Oxford Dictionary, 2011). For this study, knowledge is operationally defined as understanding the importance of hand washing and potential safety risks due to hand washing opportunities missed by nurses in a psychiatric hospital as measured by the knowledge scale.

Attitude: settled mode of thinking (Johnston, Gregory & Smith, 1997). For this study attitude is defined as the nurses' beliefs/thoughts, responses and behaviour towards hand washing as measured by the attitude scale.

Hand washing practices: are referred to antiseptic hand washing, hand rubbing, including hand care (World health organisation, 2009) operationally defined as the routine acts of nurses in carrying out hand hygiene while performing their clinical practices in a psychiatric hospital, as measured by the practice scale.

Nosocomial infection/hospital-acquired infection: Infections that occur during healthcare delivery in a healthcare setting, which can first appear 48 hours or more after hospital admission, or within 30 days after having received healthcare (Haque et al., 2018). In this study this referred to infections that occurred during healthcare delivery in a psychiatric facility or developed after discharge, secondary to exposure prior to discharge.

1.9 Outline of the thesis

The following is the outline that this thesis follows.

Chapter one: Presents the orientation of and background to the study, which includes the problem statement, aim, objectives and significance of the study as well as definitions of the key terms.

Chapter two: Presents the review of literature relevant to the nurses' knowledge, attitudes and practices/compliance, hand washing guidelines, hand washing techniques, and barriers towards hand washing/hand hygiene, hand hygiene being the single most effective way to reduce the incidence of nosocomial infections/outbreaks in healthcare facilities and ease the related public health burden worldwide.

Chapter three: This chapter describes the methodology used for this study, and includes the study design, research setting, population and data collection process. The validity, reliability and ethical considerations are described.

Chapter four: Presents the findings of the study that emerged, which are organised into three sections based on the research objectives.

Chapter five: Presents a discussion of the findings of the study, based on available literature.

Chapter six: Presents the summary of findings, conclusion, implications, recommendations and limitations of the study.



1.10 Conclusion

This chapter presented the background to the study and elaborated on the challenges experienced by healthcare systems, particularly, the psychiatric health institutions as nosocomial infections spike as result of inadequate infection prevention/control. Hand washing stands out as the top measure in infection control campaigns globally. The problem statement was described, and the aim and objectives of the study were described, as well as a definition of terms.

Chapter two

Literature review

2.1 Introduction

This chapter presents a literature review of relevant research on compliance with hand hygiene by health personnel, the WHO guidelines for hand hygiene techniques and practices, and the knowledge, attitudes and practices of health personnel regarding hand washing. Lastly, the chapter discusses barriers associated with hand hygiene.

2.2 Source of literature

The literature presented in this chapter was based on the data gathered using the University of Western Cape library data base. All published materials, books, journal articles, and WHO guidelines on hand hygiene were accessed electronically using the following search engines and repositories: Google Scholar, EBSCOHost, PubMed, CINAHL, Science Direct, Medline, and Wiley Online Library. The keywords and phrases used to search for the information included: hand washing/hand hygiene and infection control, hand washing/hand hygiene and hospital infection/ nosocomial infection, hand washing/hand hygiene practices and psychiatric hospital infection.

2.3 WHO guidelines for hand hygiene

My 5 Moments for Hand Hygiene is a standard approach that was developed by the WHO in 2009, and has proven to be an easy, logical and applicable concept in a wide range of settings and to reflect many other guidelines (Pineles et al., 2017). It describes the moments or events when hand washing is required; any missed opportunity leads to lack of effective hand hygiene for health personnel.

My 5 Moments for Hand Hygiene as outlined by the WHO (2009) are as described below:

- Hands of health personnel should be cleaned (washed) before touching the patient when approaching him or her, to avoid transmission of harmful microorganisms.
- Hands should be cleaned immediately before performing any sterile procedure, to prevent invasion of microorganisms into the patient's body.
- Clean hands immediately after contact with body fluids, in other words after performing any task that involves exposure to body fluids, such as nasal care, oral care, sampling of respiratory tract, endotracheal care, after any contact with mucous membrane and after removal of gloves, to protect oneself as well as the healthcare environment from harmful microorganisms from patients.
- Hands to be cleaned after contact with patients and patients' surroundings to protect oneself and the healthcare environment from harmful microorganisms.
- Hands to be cleaned after contact with any contaminated object or furniture in a patient's surroundings, even if the patient is not touched (Pineles et al., 2017).

The concept of '5 Moments for Hand Hygiene' entails protecting patients from the risk of microbial transmission from HCWs– Moments 1 and 2 ('before' indications), then protecting the nurses as well as other health care workers from the risk of microbial transmission – Moments 3, 4 and 5('after' indications) (Laskar et al., 2018). Each hand hygiene action makes a difference in prevention of sepsis in health care (Saito et al., 2018). It has been 200 years since promotion of hand hygiene by Semmelweis, which has been associated with a 50% reduction in the incidence of nosocomial infections (Pittet & Allegranzi, 2018).

All organisational health bodies are urged by the WHO to take action on hand hygiene for prevention of nosocomial infections. The WHO's SAVE LIVES: Clean Your Hands

campaign is held yearly to bring people together for supporting hand hygiene improvements at universal level (Saito et al., 2018; Pittet & Allegranzi, 2018).

2.4 Hand washing techniques

Hand washing is the single most effective means for reducing the public health burden of nosocomial infections worldwide (Rigby, Pegram & Woodward, 2017). The hope of attaining the target can only be possible if the practice of hand washing is not only optimally adhered to by health personnel, but also the appropriate techniques are adhered to (Graveto, Rebola, Fernandes & Costa, 2018). Research shows that there is still concern (Tschudin-Sutter, Sepulcri, Dangel, Schuhmacher, & Widme, 2015), since if adherence to hand hygiene is optimal but correct techniques are not adhered to, there will be a continuing risk of infection transmission as incorrect practice results in incomplete killing of microorganisms on the hands (Tschudin-Sutter et al., 2015).

Based on the WHO recommendations (2009) with regard to hand hygiene, any health personnel, caregiver, or any person involved in direct or indirect patient care, needs to be concerned about hand hygiene and is expected to be able to perform it correctly, at the right time, without missing any opportunity ('moment'). Preferably the hands should be rubbed using an antibacterial solution/alcohol-based formulation for routine hand hygiene when hands are not visibly soiled, as this is a faster method with duration of 20-30seconds, and thus more effective and better tolerated by the hands. These steps should be followed: apply the product to the palm of a cupped hand; cover all surfaces: rub hands palm to palm, right palm over left dorsum with interlaced fingers then vice versa, and palm to palm with fingers interlaced, backs of fingers to opposing palms with fingers interlocked, rotational rubbing of left thumb clasped in right palm and vice versa, rotational rubbing backwards and forwards

with clasped fingers of right hand in left palm and vice versa, then dry your hands, and they are now safe (Garba & Uche, 2019).

Figure 2.1. How to use hand rub to clean the hands

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

🕒 Duration of the entire procedure: 20-30 seconds




World Health Organization

Patient Safety
 A World Alliance for Safer Health Care

SAVE LIVES
 Clean Your Hands

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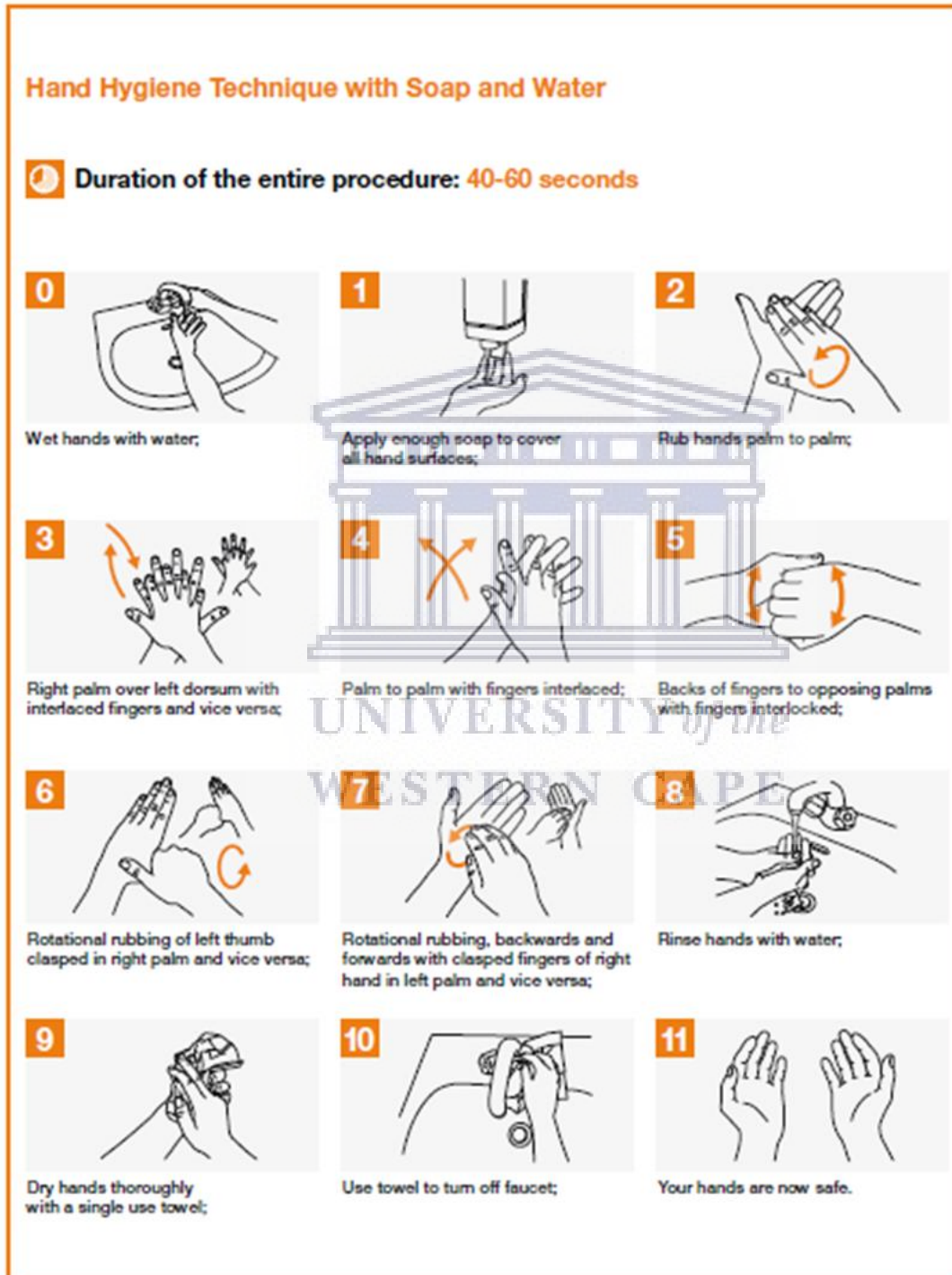
Retrieved from <https://www.gompels.co.uk/free-resources/the-5-stages-of-hand-hygiene.html>.
(WHO, 2009).

When hands are visibly dirty or soiled with blood or other body fluids, or after using toilet, or if exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreak of *C.difficile*, hands should be washed with clean water and soap following these steps with the duration of the entire procedure being 40-60 seconds: wet hands with water, and apply enough soap to cover all hand surfaces, right palm over left dorsum with interlaced fingers and vice versa, palm to palm with fingers interlaced, backs of fingers to opposing palms with fingers interlocked, rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa, rinse with water, dry hands thoroughly with a single-use towel then use towel to turn off the faucet, then hands are safe (Tschudin-Sutter et al., 2015; Garba & Uche, 2019).

Important note is that before even starting to carry out hand hygiene procedures, nurses are discouraged from wearing artificial nails, or any jewellery (including watches), and advised not to keep their own nails long, as all of these increase colonisation of hands by microorganisms, thus jeopardising patients' safety and enhancing the risk of nosocomial infections (Maheshwari, 2014; Kelcikova, Mazuchova, Bielenka, & Filova, 2019).

Figure 2.2. Guide on how to wash the hands when they are visibly soiled

Figure II.2
How to handwash



Retrieved from <https://www.gompels.co.uk/free-resources/the-5-stages-of-hand-hygiene.html>
(WHO, 2009).

Many hospital-acquired infections could be prevented by taking proper hand hygiene seriously, but compliance of the nurses in this regard remains poor (Karadag, Iseri, Yildirim, & Etikan, 2016; Abdraboh et al., 2016; Luangasanatip et al., 2015). Many previous studies have confirmed that compliance with the guidelines for hand hygiene practices by health personnel decreases the risk of hospital-acquired infections, but adherence of individual HCWs in general, including the nurses in particular to hand hygiene practices remains suboptimal worldwide (Abdraboh et al., 2016; Awoke et al., 2018). In healthcare service worldwide, noncompliance with hand hygiene by healthcare workers is a common concern, and it has a significant influence on infections, healthcare costs and fatalities (McLaughlin, Walsh, & Bryant, 2013; Abdraboh et al., 2016; Awoke et al., 2018). A study by Piai-Morais et al. (2015) indicated moderate-to-high risk of infections in a psychiatric hospital as a result of inadequate adherence to hand hygiene practices.

Studies by Teker et al. (2015) and Laskar et al. (2018) indicated that sustaining hand hygiene training and promotion could influence a rise in adherence to this single most effective way to limit the incidence of hospital-acquired infections. The practices of hand hygiene in accordance with the WHO guidelines are helpful, but the degree to which the guidelines are adopted by health personnel remains crucial (Korhonen et al., 2015; Awoke et al., 2018).

According to Karadag et al. (2016) there is variation in compliance to hand hygiene by health personnel, depending on the health facility, working conditions and frequency of hand washing. Despite the fact that hand washing is the single most important way to minimise transmission of infections in hospitals, compliance remains the main challenge (Langoya & Fuller, 2015; Jones et al., 2017). *Candida auris* has been the cause of severe illness in

hospitalised patients worldwide, and it was identified in the USA that *C.auris* has resistance to all three major classes of antifungal agents, as well as the ability to persist on surfaces and spread between patients, unlike other *Candida* species (Smith, 2017). Compliance with proper hand washing and environmental cleanliness remain fundamental to limiting the spread of multidrug-resistant organisms (Smith, 2017).

According to Al Ra'awji et al. (2018) compliance with hand hygiene guidelines and proper techniques among nurses and HCWs in general are rare, even post-educational efforts. A hand hygiene compliance rate of 40-50% remains inadequate to sustain safety, and compliance can be improved to as high as 80% (Al Ra'awji et al., 2018). In a report by Corace et al. (2017), HCWs including nurses self-reported 100% hand hygiene compliance rates; however, by using direct secret observers over a period of seven months the reality of actual hand hygiene compliance rates by nurses and other HCWs overall was found to be 31%, and nurses' compliance rates were among the lowest (Corace et al., 2017). The overestimation of self-reported hand hygiene compliance by HCWs nurses included raises a concern regarding proper educational measures that needs close attention (Loyland, Wilmont, Hessels, & Larson, 2016).

2.6 Knowledge of health personnel about hand washing

A study by Mohesh and Dandapani (2014) indicated the importance of stressing the topic of hand hygiene as an educational priority in colleges, in order to create awareness among the students. Development of a positive attitude towards hygiene practices among students would play a significant role in prevention of nosocomial infections when these students join the ranks of healthcare providers. According to Sarani et al. (2016) and Iliyasu et al. (2016) educational bodies at national level should do their best to inform nurses and nursing students

as well as all medical personnel about the prevention of nosocomial infections in order to enhance knowledge levels on standard precautions.

Knowledge level of individual HCWs plays a significant role in hand hygiene compliance rates (Abdraboh et al., 2016). A study by Dreidi et al. (2016) showed moderate knowledge and attitudes towards hand hygiene among health personnel, which could be the result of a social desirability bias among HCWs. Further research using a different method was suggested in order to confirm the findings. Gaps in knowledge regarding hand hygiene among health personnel were identified in a study by Iliyasu et al. (2016). Poor knowledge of the transmission risk of pathogens indicates how HCWs underestimate the risk of such transmission, thus putting themselves as well as their patients at risk of acquired infections (Iliyasu et al., 2016).

Low levels of knowledge regarding hand hygiene among the nurses as well as other HCWs in Saudi Arabia was the main finding in the study by Al Ra'awji et al. (2018). However, according to Nabavi et al. (2015) and Chuc et al. (2018), healthcare personnel might have adequate knowledge of hand hygiene but his or her attitude towards hand hygiene may remain low. Research by Graveto et al. (2018) also showed that despite a high level of hand hygiene knowledge, this knowledge does not translate into good hand hygiene practice. Research by Yadav and Giri (2018) reported a limited level of hand hygiene knowledge in a study population in Nepal, suggesting improvement of training programmes that aim to promote hand hygiene knowledge and compliance with policies of standard precautions.

2.7 Attitude to hand washing among healthcare providers

Research showed that nurses are more likely to wash their hands than other HCWs (Piras et al., 2017). Nurses' hand hygiene compliance rates are below 60% globally, regardless of

great efforts for improvement, and the main challenge appears to be channelling the significance of hand hygiene into sustained hand hygiene behaviours (Piras et al., 2017). According to Zhao, Yang, Huang and Chen (2018) nurses have the strongest preference for an intervention that provides solid evidence about the effectiveness of hand hygiene in reduction of the prevalence of nosocomial infections. It is important that health personnel believe that hand hygiene is an expected approach to control infection (Ataee, Ataee, Tavana & Salesi, 2017). However, a study by Jeong and Kim (2016) reported that hand hygiene knowledge does not necessarily influence hand washing compliance. Similarly, a study by Sarani et al. (2016) indicated that student nurses had a low level of hand hygiene knowledge, but their attitude towards hand hygiene was positive. The health belief model, theory of reasoned action, and theory of planned behaviour and self-efficacy serve as applicable means for the promotion of hand hygiene adherence in the practice of infection control (Jeong & Kim, 2016). Furthermore, the theory of planned behaviour is known to be useful to predict positive changes in human behaviour (Jeong&Kim, 2016). For a desired behaviour to occur, the motivation and emotions around it are of great significance (Sarani et al., 2016).

Research shows that it is not clear that explicit (self-reported) attitudes are consistent with implicit (outside of one's awareness) attitudes (Corace et al., 2017). Explicit attitudes such as belief about consequences to self and others, environmental resources, time, pressure/workload, and social/professional role/identity, have significant role in hand hygiene campaigns, as we don't always mean what we say (Corace et al., 2017). According to Jeong and Kim (2016), factors that have a negative influence on controlling beliefs need to be eliminated in order to enhance hand hygiene. Graveto et al. (2018) posit that it is vital to analyse what promotes health personnel hand hygiene behaviour, as there is remarkable inconsistency in hand hygiene performance during different hand hygiene opportunities in professional life. Also, behaviours that hinder hand hygiene are compound (Rigby et al.,

2017). When professionals' attitudes towards implementation of infection control procedures are less positive, it is obvious that the importance of hand hygiene will be undervalued (Li et al., 2019). Rigby et al. (2017) also reported that self-protective hand hygiene patterns often appear after performance of certain healthcare tasks.

The extent to which health personnel comply with hand hygiene safety protocols is largely influenced by the attitudes towards safety precautions (Davis, Harris, Mahishi, Bartholomew, & Kenward, 2016; Li et al., 2019). It was reported that presentation of concrete evidence at a trial stage might reinforce the importance and benefits of hand hygiene, which can boost nurses' confidence and result in positive attitudes towards hand hygiene practices (Zhao et al., 2018).

Nurses are more willing to improve their hand washing compliance if the intervention is compatible with their habits and past experience as well as their potential need for hand hygiene (Zhao et al., 2018). The level of involvement of hospital administrators in having a positive attitude towards effective infection prevention is of great significance; their lack of support for infection preventionists leads to failure (Li et al., 2019). According to Garba and Uche (2019), organisational mechanisms for training support, performance appraisal and clinical governance are important determinants for useful and successful change. Furthermore, pressure from individuals in higher positions could influence the degree to which HCWs follow the infection control policies (Li et al., 2017).

2.8 Hand washing practices among healthcare providers

Improvement of training programmes on hand hygiene practices at colleges or universities is crucial in order to equip future HCWs including the nurses in particular with positive attitudes and correct hand hygiene practices (Nair, Hanumantappa, Hiremath, Siraj, &

Raghunath, 2014). Frequent conduction of hand hygiene training sessions is important in conjunction with constant monitoring, including performance feedback, thus encouraging nurses to follow correct practices of hand hygiene (Nair et al., 2014).

Despite health personnel having adequate knowledge regarding hand hygiene, actual practices of hand hygiene remain poor, which enhances risks of transmission of pathogens by nurses and other HCWs (Iliyasu et al., 2016; Chuc et al., 2018). Hand hygiene practices by nurses who are HCWs working closely with patients need to be improved and maintained at an optimal level, otherwise direct microbial transmission to patients may occur (Ataee et al, 2017). Research by Arntz et al. (2016) demonstrated the effectiveness of implementation of a multimodal hand hygiene improvement programme in enhancing hand washing practice. Previous studies indicated a wide discrepancy in hand hygiene practice rates among nurses in different working areas, but the overall outcome of practice according to the WHO guidelines was found to be too low (Awoke et al., 2018). Research shows that a high level of hand hygiene practice by health personnel does not really matter if there is no adherence to correct techniques (Graveto et al., 2018). The quality of hand hygiene practice entails adherence to correct hand hygiene techniques and time spent on them as well as full coverage of the hands (Tschudin-Sutter et al., 2015; Loftus, Guitart, , Tartari, , Stewardson, Amer et al, 2019)

Possible negatives effects of hand hygiene products have been reported, and these may serve as an obstacle to the practice of hand hygiene procedures (Loyland et al., 2016). Therefore educating the nurses as well other HCWs about proper care of their hands is of great significance; this includes in terms of hand washing with water, where it is important to know that water temperature is an important aspect of hand hygiene and discouraging the use of hot water is crucial since it increases the risk of skin irritation (Sharma, Saxena, & Sharma, 2016; Sharif, Arbabisarjou, Balouchi, Ahmadidarrehsima, & Kashani, 2016).

2.9 Barriers to hand hygiene in healthcare settings

With hand washing procedure being the key success factor for quality improvement in healthcare in the struggle to limit the public health burden of nosocomial infections, it is crucial to take into consideration some of the elements that hinder the desired compliance by nurses and other HCWs (Pittet & Allegranzi, 2018). Some of the identified barriers impacting on compliance with proper hand hygiene are discussed below.

2.9.1 Individual factors

The concept of hand hygiene remains the primary focus to achieve success in alleviating the world public health burden of nosocomial infections (Winship & McClunie-Trust, 2016). Therefore, it is important to take into account factors that hinder the compliance with as well as the quality of hand hygiene procedures in healthcare settings (Piai-Morais et al., 2015). A number of factors have been identified as obstacles at individual level, hindering the desired outcome of this powerful mean of infection control: biological characteristics, such as male gender and age of the nurses (Laskar et al., 2018; Chuc et al., 2018); social connectedness, such as fear of compromising the relationship between health personnel and patient, and believing that gloves replace the need for hand hygiene (Tekere et al., 2015; Chuc et al., 2018); inadequate time spent washing hands due to operational reasons; and lack of active participation in hand hygiene promotion, lack of role models, lack of scientific information on the real impact of appropriate hand hygiene on nosocomial infection rates, disagreement with recommendations, disbelief in the value of hand hygiene, lack of knowledge of protocol, and forgetfulness (Tekere et al., 2015; Foote & El-Masri, 2016; Chuc et al., 2018).

Additional obstacles reported by researchers include: perceived low risk of getting or transmitting infection, despite easy access to clean water in-between seeing patients (Iliyasu

et al., 2016);prioritizing patients' needs; working during the week versus during the weekend; cultural background, such as lack of tradition and the habit of hand hygiene practice, and religious beliefs; and category of profession, such as being a physician rather than a nurse and being an assistant nurse rather than a nurse (Teker et al., 2015; Laskaret al., 2018).

In psychiatric facilities in particular, recent research in Taiwan showed specific challenges encountered by infection prevention. A study by Li et al. (2019) reported that the trained infection prevention perceived that most of their preservice knowledge and skills in medical wards did not meet their needs once they found themselves working in psychiatric settings. Therefore, lack of knowledge and skills (training),including lack of a period of clinical practice in a psychiatric setting, pose difficulties in infection prevention measures in psychiatric health facilities (Li et al., 2019). Insufficient staff that deal with infection prevention and control in psychiatric health settings, and lack of involvement by hospital administrators to provide support to infection prevention and thus lighten the process (Li et al., 2019) are also important factors. Patients may not have a full understanding of instructions from infection prevention; therefore, the success of infection prevention depends immensely on support from fellow health personnel in the units. However, it was reported that many healthcare professionals undervalue the importance of infection control in the psychiatric setting (Li et al., 2019).

2.9.2 Environmental factors

Research has shown the impact of aspects at environmental level that need close attention in order to reach the target of hand hygiene campaigns (Awoke et al., 2018). Insufficient hand washing facilities as well as increased opportunities for hand hygiene make HCWs more likely to be non-compliant with hand hygiene; thus availability and accessibility of basins/sinks and running clean water in the area of care make hand hygiene practice easier

(Foote & El-Masri, 2016; Awoke et al., 2018). According to Foote and El-Masri (2016) the absence of detergent/soap, lack of clean towels, poor quality of soap, and lack of hand lotion/lubricants also hinder the effective practice of hand hygiene.

Additional factors identified as impacting on the desirable outcome of hand hygiene are: lack of time, surgery, anesthesiology, emergency unit, workload, and activities with a higher risk of cross-transmission, lack of appropriate infrastructure, and availability of equipment (Teker et al., 2015; Rigby et al., 2017), shortage of staff, overcrowding of patients, lack of priority given to hand hygiene, lack of a safety climate, lack of administrative sanction measures for health personnel who are non-adherent to hand hygiene, lack of role models for hand hygiene, and lack of administrative appraisal of the adherence of health personnel to hand hygiene (Teker et al., 2015; Rigby et al., 2017).

In psychiatric institutions the fact that patients have unique characteristics, such as mental impairment, due to the seriousness of mental illness make implementation of infection control measures focusing on outbreaks even more challenging (Fukuta & Muder, 2013). According to Li et al. (2019) psychiatric facilities are mostly closed; they have a high patient concentration with increased social interaction, and thus a higher risk of cross-contamination and outbreaks. In psychiatric settings the use of seclusion rooms for isolation during outbreaks is not ideal, since patients with cognitive impairment perceive isolation as punishment, and as a result they conceal their physical symptoms (Li et al., 2019).

Informational needs, cultural background and knowledge of infection prevention may be significant to increase effective communication (Li et al., 2019). There remains a need to ensure infection control surveillance in psychiatric healthcare institutions to reduce the incidence of physical comorbidities in these settings (Laskar et al., 2018).

2.10 Conclusion

Previous studies have shown evidence that hand hygiene is gradually improving; however there is still a challenge in reaching the target of the agenda of infection prevention and control, since the rate of nosocomial infections is still on the rise despite increasing levels of hand hygiene compliance. It is evident that training programmes that focus on hand hygiene knowledge on their own, and hand hygiene practice without proper techniques do not have a strong and lasting effect on hand hygiene procedures. However, hand hygiene is known to be the single most effective means of attaining a 50% reduction in infections (Pitett & Allegranzi, 2018). Research also shows the need to change HCWs' attitudes into positive behaviours. Permanent training programmes with an emphasis on integration of the knowledge, attitudes, practice and techniques of hand hygiene, including attention to the barriers to this meaningful procedure, especially in psychiatric facilities, will have sustainable effects. Therefore, an intervention that is not limited to education and promotion alone but includes continuous staff motivation and frequent evaluation might bring about significant outcomes. Also, there needs to be constant inspection in closed psychiatric healthcare settings to detect and block infection outbreaks.

Chapter three

Research design and methodology

3.1 Introduction

In this chapter the choice of research methodology, research design and methods that were followed in the study are described. The research method includes the research approach, description of the study design, study setting, population, sampling, collection, and data analysis. This chapter also discusses the rigour of the study and the ethical principles that governed the study.

3.2 Research approach

The choice of research methodology was determined by the research question that the researcher aimed to address. Quantitative research is described as a realistic and appropriate approach for this study, as it allows the researcher to uncover the existing reality of the phenomenon (Grove, Burns and Gray, 2013). This approach is based on the positivism paradigm, as the study aims to investigate the knowledge, attitudes and practices of nurses in the selected psychiatric hospital.

3.3 Research design

A survey design was employed to obtain the information to address the research objectives. According to Grove, Burns and Gray (2013), the research design is like a blueprint of how the researcher intends to collect data in a study in order to answer the research questions on a given condition. Polit and Beck (2013) stated that a quantitative descriptive survey is suitable when respondents are only required to describe the occurrence of real-life situations. Burns and Grove (2010) describe descriptive design as the examination and description of

phenomena that are happening in reality, which offers a precise account of features of specific individuals, situations or groups. A descriptive study is valuable in obtaining knowledge in an area where little research has been conducted or where little is known about the phenomena under investigation, which is the case in this study (Houser, 2013). A descriptive survey design is most appropriate for this study to investigate and determine the knowledge, attitudes and practices of nurses towards hand washing (Brink, Van der Walt & Van Rensburg, 2012). The following were the objectives of the study: to describe the knowledge of nurses on hand hygiene; to examine the attitudes of nurses towards hand hygiene; and to examine the practices of nurses regarding hand hygiene.

3.4 Research setting

The study setting refers to a specific place from where the data are collected. This study was conducted at a selected psychiatric hospital in the Western Cape province of South Africa. The hospital is the largest psychiatric hospital in the Western Cape. It accommodates mostly severely ill psychiatric patients, and is a 740-bed specialist psychiatric referral hospital divided into four compartments, that include a child and adolescent unit, a forensic unit where patients have a long leave of absence and return to the institution, a general adult psychiatry unit, as well as an intellectual disability unit. These services have both ambulatory and inpatient components. It is located in the north of the Western Cape. The researcher was interested in this psychiatric setting because it is larger than the three other psychiatric hospitals in the Western Cape, and has more services— the four compartments mentioned above as well as a parents' guidance clinic, child and family unit, main adult outpatient department and general outpatient department.

3.5 Population

The population is the entire group of persons or objects that are of interest to the researcher and meet the criteria that they are interested in studying (Brink et al., 2012). A research population is also known as a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait. The target population in this study included all permanent nurses working at the selected psychiatric hospital, which at the time of data collection was 381 nurses. These nurses included males and females from different age groups with different categories of nursing qualification.

3.6 Eligibility criteria

According to Polit and Beck (2010), inclusion criteria are those indispensable features that deem a participant suitable to be included in the study. The nurses for this study included all categories of nurses, both female and male, who were permanently employed at the selected psychiatric hospital, such as registered nurses, auxiliary nurses, enrolled nurses, and enrolled nurse assistants. All student nurses, community service nurses and seasonal nurses were excluded from the study.

3.7 Sampling strategy

A sample is the subset of the population that is selected to represent the population (Brink et al., 2012). Sampling includes selecting groups of people, events, behaviours or other elements to conduct a study on (Grove et al., 2013). The random sampling technique, also known as probability sampling, was used to recruit study participants. This technique was appropriate for this study as the objective is to generalise the findings to the wider population from which the sample was taken. A simple random sampling technique was employed in

this study as every individual had an equal and independent chance of being chosen. Of the total number of 29 wards, 24 wards were operating during the period of data collection as researcher found that some other wards were empty and closed. Therefore in order to increase response rate (195/24) eight questionnaires were distributed in each ward and one extra questionnaire was added then three wards from the 24 received, nine questionnaires for the voluntary participants therefore a total of 195 questionnaires were distributed.

3.8 Sample size

The sample was selected from the target population of 381 nurses, and the sample size was calculated as follows: Population size (N): 381, according to the Yamane formula (sample size is n , where $n = \frac{N}{1 + N(e^2)}$, and $e = .05$ error, with 95% confidence; sample size $n=195$).

The researcher used the random sampling technique to select voluntary participants from 381 nurses from all wards at the selected psychiatric hospital to arrive at the sample size of 195 nurses from both day and night shifts.

3.9 Instrument

A self-administered structured questionnaire was used to conduct the study. Knowledge was assessed using an adapted hand hygiene questionnaire from both the WHO and the Institute for Healthcare Improvement for HCWs. Attitudes and practices were assessed using a self-administered questionnaire adapted from the WHO guidelines for Infection Control in Health-Care Facilities. Questions 5 and 6 were added into the attitude and question 17 and 18 were added on practice questionnaire, based on expert opinions. Experts in the research field and a statistician were also consulted to ensure the appropriateness of the research tool to answer the study objectives. The questionnaire consisted of four sections: section A

contained questions related to demographic information; section B consisted of 13 questions related to hand washing knowledge, all used the format of a Likert scale with the responses 'Agree', 'Disagree', and 'Not sure'; section C consisted of 6 questions related to attitudes towards hand washing with Likert scale responses 'Strongly agree (SA), Agree (A), Not sure (N/S), Disagree (SD), Strongly disagree (D)'; and section D consisted of 18 questions related to practices of hand washing, with responses 'Yes', 'No' or 'Sometimes'. The Likert scale was used to interpret the knowledge, attitudes and practices of nurses towards hand washing. The self-administered questionnaire was in English, as this was a common language for all respondents.

3.10 Pilot test

A pilot test was conducted to ensure the reliability and validity of the instrument. Pilot testing before the actual data collection allows determination of the length of time the questionnaire will take to complete, and whether the questions are clear to the respondents and how respondents would cope with them. Ten questionnaires were handed out to ten participants who were not part of the actual study. The pilot test found that questions 5 and 6 from the attitude section (C) were difficult to answer and they were modified. Similarly, questions 17 and 18 were also added in the practice measurement.

3.11 Data collection process

According to (Grove, Burns & Gray, 2013), the data collection process is the precise, systemic gathering of information relevant to the research purpose or, the specific objectives and questions of a study. Data was collected by the researcher herself. Before data collection, Ethics clearance was first granted by the University of Western Cape ethics research committee (See annexure B), then the Department of Health granted permission (See annexure C) to use the health facility for the study purposes.

The researcher then accessed area managers and sought permission to meet nurses from each ward during a quiet time of the day and nightshift (during tea and lunch times), without causing any sort of obstruction to their work. In each ward the researcher first explained the reason for being at the premises, and then explained the study topic and aim of the study to the nurses on duty. Informed consent was obtained from those who agreed to participate in the study before completing the questionnaires, and questionnaires were handed out to them to be completed. Some of the nurses preferred to complete the questionnaire and returned them within 10–15 minutes, and those who preferred to return the completed questionnaires by the end of their shift and later on, they were given the questionnaire to complete on their own time. Then completed questionnaire from each of the participant was collected on a different occasion as agreed upon between researcher and respondents. The researcher met all categories of nurses in both day and night shifts, and continued to collect data within the valid period of ethics clearance until the set number of the sample was attained.

3.12 Data analysis

Data are pieces of information obtained from data collection, and analysis is the systematic organisation and synthesis of research (Polit & Beck, 2013). All 195 questionnaires which were distributed were returned. There were no irregularities to the answers given and therefore no completed questionnaire was discarded. Data were categorised according to their domain, and each completed questionnaire was coded. The data were double-entered into an Excel spread sheet to cross-check the correctness of data entry, and then imported into the Statistical Package for the Social Sciences (SPSS) version 25 program for analysis. Descriptive and inferential statistics data analysis techniques were used to summarise and present the findings. Descriptive statistics help to convert and reduce a large amount of data to an organised whole, which makes it possible for readers to make sense of it (Polit & Beck,

2013). The analysis was carried out using descriptive measures to generate frequencies, percentages, and mean values. Frequencies and percentages were used to describe categorical data. The frequency of a particular response such as gender, age in years, work experience level (in years), qualification level, nurse's knowledge, attitude and practice were calculated using frequencies and percentages.

Thirteen items were assessed to describe the knowledge of the nurses towards hand washing. The knowledge items were measured on a Likert scale and grouped into disagree with a score of 1, not sure with a score of 2 and agree with a score of 3. One was considered a minimum score and 39 was considered a maximum score, both disagree and not sure were treated as limited knowledge. After grouping them the score of each item was calculated and then the percentage of the scores was also calculated on each item where the higher the score the more knowledgeable and the lower the score the less knowledgeable.

Numerical values were given to the attitude Likert scale (strongly disagree=1, disagree =2, not sure=3, agree=4, strongly agree=5) next to each variable on the questionnaire to be investigated in order to facilitate the calculation of each statistical value. The five-point Likert scale was collapsed into agree, not sure and disagree. Strongly agree and agree were recorded into agree with a score of 3 and strongly disagree and disagree were recorded into disagree with a score of 1, then not sure was recorded with a score of 2.

Six items were assessed to describe the nurses' attitude towards hand washing, these items were grouped into disagree with a score of 1, not sure with a score of 2 and agree with a score of 3, after grouping them together then the score on each item was calculated. 1 was considered minimum and 18 was considered maximum. Then percentage of the score on each item was calculated, the higher percentage the more positive attitude, the less percentage the more negative attitude, both disagree and not sure were treated as negative attitude and agree

positive attitude. Eighteen items were assessed to describe the practice of the nurses towards hand washing. The practice three-point scale was collapsed into yes and no, no with a score of 1 and yes with a score of 2. Then the score was calculated for each item and then the percentage was also calculated. The higher percentage the more practice of hand washing and the lower percentage the less practice of washing.

The Chi-square test was used to determine the association between sociodemographic characteristics (gender, age, educational level, work experience, qualification) and nurses' knowledge, attitudes, and practices of hand washing and the level of significance was set at $P < .05$. The statistical analysis was carried out with the assistance of a statistician.

3.13 Reliability

Reliability is the consistency with which the instrument measures what it is supposed to measure over a period of time (Polit & Beck, 2010). An instrument can be said to be reliable if it is used to collect data under similar circumstances over time and reveals the same or similar results (Brink et al., 2012). The statistical Cronbach's alpha measure was used to test the internal consistency and reliability of the instrument. The value of Cronbach's alpha should be at least .70 and above for a new instrument. In this study a Cronbach's alpha score was determined for the Likert scale questions and reliability tests were done. The knowledge scale included 13 items and Cronbach's alpha was .728; the attitude scale included 6 items and Cronbach's alpha was .691; and the practice scale included 18 items and Cronbach's alpha was .771. There were 37 items for all sections and the Cronbach's alpha test for all three sections was .801.

3.14 Validity

Validity refers to the accuracy with which an instrument measures what it is supposed to measure (Brink et al., 2012). Face validity of this instrument was assured by giving the instrument to research experts with experience in the nursing field to review. Content validity asserts how well the instrument represents all components of the variables to be measured (Brink et al., 2012). Brink et al. (2012) suggest that to ensure content validity, the instrument should be reviewed by subject experts and a pilot study should be conducted. In order to ensure content validity, the instrument was examined by experts in the field, and a statistician. This confirmed that the instrument was measuring what it intended to measure and ensured that all elements relevant to the study were included (Table 3.1).

Table 3.1: How content validity was ensured by the tool used in this study

Objectives	Questions
To determine the knowledge of nurses of hand washing at a psychiatric hospital	Section B, questions 1–13
To identify attitudes of the nurses towards hand washing at a psychiatric hospital	Section C, questions 14–19
To assess the practices of the nurses regarding hand washing at a psychiatric hospital	Section D, questions 20–37

3.15 Ethical considerations

Ethics approval was obtained from the ethics research committee of the University of Western Cape (See Annexure B), and the Department of Health then gave permission to conduct this study (See Annexure C). Permission was also sought from area managers of the selected psychiatric hospital. Three ethical principles guided the researcher through the proposed study: respect for persons, beneficence and justice. These principles are based on

the human rights that have to be protected, namely the right to self-determination, privacy, anonymity and confidentiality, and fair treatment, and to be protected from discomfort and harm. All nurses from the selected psychiatric hospital were informed about the study and the local authority's permission was requested and granted for them to complete questionnaires. The researcher was mindful not to cause any disruption to the functions of the facility. Voluntary informed written consent was obtained from the respondents and their confidentiality was assured by not mentioning names or identifiers during the study period and beyond.

Principle of respect of persons: This principle includes the right to self-determination and to full disclosure (Brink et al., 2012). Respondents' rights to self-determination were honoured, because respondents decided independently, without any coercion, whether or not to participate in the study, and they had the absolute right not to answer any questions that would cause discomfort, to disclose or not disclose personal information, and also to ask for clarification about anything that might be ambiguous. Each participant was asked to voluntarily sign a consent form after receiving adequate information about the study that was being undertaken. There is no signed consent form that was linked to any specific question in the questionnaire, and respondents were clearly informed that they could withdraw from the study at any time if they so wished, without sanction or any form of consequences. Anonymity of the respondents was ensured.

Principle of beneficence: This principle includes freedom from harm and any kind of exploitation (Brink et al., 2012). In this study, the researcher ensured that no discomfort, harm or exploitation could occur while participating. Minimal risk was anticipated and the respondents were encouraged to present complaints in the case of any harm or discomfort due

to the study. No concerns were raised by any of the respondents. Preparations were made for counselling to be provided for respondents if needed, but none of the respondents needed it.

Principle of justice: The respondents in this study had the right to fair selection and treatment, and were requested to participate in the study voluntarily after adequate information had been provided to them and consent forms were signed. The right to privacy was upheld in this study. Information collected will remain anonymous and confidential. Questionnaires were distributed to the nurses on different shifts in each ward, and they were returned without any indication of their identity or any information that might reveal this. After data were captured on the computer and stored and protected with a password, the hard copies were kept in a locked cabinet. Both the hard and soft copies of the data will be destroyed after five years. The soft copy will be deleted from the computer and the hard copy will be destroyed by shredding. During dissemination of the results through publications and conference presentations, the identity of respondents will remain anonymous.

Conclusion

In this chapter, the research approach and design of this study were described; setting, population, sampling strategy and eligibility criteria were explained. Instrument of the study was described, pilot study, details of data collection process and analysis discussed, validity and reliability of the instrument was explained. Lastly the ethics that guided this study were detailed. Next is chapter four that presents the findings of the study.

Chapter four

Presentation of findings

4.1 Introduction

This chapter presents the findings of the study in three sections based on the research objectives, which were: (1) To describe the knowledge of nurses on hand washing at a psychiatric hospital; (2) To determine the attitudes of nurses towards hand washing at a psychiatric hospital; and (3) To determine the practices of nurses regarding hand washing at a psychiatric hospital.

From the target population of 381, the sample size was calculated to be 195. One hundred and ninety-five (195) questionnaires that were distributed to participants, were all returned and fully completed by respondents, giving a response rate of 100%. The questionnaires were given unique identity labels numbered 1-195 before data analysis, and were double-checked for completeness before the researcher entered the data into an Excel spreadsheet. With the help of the statistician, data were imported from Excel to IBM SPSS version 25. Descriptive statistics were used to generate frequency distribution, mean percentages, and standard deviation (STD). Cross-tabulation was conducted to determine the association of some of the variables with knowledge, attitudes and practices. The results were presented mainly by means of tables.

4.2 Section A: Sociodemographic characteristics of the respondents

Sociodemographic characteristics such as gender, age, rank, work experience and educational level of the respondents are presented in Table 4.1. The majority of respondents in the study (60%, n=117) were females, with 40% (n=78) males, from all categories of nurses. The

largest number of respondents were registered nurses (40.5%, n=79), followed by enrolled nurses (24.6%,n=48,enrolled nurse assistants (22.1%,n=43),and auxiliary nurses (12.8%,n=25).The respondents' ages rangedfrom20 years to above 40 years, with the majority of the nurses being older than 40 years (41%,n=80), with 35.9% (n=70) aged 30-40 years. Duration of work experience ranged from less than 1 year to more than30years. Very few respondents (3.6%,n=7) had been in their current position for less than 1 year. The majority of respondents (33.3%,n=65) had been in their current position for 1–5 years, followed by 29.2% (n=57) for 6–10 years, 18.5% (n= 36) for 21–30 years, 9.2% (n=18) for more than 30 years, and 6.2 % (n=12) for 11–20 years. Traditionally nurses work by rotating between different departments/wards, or between healthcare facilities, which could be the reason that the majority of nurses had less than 10 years of experiences in their current position.

Table 4.1 Gender, age, work experience and level of education of the 195 nurses

Summary	N	Percentage
Gender	Female	117 60.0%
	Male	78 40.0%
Age (yrs)	20-30	45 23.1%
	30-40	70 35.9%
	>40	80 41.0%
Rank	Registered nurse	79 40.5%
	Enrolled nurse	48 24.6%
	Enrolled nurse assistant	43 22.1%
	Auxiliary nurse	25 12.8%
Duration of	<1 year	7 3.6%

work experience (yrs)	1 – 5 years	65	33.3%
	6 – 10 years	57	29.2%
	11 – 20 years	12	6.2%
	21 – 30 years	36	18.5%
	> 30 years	18	9.2%
Educational level	Grade8 – 12	105	53.8%
	Diploma	32	16.4%
	Advanced Diploma	29	14.9%
	Degree	27	13.8%
	Master's	2	1.0%

The highest qualification among the nurses was a master's degree, which was held by 2 (1%) registered nurses, and the lowest qualification was Grade 8–12, held by 51.8 % (n=101) of the nurses, which included both auxiliary nurses and some of the enrolled nurse assistants. There were 32 (16.4%) respondents with a diploma, 29 (14.9%) with an advanced diploma, and 27 (13.8%) with a degree.

4.3 Section B: Knowledge of the nurses on hand washing

In assessing the knowledge of the nurses on hand washing, respondents were requested to agree, disagree or remain neutral (uncertain) in response to 13 items which assessed nurses' knowledge on hand washing. The results indicate that responses varied between 58.5% and 99% for various knowledge items, as outlined below.

Questions 1–5 related to hand washing opportunities. On the statement that hand hygiene should be performed before having direct contact with a patient, the overwhelming majority of the respondents agreed (95.4%, n=186), while 4.1% (n=8) disagreed, and 0.5% (n=1) was uncertain. On the question relating to hand washing before inserting an invasive device,

almost all respondents (99%, n=193) agreed with the statement and only 1% (n=2) disagreed. About 96.9% (n=189) agreed that hand hygiene should be performed when moving from a contaminated body site to a clean body site during an episode of patient care, while 1% (n=3) disagreed and 1%(n=3) were uncertain. Regarding the need to perform hand hygiene after having direct contact with a patient or with items in the immediate vicinity of the patient, 93.3% (n=182) agreed and 3.3% (n=7) disagreed, while 3% (n=6) were uncertain. On the statement regarding glove use, 90.3% (n=176) agreed that hand hygiene should be performed after glove removal, while 8.2% (n=16) disagreed and 1.5% (n=3) were uncertain.

Question 6 referred to the appropriate moment for use of an alcohol-based hand rub, in terms of the effective regime to reduce pathogens when hands are not visibly soiled/contaminated, by applying 1.5 – 3 ml of alcohol-based hand rub to the hands and rubbing until hands are dry. About 73.8% (n=144) agreed with the statement, while 14.4% (n=28) disagreed and 11.8% (n=23) were uncertain. Question 7 involves the route of infection transmission, and the majority (79%,n=154) agreed that antibiotic-resistant pathogens most frequently spread from one patient to another in the healthcare setting via the contaminated hands of clinical staff, while 10.8% (n=21) disagreed with the statement and 10.3% (n=20) were uncertain.

For questions 8–12 on the potential risk of infection transmission, the majority (79%, n=154) of the respondents agreed that herpes simplex can potentially be transmitted from patients to clinical staff due to lack of hand hygiene, while 9.7% (n=19) disagreed and 11.3% (n=22) were uncertain. About 82.1% (n=160) agreed that infection with methicillin-resistant *S. aureus* can potentially be transmitted from patients to clinical staff as result of lack of hand hygiene, while 5.6% (n=11) disagreed and 12.3% (n=24) were uncertain. Three-quarters (75.4%,n=147) of the respondents agreed that respiratory syncytial virus infection can potentially be transmitted from patients to clinical staff due to lack of hand hygiene, while

7.2% (n=14) disagreed and 17.4% (n=34) were uncertain. With regard to hepatitis B virus, the majority (81.5%,n=159) of the respondents agreed that it can potentially be transmitted from patients to clinical staff due to lack of hand hygiene, while 11.8%(n=23) disagreed and 6.7%(n=13) were uncertain. With regard to the effect of alcohol-based hand rub, about 72.8% (n= 142) agreed that hand hygiene products cause stinging of hands where there is pre-existing skin irritation, while 9.2% (n=18) disagreed with the statement and 17.9% (n=35) were uncertain.

Question 13 related to the survival of *C. difficile*, *methicillin-resistant S. aureus*, and *vancomycin-resistant enterococcus* already in the environment of the patient for days to weeks; about 58.5% (n=114) of the respondents agreed with the statement, while 7.7% (n=15) disagreed and 33.8% 9 (n=66) were uncertain. If we combine the latter two results, the rate of disagreement and uncertainty is 41.5% (n= 81), which highlights the limited knowledge on this particular aspect.

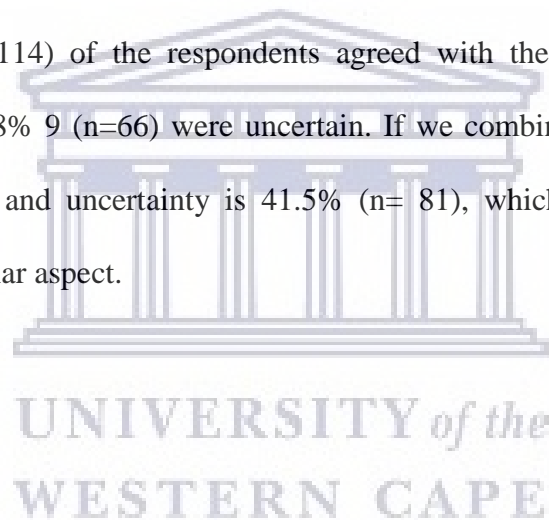


Table 4.2: Nurses' knowledge on hand washing

Knowledge questions		Disagree	Not sure	Agree
Hand hygiene should be performed before having direct contact with a patient	N	8	1	186
	%	4.1%	.5%	95.4%
Hand hygiene should be performed before inserting an invasive device (e.g. intravascular catheter, Foley catheter)	n	2	0	193
	%	1.0%	0.0%	99.0%
Hand hygiene should be performed when moving from a contaminated body site to a clean body site during an episode of patient care	n	3	3	189
	%	1.5%	1.5%	96.9%
Hand hygiene should be performed after having direct contact with a patient or with items in the immediate vicinity of the patient	n	7	6	182
	%	3.6%	3.1%	93.3%
Hand hygiene should be performed after removing gloves	n	16	3	176
	%	8.2%	1.5%	90.3%
If hands are not visibly soiled/contaminated the most effective regime to reduce pathogens is to apply 1.5ml to 3ml of alcohol-based hand rub to the hands and rubbing hands together until they dry	n	28	23	144
	%	14.4%	11.8%	73.8%
Antibiotic-resistant pathogens most frequently spread from one patient to another in healthcare settings via the contaminated hands of clinical staff	n	21	20	154
	%	10.8%	10.3%	79.0%

If appropriate hand hygiene is not performed herpes simplex virus infection can be potentially transmitted from patients to clinical staff	n	19	22	154
	%	9.7%	11.3%	79.0%
If appropriate hand hygiene is not performed colonisation or infection with methicillin-resistant <i>S. aureus</i> can potentially be transmitted from patients to clinical staff	n	11	24	160
	%	5.6%	12.3%	82.1%
If appropriate hand hygiene is not performed respiratory syncytial virus infection can potentially be transmitted from patients to clinical staff	n	14	34	147
	%	7.2%	17.4%	75.4%
If appropriate hand hygiene is not performed hepatitis B virus infection can potentially be transmitted from patients to clinical staff	n	23	13	159
	%	11.8%	6.7%	81.5%
Alcohol-based hand hygiene products cause stinging of the hands in some providers due to pre-existing skin irritation	n	18	35	142
	%	9.2%	17.9%	72.8%
<i>C.difficile</i> , methicillin-resistant <i>S. aureus</i> and vancomycin-resistant enterococcus already in the environment of the patient can survive for days to weeks	n	15	66	114
	%	7.7%	33.8%	58.5%

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4.3.1 Association between demographic variables and nurses' knowledge on hand washing

The means test was conducted to assess the association between demographic variables and nurses' knowledge on hand washing (Table 4.3). In terms of gender, the findings indicate that males had slightly more knowledge than females, with mean scores of 92.5 and 91.41, respectively. With regard to respondents' age, those aged 30–40 years had a higher mean score (92.09) than those aged 20–30 years and those older than 40 years, with mean scores of 91.28, and 91.96, respectively. In terms of rank, registered nurses had the highest mean score (92.66), followed by enrolled nurses (91.88), enrolled nurse assistants (90.94) and auxiliary nurses (90.77). The findings indicate that educational level has an impact on the knowledge of hand washing.

Regarding the respondents' years of experience, the findings reveal that respondents with 11–20 years' experience had the highest mean score (96.58), followed by those with more than 30 years of work experience (94.73), 21–30 years of work experience (92.81), 6–10 years of work experience (90.91), and below 5 years of work experience (89.74).

In terms of respondents' level of education and knowledge on hand washing, the findings reveal that respondents with degrees had the highest mean score (93.35), indicating that these respondents had more knowledge than those with a master's degree (92.31), Grade 8–12 (91.82) education or a diploma (90.30).

No statistical significance was found when demographic variables were tested for association with knowledge (gender: $P=0.41$; age: $P=0.89$; rank: $P=0.70$; work experience: $P=0.18$; educational level: $P=0.79$)

Table 4.3 Association between demographic variables and handwashing knowledge

Knowledge		Mean	STD	P value
Gender	Female	91.41	10.03	0.4077
	Male	92.50	7.28	
Age (yrs)	20–30	91.28	8.26	0.88h90
	30–40	92.09	8.33	
	>40	91.96	10.07	
Rank	Registered nurse	92.66	7.97	0.6986
	Enrolled nurse	91.88	8.35	
	Enrolled nurse assistant	90.94	11.85	
	Auxiliary nurse	90.77	8.07	
Work experience (yrs)	<1	89.74	13.24	0.1790
	1–5	90.69	11.02	
	6–10	90.91	8.35	
	11–20	96.58	6.59	
	21–30	92.81	6.25	
	> 30	94.73	6.00	
Educational level	Grade8–12	91.82	9.57	0.7868
	Diploma	90.30	8.99	
	Advanced diploma	92.22	8.29	
	Degree	93.35	7.80	
	Master's	92.31	10.88	

4.4 Section C: Attitudes of nurses towards hand washing

As shown in Table 4.4 below, six items were used to assess nurses' attitudes towards hand washing. Almost all of the respondents (99.5%, n=194) agreed that hand washing is protective to the nurses, while 0.5% (n=1) disagreed with the statement. On the question related to means of improving hand hygiene, 90.3% of the respondents agreed that hand washing can be improved by administrative orders and continuous observation, while 4.1% (n=8) disagreed and 5.6% (n=11) were uncertain. About 86.7% (n=169) agreed that hand washing lowers nosocomial infections more than any other method of infection control, while 5.1% (n=10) disagreed and 8.2% (n=16) were uncertain. Regarding how to improve hand washing, 75.9% agreed that hand washing can be improved by role models, while 14.4% (n=28) disagreed and 9.7% (n=19) were uncertain; and 99% (n=193) agreed that it is important to assist or encourage patients to do hand washing after using the bathroom, with 1% (n=2) disagreeing with the statement. On the question related to patient hand washing before and after eating, 97.9% (n=191) agreed that it is important to assist or encourage patients to do so, while 2.1% (n=4) disagreed.

Table 4.4: Statistical description of attitudes towards hand washing

Summary of attitudes		Disagree	Not sure	Agree
Hand washing is protective to the nurses+	N	1	0	194
	%	0.5%	0.0%	99.5%
Hand washing can be improved by administrative orders and continuous observation	N	8	11	176
	%	4.1%	5.6%	90.3%
Hand washing lowers nosocomial infections more than any other methods of infection control	N	10	16	169
	%	5.1%	8.2%	86.7%
Hand washing can be improved by role	N	28	19	148

models	%	14.4%	9.7%	75.9%
It is important to assist or encourage patients to do hand washing after use of bathroom	N	2	0	193
	%	1.0%	0.0%	99.0%
It is important to assist or encourage patients to do hand washing before and after eating	N	4	0	191
	%	2.1%	0.0%	97.9%

4.4.1 Association between demographic variables and respondents' attitudes towards hand washing

Statistical tests were carried out on the responses regarding nurses' attitudes towards hand washing in association with demographic variables. In terms of gender, the findings indicate that females had a better attitude to hand washing (mean score 96.06) than males (95.09). However, this difference between gender and attitudes of nurses towards hand washing is not statistically significant ($P=0.4219$).

With regard to respondents' age, nurses older than 40 years had a better attitude (mean 95.76) than those aged 20–30 years (95.68) or 30–40 years (95.56). No statistical significance ($P=0.9883$) was found in the association between age and attitudes of the nurses towards hand washing. In terms of rank, the study reveals that registered nurses had better attitudes (mean 97.33) than the enrolled nurses (94.56), auxiliary nurses (95.33) and enrolled nurse assistants (94.06%). No statistical significance was found ($P=0.1254$) in the association between rank of nurses and their attitudes towards hand washing.

As shown in the Table 4.5 below, respondents who had been in their current position for less than one year had a better attitude towards hand washing (mean score 98.41) than those who had been in their current position for more than 30 years (97.84) or for 21–30 years (96.45).

No statistical significance was found in the association between work experience and attitude (P=0.4918). In terms of respondents' level of education, findings indicate that respondents with an advanced diploma had a better attitude (mean score 98.66) than those with degrees (98.15), a master's degree (97.22), Grade 8–12 (94.66), or a diploma (94.10). No statistical significance was found in the association between educational level and attitude.

Table 4.5: Association between demographic characteristics and attitude

Attitude		Mean	STD	P value
Gender	Female	96.06	8.76	0.4219
	Male	95.09	7.49	
Age (yrs)	20–30	95.68	6.37	0.9883
	30–40	95.56	7.30	
	>40	95.76	9.93	
Rank	Registered nurse	97.33	5.96	0.1254
	Enrolled nurse	94.56	7.29	
	Enrolled nurse assistant	94.06	12.50	
	Auxiliary nurse	95.33	6.55	
Work experience (yrs)	<1 year	98.41	2.71	0.4918
	1–5	94.19	10.64	
	6–10	95.81	6.32	
	11–20	95.83	8.58	
	21–30	96.45	7.87	

	> 30	97.84	5.09	
Educational level	Grade8–12	94.66	9.56	0.0586
	Diploma	94.10	8.81	
	Advanced diploma	98.66	3.20	
	Degree	98.15	4.08	
	Master's	97.22	3.93	

4.5 Section D: Hand washing practices of nurses

Table 4.6 below indicates responses to the 18 items that were used in assessing the practices of nurses regarding hand hygiene at a psychiatric hospital. The results indicate that in terms of hand washing opportunities before carrying out a procedure/action, almost all (99.5%,n=194) respondents claimed that they do wash their hands before an invasive procedure, whereas 0.5% (n=1) did not. With regard to non-invasive procedures, 91.3% (n=178) of the respondents do practice hand washing before such procedures, while 8.7% (n=17) stated that they do not. Regarding hand washing practices before personal contact, the majority (80%,n=156) of the respondents do practice hand washing before personal contact, while 20% (n=39) indicated that they do not practice hand washing before personal contact.

Respondents were asked about their hand washing practices before contact with body fluids, and the results show that 82.6% (n=161) do practice washing their hands before such contact, while 17.4% (n=34) do not. On the similar question, 85.6% (n=167) of the respondents indicated that they do practice washing their hands before handling contaminated inanimate objects; 69.7% (n=136) reported washing their hands before handling waste materials, while 30.3% (n=59) do not carry out hand washing before handling waste materials.

In terms of the use of gloves, 69.7% (n=136) of the respondents indicated that they do practice hand washing before using gloves, while 30.3% (n=59) of them do not. On the question related to administration of medication, 94.9% (n=185) of the respondents reported that they do practice hand washing before administration of medication, while 5.1% (n=10) of them do not. Similarly, 99.5% (n=194) of the respondents reported that they do practice hand washing before handling food, while 0.5% (n=1) indicated that they do not.

Table 4.6: Statistical description of hand washing practices

Summary of hand washing practice		No	Yes
Do you wash hands before invasive procedure?	N	1	194
	%	.5%	99.5%
Do you wash hands after invasive procedure?	N	0	195
	%	0.0%	100.0%
Do you wash hands before non-invasive procedure?	N	17	178
	%	8.7%	91.3%
Do you wash hands after non-invasive procedure?	N	19	176
	%	9.7%	90.3%
Do you wash hands before personal contact?	N	39	156
	%	20.0%	80.0%
Do you wash hands after personal contact?	N	29	166
	%	14.9%	85.1%
Do you wash hands before body fluids contact?	N	34	161
	%	17.4%	82.6%
Do you wash hands after body fluids contact?	N	1	194
	%	.5%	99.5%
Do you wash hands before touching contaminated inanimate objects?	N	28	167
	%	14.4%	85.6%

Do you wash hands after touching contaminated inanimate objects?	N	4	191
	%	2.1%	97.9%
Do you wash hands before handling waste?	N	59	136
	%	30.3%	69.7%
Do you wash hands after handling waste?	N	2	193
	%	1.0%	99.0%
Do you wash hands before using gloves?	N	59	136
	%	30.3%	69.7%
Do you wash hands after using gloves?	N	11	184
	%	5.6%	94.4%
Do you wash hands before administrating medications?	N	10	185
	%	5.1%	94.9%
Do you wash hands after administrating medications?	N	15	180
	%	7.7%	92.3%
Do you wash hands before food handling?	N	1	194
	%	0.5%	99.5%
Do you wash hands after food handling?	N	5	190
	%	2.6%	97.4%

4.5.1 Association between demographic variables and nurses' hand washing practices

The findings of this study revealed that while females had better hand washing practices (mean score 95.63) than males (94.66), there was no statistical significance ($P=0.2907$) between these results (Table 4.7). The study looked at the hand washing practices in terms of the age categories of the respondents. Those respondents aged 20–30 years had better hand washing practices (mean score 96.11) than those of above 40 years (95.28) and those aged 30–40 years (94.64). There was a statistically significant ($P=0.4751$) relationship between respondents' age and hand washing practices.

Table 4.7 Association between demographic characteristic and hand washing practice

Practice		Mean	STD	P value
Gender	Female	95.63	6.43	0.2907
	Male	94.66	6.07	
Age (yrs)	20-30	96.11	6.71	0.4751
	30-40	94.64	5.95	
	>40	95.28	6.35	
Rank	Registered nurse	95.29	6.53	0.7362
	Enrolled nurse	94.62	6.89	
	Enrolled nurse assistant	96.06	5.08	
	Auxiliary nurse	94.89	6.40	
Work experience (yrs)	<1	95.24	9.17	0.5147
	1-5	95.85	5.98	
	6-10	93.81	6.72	
	11-20	95.60	5.36	
	21-30	95.99	5.57	
	> 30	95.83	6.75	
Educational level	Grades 8-12	95.08	6.29	0.3931
	Diploma	96.87	4.22	
	Advanced diploma	93.68	7.08	
	Degree	95.58	7.36	
	Master's	95.83	5.89	

With regard to the professional rank of the nurses, the results indicate that enrolled nurse assistants had better hand washing practice (mean score 96.06) than registered nurses (95.29), auxiliary nurses (94.89), and enrolled nurses (94.62). No statistical significance ($P=0.7362$) was found in the association between professional rank and hand washing practices. In terms of years of experience, the respondents who have been in their current position for 21–30 years had better hand washing practices (mean score 95.99) than those who have been in their

position for 1–5 years (95.85), followed by those who have been in their current position for more than 30 years (95.83). However, there was no statistical significance ($P=0.5147$) in the association between work experiences and hand washing practices.

Regarding respondents' level of education, those with a diploma had better hand washing practices (mean score 96.87) than respondents with a master's degree (95.83), followed by those with a degree (95.58) and those with Grades 8–12 (95.08). No statistical significance ($P=0.3931$) was found in the association between educational level of the respondents and their hand washing practices.

4.6 Conclusion

This chapter presented the findings on sociodemographic characteristics of the respondents, knowledge of the nurses on hand washing, then provided association between demographic variables and nurses' knowledge on hand washing, description of findings on attitudes of nurses towards hand washing and association between demographic variables and respondents' attitudes towards hand washing lastly description of hand washing practices of nurses and association between demographic variables and nurses' hand washing practices, the next chapter five discuss the study findings in details with relevant literature support.

Chapter five

Discussion of results

5.1 Introduction

This chapter discusses the findings of the study in relation to the current evidence in the literature. In the process of investigating the knowledge, attitudes and practices of hand washing among nurses at a psychiatric hospital, it was found that there are discrepancies in the levels of these regarding certain aspects of hand washing techniques and pathogen transmission that are very important in the prevention of infections. The discussion of the findings is based on the research objectives of the study, which were: to describe the knowledge of the nurses on hand washing, to examine the attitudes of the nurses towards hand washing, and to examine the practices of the nurses regarding hand washing in a selected psychiatric hospital.

5.2 Demographic information

Demographic data indicated that female nurses were more predominant in this study (60%,n=117), with and 40% (n=78) male nurses. This result is consistent with those of a study conducted in a psychiatric facility in Finland by Kurjenluoma,Rantanen,McCormack, Slater, Hahtela & Suominen (2017),where62.4% of respondents were female and 37.6% male, indicating that nursing is a predominantly female profession; however, with 40% (n=78) of males, the present study highlights the increasing number of male nurses entering psychiatric nursing – more so than general nursing – as is also reflected in the previous study by (McKenna, Vanderheide &Brooks., 2016).

5.3 Knowledge of nurses on hand washing

Results in the current study indicate that positive responses in terms of knowledge on hand washing varied between 58.5% and 99% for various items. This is consistent with the findings of Diwan et al. (2016) on hand hygiene knowledge assessment, where HCWs' knowledge on hand hygiene was reported to vary between 77% and 98%. Almost all of the nurses (99%,n=193) agreed with the statement that hand washing should be performed before inserting invasive devices. A similar finding was identified by Diwan et al. (2016), where 95% of respondents acknowledged performance of hand hygiene before invasive procedures at all times.

Statistical tests on the findings of this study on hand hygiene knowledge showed no significant association between different demographic variables and knowledge; the overall mean score ranged between 89.74 and 96.58, which indicates adequate knowledge. This finding is consistent with that of Dreidi et al. (2016) that there was no significant association between the demographic variables and the knowledge level of the participants. However, Zakeri et al. (2017), in a study in two teaching hospitals in Iran identified significant association between average work experience and inadequate knowledge about hand washing.

Regarding knowledge related to the route of infection transmission, for the question related to the potential risk of infection as a result of missed opportunities for hand hygiene the majority 81.5% (n=159) of responses were correct. This was similar to the findings reported in a study conducted by Derhun, de Souza, Costa, Inoue and Matsuda (2016), which found a high percentage of correct responses by professional nurses with regard to hand hygiene knowledge. This study took into account the concept of self-assessment, which refers to self-reflection that requires an individual's awareness and capacity to examine knowledge, so he

or she can attain sustainable and newer hand hygiene skills needed to maintain safety during patient care activities (Kelcikova, Mazuchova, Bielená & Filová, 2019). While Nematian, Palenik, Mirmasoudi, Hatam & Askarian (2017) identified high hand hygiene knowledge scores, these did not reflect on actual observed hand hygiene performance. Similarly, in a study by Corace et al. (2017), self-reported hand hygiene compliance was above 90%, but use of an anonymous observer over a period of five months revealed actual rates of 13-33%. Therefore the researcher assumed that flawed self-assessment could also be an issue in this study context, as previously reported in a study conducted by Kelcikova et al. (2019) where faulty self-assessment by HCWs was identified but was possibly due to inability to self-assess rather than dishonesty. This could raise a concern in this study, since it has a potential negative impact regarding hand hygiene self-evaluation.

Interestingly, it is noted that from the knowledge questions 6–12, the trend in responses was leaning towards a decline in hand hygiene knowledge level on various aspects. Moreover, for question 13, a lower 58.5% knowledge level was identified among the participating about readiness in terms of prevention of pathogens such as *C. difficile*, *methicillin-resistant S. Aureus* and *vancomycin-resistant enterococcus* in the patients' immediate environment. This is of concern since these pathogens have long-term survival and do not easily disappear from the environment. A previous study identified that regardless of rank, nurses have limited knowledge about the importance of knowing about the patients, themselves as HCWs and the hospital environment that form part of the pathogens' reservoir in the clinical settings (Clack, Passerini, Manser & Sax, 2018). The percentage of those who disagreed plus those who were uncertain was 41.5%, and even though 58.5% of respondents reported having adequate knowledge on this aspect, it is a concern that so many respondents had limited or no knowledge on this important aspect of infection prevention. This could lead to cross contamination of pathogens carried by hands from the healthcare environment, including

multidrug-resistant strains (Apisarnthanarak & Weber, 2018). Nurses have a moral, ethical and professional responsibility to use the standard guidelines for optimal hand washing practice during delivery of care (Kingston et al., 2017). Therefore, nurses should at least know that both their hands and patients' hands can be directly or indirectly contaminated from the hospital environment (Apisarnthanarak & Weber, 2018). Defeating multidrug-resistant organisms primarily relies on improved compliance with proper hand hygiene by HCWs (Grayson et al., 2018).

Unfortunately, there are limited data that specifically show or demonstrate cross-contamination from environmental sources in mental healthcare facilities. Therefore, although 41.5% (n=81) respondents with limited knowledge appears smaller in comparison with the amount of those with knowledge (58.5%, n=114), in terms of practice the impact in healthcare safety is high. This result highlights the gap in hand hygiene knowledge among the nurses, which is consistent to the findings of a descriptive study on HCWs by Yadav & Giri (2018), where despite a positive finding they also identified gaps in hand hygiene knowledge. A study in a tertiary hospital in Nigeria by Iliyasu et al. (2016) also identified a gap in knowledge regarding hand hygiene, with half of the doctors studied (52%, n=25) agreeing that the use of sterile gloves is the most effective method of preventing nosocomial infections.

It is vital to note that the knowledge of the nurses about hand hygiene in prevention of nosocomial infections depends on many factors, such as individual and educational characteristics and training courses; however, an adequate or high knowledge level of hand hygiene alone does not necessarily imply an acceptable level of hand hygiene practice (Garba & Uche, 2019). The key factor is to ensure that the nurses have sufficient knowledge of the role that their hands play in the transmission of nosocomial infections during various administrative and patient care activities (Mahesh & Washingari, 2014; Derhun et al., 2016).

Other hand hygiene predicting factors such as attitude, practices and perceptions of hand hygiene need to be examined in order to holistically address obstacles to optimal hand hygiene procedures as the single most effective weapon against nosocomial infections (Derhun et al., 2016).

In this study about 78.8% had knowledge about the use of alcohol-based hand rub when hands are not visibly soiled; however, 26.2% of the nurses had limited knowledge. Alcohol-based hand rub is effective during care and so it is recommended for hand disinfection due to its advantageous characteristic of being fast acting and eliminating a broad spectrum of microbes, which improves compliance (Ataee et al., 2016). It could be assumed that this particular hand washing behaviour might not be performed, due to the lack of awareness of the nurses. A similar finding was reported by Derhun et al. (2016) in their study where professionals had limited knowledge regarding the use of alcohol-based hand rub. Also, it appears that soap and water is preferred by professionals for hand hygiene rather than alcohol-based hand rub (Derhun et al., 2016).

Possible skin damage caused by alcohol-based hand rub (hand hygiene products) was reported by 72.8% of nurses. This finding is supported by the findings of Loyland et al. (2016) in an exploratory study, where respondents expressed strong feelings of dislike towards hand sanitisers due to skin damage. Therefore, this result highlights the possible reluctance of nurses to comply with hand hygiene when the hands are not visibly dirty, which poses a potential health risk. This implies that nurses need to be educated more on correct hand hygiene techniques and the importance of hand care to avoid possible irritation caused by hand hygiene products (Ataee et al., 2017; Sharif et al., 2016).

In the current study statistical test findings indicated that male respondents had more knowledge (mean score 92.05) than female respondents (91.41). This is inconsistent with the

finding of Zakeri et al. (2017) of no difference in hand hygiene knowledge between males and females. In this study the respondents who had 11–20 years of work experience in the field, had more knowledge of hand hygiene (mean score 96.58) than those who had less than 10 years of work experience in the field. A similar finding was found by Sodhi, Shrivastava, Arya and Kumar (2013), which indicates that hand hygiene knowledge increases with the duration of work experience. On the other hand, in the current study it was noted that respondents with more than 20 years of work experience in the field had less hand hygiene knowledge than those with 11–20 years of work experience. This could be due to the fact that as the length of work experience increases, the less the hand hygiene knowledge of nurses is promoted. Hence lack of updated knowledge among more experienced nurses could contribute to the lower level of hand hygiene knowledge. This finding is supported by those of a study conducted in Iran by Zakeri et al. (2017) and Al’Ra’awji et al. (2018), where they identified that the more years of employment, the less the hand hygiene knowledge level of HCWs was promoted. The younger nurses aged 20–30 years could have less hand hygiene knowledge due to having less work experience than older nurses with more work experience. The previous findings highlight the need for repeated training sessions to provide the current knowledge in hand hygiene (Maheshwari, 2014).

In this study respondents with degrees (mean score 93.35%) had more knowledge than those with lower qualifications, which indicates that education has a positive impact on hand hygiene knowledge. This finding is supported by Van de Mortel, Kermode, Prozano and Sansoni (2012), who found a trend towards an increase in knowledge score as respondents progressed through their course of training. Similarly, Korhonen et al. (2019) found that third-year nursing students had a slightly better knowledge and understanding of hand hygiene than second-year nursing students.

5.4 Attitudes of nurses towards hand washing

The overall results for attitude for all six questions in the current study – where the scores varied between 75.9% and 99.5% – indicates a positive attitude towards hand washing. This finding is consistent with the study by Kelcikova et al. (2019) where overall HCWs demonstrated a positive attitude towards hand hygiene. Almost all respondents (99.5%) agreed that hand washing is protective to both nurses and patients; Piras et al. (2017) identified a similar finding, where nurses perceived hand hygiene as protective behaviour. Kelcikova et al. (2019) also found that the majority of HCWs considered non-compliance with hand hygiene as a significant risk for infection transmission. Regarding the aspect related to means of improvement of hand washing and continuous monitoring, the majority of nurses (90.3%) agreed that there is a need for continuous monitoring to improve hand washing attitudes. This is consistent with the exploratory study by Loyland et al. (2016), where the suggested hand hygiene improvement measures given by respondents included strict measures at organisational level, regular observation and education.

In terms of the most effective method of infection control, this study shows that 86.7% of nurses agreed that more than any other method, hand hygiene lowers nosocomial infections. This is consistent with the findings of the study by Osman, Rahimtullah, Moahamed, Ismail, & Abdelkarim (2017), where 100% of respondents agreed that effective hand hygiene lowers the number of nosocomial infections.

The findings of this study further revealed that 75.9% of nurses reported that role models are influential when it comes to hand washing. Role models could include nurse shift leaders (senior nurses), nurses in charge (unit managers) and doctors (Lee et al., 2014; Oh, 2019). This finding is consistent with those of Winship & McClunie-Trust (2016) and Kingston et al. (2017), which identified role models as the predictors of hand hygiene improvement, as

they have great influence on junior nurses or HCWs. However, if role models display a negative behaviour, this will negatively impact junior nurses' behaviour (Kingston et al., 2017). Although the domain of hand hygiene role model in this study received a significant response, almost a quarter of respondents (24.1%, n=47) did not agree that role models could improve hand hygiene. In the context of this study, this is an important area that needs more attention, particularly with regard to the reliability of nurses' leaders regarding the hand hygiene campaign.

Although a different method was used to conduct the study, Oh (2019) found a lower mean score for role models as a predictor of improving hand hygiene. This finding is also confirmed by anecdotal evidence that one of the main challenge in the hand hygiene campaign at the selected psychiatric hospital was the ineffective support that nurse leaders had for infection prevention personnel, as well as undermining efforts to ensure sustainable hand hygiene. An exploratory study conducted in the psychiatric clinical setting in Taiwan by Li et al. (2019) identified the existence of undervaluation of the importance of infection control by professionals. This stresses the need for and significance of role models' involvement in hand hygiene campaigns as a global priority for the prevention of nosocomial infections (Lee, Park, Chung, Lee, Kang et al, 2014).

Of the respondents 99% had good attitudes about the importance of assisting patients with hand hygiene after using the bathroom, and about 97% had also good attitudes about supporting patients before and after eating. Taking into consideration specific characteristics of psychiatric patients, such as limitations in cognitive ability, this result showing a positive attitude by respondents is not consistent with a study in a general hospital by (Labi, Obeng-Nkrumah, Nuertey, Issahaku, Ndiaye et al, 2019) where patients were not considered in the

matter of hand hygiene. Therefore, addressing specific challenges regarding implementation of hand hygiene in psychiatric institutions could be useful (Li et al., 2019).

In this study the findings showed that females had a slightly better attitude (mean score 96.06) than males (95.09). This finding is similar to that of a study conducted by Mohesh and Dandapani (2014), on medical students where females appeared to have slightly better hand hygiene attitudes than males.

Respondents older than 40 years had a better attitude (mean score 95.76) than the rest of the lower age groups; this result could be an indication of a strong sense of responsibility in nurses as age increases (Appleby et al., 2015). Statistical findings in the current study also indicated that registered nurses had a better attitude towards hand hygiene (mean score 97.33) than the nursing assistants (enrolled nurses, enrolled nurses assistants and auxiliary nurses). This finding highlights the impact of educational level, and is in agreement with the statement that throughout professional life an increased level of training has an impact on knowledge and thus a better attitude towards social responsibilities (Mohesh & Dandapani, 2014). Interestingly, the current findings show that respondents with less than one year of experience in their professional position had better attitudes than those who had been in the field for longer; this decline in level of attitude could possibly be explained by a lack of support from hospital administrators (Li et al., 2019). Therefore, implementing regular educational programmes to boost nurses' motivation to maintain their routine standards from the beginning of their career is ideal (Kingston et al., 2017).

5.5 Hand washing practices of nurses

The current study shows that more than 90% of all respondents practiced hand washing before and after invasive and non-invasive procedures. This finding is consistent with that of a study by Khanal & Thapa (2017), that 98.5% of all respondents performed hand hygiene before and after invasive or non-invasive procedure. For question 5 that is related to WHO Moment 1 80% of respondents answered correctly that they washed their hands before personal contact. For question 6 related to WHO Moment 4, the response rate was even higher with 85% of respondents indicating that they washed their hands after contact with a patient. This finding is consistent with that reported in a previous study on student nurses (Korhonen et al., 2015), which found that the hand hygiene compliance rate was less before than after touching a patient. The 5% increase in hand washing after patient contact could be linked to respondents' perception of risk of acquiring infection (Winship & McClunie-Trust, 2016; Sundal et al, 2017).

Of the respondents 99.5% has good hand washing practices after exposure to body fluids, which is with the results reported by Garba & Uche (2019), where 86.2% of respondents reported always washing their hands after body fluids exposure, and 82.6% that they washed their hands before exposure to body fluids. This is in line with the definition of the WHO that a moment for hand hygiene is important when there is perceived risk or actual risk of pathogen transmission from one surface to another via the hands (Winship & McClunie-Trust, 2016).

However, some authors have highlighted that there is evidence of possible overestimation of hand hygiene performance by respondents (Piras, Minnick, Lauderdale, Dietrich, & Vogus, 2018); this could also be explained by respondents having insufficient ability to evaluate their

own hand hygiene objectively, thus resulting in over assessment, which could contribute to noncompliance with hand hygiene (Kelcikova et al., 2019).

In the current study (self-reported), the majority (85.6%, n= 167) of nurses reported practicing hand hygiene before working with contaminated inanimate objects and 69.7% (n= 136) before waste handling. However, this shows that over 30% of the respondents did not practice hand hygiene before waste handling. This finding raises concern, as it is more realistic and rational to wash hands after touching patients' surroundings (WHO Moment 5), and after waste handling (WHO Moment 3), as the goal is to curb the spread of microorganisms carried from the surrounding objects and waste products. This shows the need for establishment of systematic professional monitoring and evaluation of the level of self-assessment in their clinical practice, as hand hygiene is more meaningful when carried out correctly and when necessary (Sundal et al., 2017).

The current study only examined the compliance level of the nurses with practice; however, extent of the use of correct techniques for hand hygiene practice remains unknown. Due to theoretical concerns about HCWs over-reporting their own performance, future research on this topic should focus on both self-reported responses and direct observation to address the actual practice of correct hand hygiene techniques. This will reveal whether there is a gap between reported and observed practices.

Associations between demographic variables and practice, showed no statistical significance between practice and gender (P=0.2907), educational level (P=0.3931), work experience (P=0.5147), age (P=0.4751) and rank (P=0.7362). This finding is consistent with that of a study by Nematian et al. (2017), which found no significant difference in hand hygiene compliance in terms of gender (P=0.09), educational level (P=0.71) and work experience (P=0.85). The result is also supported by similar finding in a study by (Alfahan et al, 2016)

where they found no association between hand hygiene practice and gender, age, and work experience.

The current self-reported study shows that female nurses had better practice (mean score 95.63) of hand washing than male nurses (94.66). This finding is similar to the result found from an interventional study by Laskar et al. (2018), where females had a higher hand hygiene complete adherence rate post-intervention. The study has shown that respondents aged 20–30 years had better practice than those older than 30, and a similar finding was reported in an observational study conducted in Switzerland by Tschudin-Sutter et al. (2015), where those aged below or equal to 25 years had better hand hygiene practice than those of over 25 years of age.

In terms of professional rank, the findings of current study indicate that enrolled nurse assistants had better practice (mean score 96.06) than the registered nurses, enrolled nurses and auxiliary nurses. This finding is not consistent with that of a study by Laskar et al. (2018), where they found no difference in hand hygiene practice between junior and senior nurses, highlighting that knowledge alone about hand hygiene does not necessarily transform into hand washing best practice (Graveto et al., 2018) – it could also possibly be related to the inability of some nurses to transform theoretical knowledge into the behavioural change of hand hygiene practice (Winship & McClunie-Trust, 2016). Respondents with 21–30 years of experience had better hand hygiene practice (mean score 95.99) than respondents with less than 21 years of experience. With those with 11–20 years of experience having a mean score of 95.60. This result is supported by a study by Tschudin-Sutter et al. (2015), who found that the practice of hand hygiene increased with work experience. However, the current results also indicate that after 30 years of service nurses had a lower level of hand hygiene practice than those with 21–30 years of experiences, showing that at some point in their professional

lives the standard of hand hygiene practice dropped. This downward spiral of hand hygiene standards by professionals is quiet alarming, as it may increase potential health risks and, more especially because staff with more experience tend to become the most important referents to other nurses in the wards (Piras et al., 2018). The finding suggests the need for continuous motivational programmes that aim to improve the perception of being a role model to others and thus improve hand hygiene compliance standards (Lee et al., 2014).

In the current self-reported study, nurses with diploma qualifications reported better hand hygiene practices than nurses with degrees. However, as explained by Chuc et al. (2018), who had a similar finding, this could be related to negligence with hand hygiene despite awareness of and belief in the importance of hand hygiene, or it could possibly be related to lack of a tradition or culture of hand hygiene compliance, lack of role models, peer feedback, ignorance as well as a lack of motivation such as hand hygiene performance appraisal at individual and institutional level, especially when no priority is given to hand hygiene (Tekere et al., 2015) as some of respondents with higher qualifications might be among the most senior nurses.

5.6 Conclusion

The findings of this study indicate that despite correct responses on hand hygiene knowledge, knowledge gaps were also identified among the nurse respondents. Regarding attitude to hand hygiene, variations in attitude level were noted among nurses in relation to their age, gender, rank, work experience and educational level. Moreover, it was noted that there was a possible overestimation of hand hygiene practice by respondents. Lastly, no association was found between demographic variables (age, gender, education, and experiences) and knowledge, attitudes and practice.

The next chapter six summarises and concludes the study findings, highlights the implications of the study, and suggests recommendation based on the findings.



Chapter six

Summary of findings, conclusion, limitations and recommendations

6.1 Introduction

The preceding chapters presented the background to the study, study objectives, and the literature review as well as the methodology and data analysis used to address the objectives of the study. The quantitative data collected were analysed and findings were presented, and these were discussed, framed by the literature that was reviewed. This chapter presents a summary of the main findings and a conclusion. The limitations of the study are outlined and recommendations based on the findings are made.

6.2 Summary of the main findings

This study identified a gap in the knowledge of hand washing based on a hand washing assessment scale, as well as discrepant levels of knowledge, attitudes and practices of respondents throughout their careers. There is a possibility of self-assessed over-reporting in terms of knowledge, attitudes and practices regarding hand washing.

The main findings that the study revealed were as follows: with regards to gender, males had more knowledge(mean score92.5) than females(91.41), but females had better attitudes to hand washing (mean score96.06) than males(95.09)and a higher level of practice(mean score 95.63) than male nurses(94.66).

6.2.1 The role of age

Respondents aged 30-40 years had more knowledge than the younger respondents of 20-30 years as well as the respondents who were older than 40 years. However, it transpired that the same age group of 30–40 years had the lowest levels of a good attitude towards hand hygiene than the younger and older respondents. The younger respondents are starting off in their career and possibly more motivated, but lack of role models from among their seniors may cause their motivation to diminish. In addition, this same age group of respondents (30–40 years) presented the lowest level of hand hygiene practice – despite having the highest theoretical knowledge level.

6.2.2 The role of education and training

Respondents with degrees had the highest level of hand washing knowledge compare to those with lower levels of qualifications; however, their levels of attitude and practice were lower than those of respondents with lower levels of qualifications.

The findings showed that registered nurses had more knowledge, with the highest mean score (92.66), than enrolled nurses (91.88), enrolled nurse assistants (90.94), and auxiliary nurses (90.77). The registered nurses also had a better attitude, with the highest mean score (97.33), than enrolled nurses (94.56), enrolled nurse assistants (94.06) and auxiliary nurses (95.33), but a lower level of practice (95.29) than the enrolled nurse assistants (96.06). These findings are supported by those reported in study carried out in Korea by Jeong and Kim (2016), who found that hand hygiene knowledge was not a factor that influenced hand hygiene behaviour. Graveto et al. (2018) also stated that a high level of hand hygiene knowledge itself does not convert into good hand hygiene practice. No statistical significance was found in the association between the gender, age, rank, work experience, and educational level of the

nurses and their knowledge, attitudes and practice of hand washing. This suggests that more training is needed that integrates all three aspects of this study: knowledge, attitudes and practice of hand hygiene.

6.2.3. The role of work experience

Respondents whose length of employment was 11–20 years had more knowledge than respondents with less 11 years and more than 20 years' work experience. However, it appears that respondents whose work experience was less than a year in duration had the highest attitude level, compared to those with more years of work experience. Similarly, it was revealed that respondents with 11–20 years of experience presented the lowest level of hand washing practice than respondents with less and more working experience.

6.3 Conclusion

This study identified a gap in knowledge and reveals the discrepancy between the level of attitude and level of practice of the respondents throughout their careers, based on gender, age, work experience, rank and educational level. It is also possible that there was some over-reporting of knowledge and practice. This finding raises concerns as it indicates the possibility of failure to reach the goal of reducing the burden of nosocomial infections/outbreaks in healthcare facilities, specifically in psychiatric hospitals, since the levels of knowledge; attitudes and practice of hand washing by nurses are not consistent throughout their professional lives. It is also the assumption of this study that the levels of knowledge, attitudes and practice of hand washing could possibly be much lower than what was reported, due to the evidence regarding self-assessed over-reporting that was presented in Chapter five. The study also shows that no significant association was found between knowledge, attitudes, practice and demographic variables.

6.4 Limitations of the study

The researcher aims to highlight some of the possible weaknesses that might have impacted the outcomes of this study. Only self-administered questionnaires were used to assess the knowledge, attitudes and practice of the nurses; this study did not employ an observational tool to compare self-reported and actual practices. Use of the random sampling technique could also have an impact on the proportions of work level within the representative sample; for instance, the number of registered nurses (79) were larger compared to enrolled nurses (48), which could impact the credibility of results.

In terms of the objective that sought an association between demographic variables and knowledge, attitudes and practice of the nurses regarding hand washing, a small sample size distribution was found on the knowledge and practice scales, as these two sections contained a large number of questions, which could restrict the statistical significance, thus limiting the generalisability of findings to the wider population.

6.5 Recommendations

The power of proper hand hygiene is that it can save lives and prevent epidemic disease outbreaks at local level. It also therefore goes beyond this to play a major role in curbing the spread of pandemic outbreak diseases on a global level.

6.5.1 Recommendation for hand hygiene practice

- Constant support and reinforcement from authority figures towards the few existing infection control nurses can ease the implementation process and aid the successful hand hygiene agenda, as managerial pressure might influence compliance level.

6.5.2 Recommendations for hand hygiene education

- Updating of knowledge through regular motivational infection control programmes on current hand hygiene skills is suggested at least once monthly, to convert knowledge into action, change attitudes into positive behaviour, and promote/maintain correct hand washing techniques in order to maintain a standard level of knowledge, attitudes and hand washing practice.
- Peer feedback to sustain the knowledge, attitudes and positive behaviour/practices of the correct and consistent hand hygiene procedure throughout nurses' professional lives is encouraged.
- Nurses need to be more educated on correct hand hygiene techniques and the importance of hand care to avoid possible irritation caused by hand hygiene products.

6.5.3 Recommendations for hand hygiene policy

- Educational and monitoring strategies need to be established and intensified to expand the hand hygiene knowledge of nurses and encourage correct practice in terms of techniques/frequency. This is necessary because while nurses acknowledge the importance of hand hygiene, their actual practice does not always correspond with this.

Periodical campaigns for hand hygiene promotion by hospital administrators is of great significance to address possible barriers that hinder the quality of hand hygiene procedure, specifically in mental health facilities.

6.5.4 Implications for further study

- Due to possible over-estimation of compliance in the current self-reported study, future research on the topic, applying both survey and observational tools to identify the actual practices of hand hygiene.
- Further, larger-scale research on this topic at national level is recommended, with the use of both survey and observational tools in order to generalize the findings of the study and influence policy on hand hygiene practices at a psychiatric health facilities.



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Appendix A. QUESTIONNAIRES

SECTION A. DEMOGRAPHIC INFORMATION

1. Gender:

A. Female B. Male

2. Age:

A. 20-30 ; B. 30-40 ; C. Greater than 40

3. Religion

4. Marital status

A. Single ; B. Married ; C. Separated ; D. Divorced ; E. Widowed

5. What is your rank

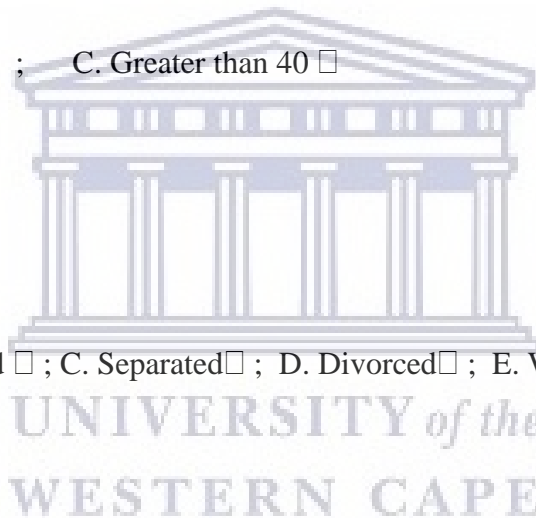
A. Registered nurse ; B. Enrolled nurse ; C. Enrolled nurse assistant ; D. auxiliary nurse

6. Work experience

A. Less than 1 year ; B. 1-5 ; C. 6-10 years ; D. 11-20; 21-30 , E. Greater than 30 years

7. Level of education

A. Grade 8-12 ; B. Diploma ; C. Advanced diploma ; D. Degree ; E. Masters



SECTION B. QUESTION RELATED KNOWLEDGE OF HAND WAHSING

Instructions for scoring the following sections: Please answer items in section one by circling

“Agree” (A)=3, “Not sure” (N/S)=2, ”Disagree” (D)=1,

Hand washing Knowledge scale	A	D	N/S
1. Hand hygiene should be performed before having direct contact with a patient	A	D	N/S
2. Hand hygiene should be performed before inserting an invasive device (e.g. intravascular catheter, foley catheter)	A	D	N/S
3. Hand hygiene should be performed when moving from a contaminated body site to a clean body site during an episode of patient care	A	D	N/S
4. Hand hygiene should be performed after having direct contact with a patient or with items in the immediate vicinity of the patient	A	D	N/S
5. Hand hygiene should be performed After removing gloves	A	D	N/S
6. If hands are not visibly soiled or visibly contaminated with blood or other Proteinaceous material, the most effective regimens for reducing the number of pathogenic bacteria on the hands of personnel is to apply 1.5 ml to 3 ml of alcohol-based hand rub to the hands and rubbing hands together until they feel dry	A	D	N/S
7. Antibiotic-resistant pathogens most frequently spread from one patient to another in health care settings via the contaminated hands of clinical staff	A	D	N/S
8. If appropriate hand hygiene and is not performed herpes simplex virus infection can be potentially transmitted from patients to clinical staff	A	D	N/S
9. If appropriate hand hygiene is not performed colonization or infection with methicillin-resistant staphylococcus aureus can be potentially transmitted from patients to clinical staff	A	D	N/S

10.If appropriate hand hygiene is not performed respiratory syncytial virus infection can be potentially transmitted from patients to clinical staff	A	D	N/S
11. If appropriate hand hygiene is not performed hepatitis B virus infection can be potentially transmitted from patients to clinical staff	A	D	N/S
12. Alcohol-based hand hygiene products cause stinging of the hands in some providers due to pre-existing skin irritation	A	D	N/S
13. The following pathogens readily survive in the environment of the patient for days to weeks: Clostridium difficile (the cause of antibiotic-associated diarrhea), Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant enterococcus	A	D	N/S



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SECTION C: QUESTION RELATED TO ATTITUDES OF HANDWASHING

Please indicate if you agree or disagree with the statement by circling

Strongly agree (SA)=5, Agree (A)=4, Not sure (N/S) =3, Disagree (SD)=2, Strongly disagree (D)=1

Attitude scale	SD	D	N/S	A	SA
14. Hand washing is protective to the nurses and patients					
15. Hand washing can be improved by administrative orders and continuous observation					
16. Hand washing lowers nosocomial infections more than any other methods of infection control					
17. Hand washing can be improved by role models					
18. It is important to assist or encourage patients to do hand washing before					

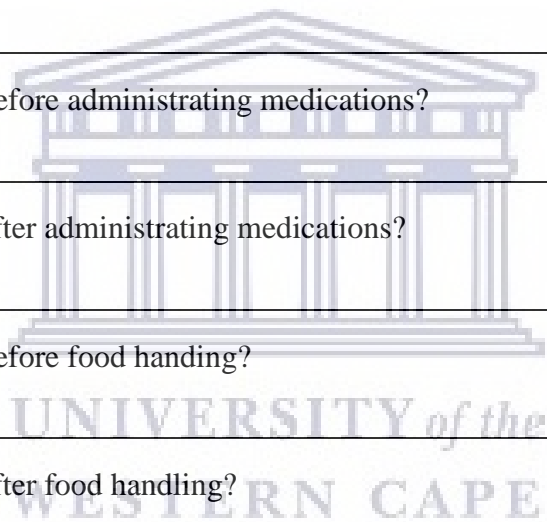
and after use of bathroom					
19.It is important to assist or encourage patients to do hand washing before and after eating					

SECTION D: QUESTIONS RELATED TO PRACTICE OF HANDWASHING

Section three should be answered by ticking one box of YES(Y) or NO(N) Sometimes(S)

Practice scale	Y	N	S
20. Do you wash hands before invasive procedure?			
21. Do you wash hands after invasive procedure?			
22. Do you wash hands before noninvasive procedure?			
23. Do you wash hands after noninvasive procedure?			
24. Do you wash hands before personal contact?			
25. Do you wash hands after personal contact?			
26. Do you wash hands before body fluids contact?			
27. Do you wash hands after body fluids contact?			

28. Do you wash hands before contaminated inanimate objects?			
29. Do you wash hands after contaminated inanimate objects?			
30. Do you wash hands before wastes handling?			
31. Do you wash hands after wastes handling?			
32. Do you wash hands before using gloves?			
33. Do you wash hands after using gloves?			
34. Do you wash hands before administrating medications?			
35. Do you wash hands after administrating medications?			
36. Do you wash hands before food handing?			
37. Do you wash hands after food handling?			





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17 March 2017

Mrs F Muhawenimana
School of Nursing
Faculty of Community and Health Sciences

Ethics Reference Number: BM17/2/8

Project Title: Knowledge, attitudes and practices of nurses towards hand washing at a selected Psychiatric Hospital in Western Cape, South Africa.

Approval Period: 10 March 2017 – 10 March 2018

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval. Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

The permission from the health facility and/or health department must be submitted for record keeping to BMREC.

A handwritten signature in black ink, appearing to read 'Josias'.

*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*

PROVISIONAL REC NUMBER -130416-050



REFERENCE: WC_2017RP51_581
ENQUIRIES: Ms Charlene Roderick

University of Western Cape

Robert Sobukwe Road

Cape Town

7535

For attention: Mrs Feza Muhawenimana

Re: Knowledge, attitudes, and practices of nurses towards hand washing at a selected Psychiatric Hospital in Western Cape South Africa.

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.

Please contact following people to assist you with any further enquiries in accessing the following sites:

Lentegeur Hospital

Ms Nadine Jacobs

021 370 1105

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
3. In the event where the research project goes beyond the *estimated completion date* which was submitted, researchers are expected to complete and submit a progress report

(Annexure 8) to the provincial Research Co-ordinator

(Health.Research@westerncape.gov.za).

4. The reference number above should be quoted in all future correspondence.

Yours sincerely



Dr A Hawkrige

DR A HAWKRIDGE

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE:

6/6/2017



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30 May 2020

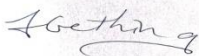
Declaration of Editing of Editing of mini thesis:

Knowledge, attitudes, and practices of nurses towards hand washing at a selected Psychiatric Hospital in the Western Cape, South Africa

I hereby declare that I carried out technical and language editing of the above mini thesis on behalf of Feza Muhawenimana. This included reviewing the text for clarity, punctuation, grammar, content and consistency.

I am a professional writer and editor with many years of experience (e.g. 5 years on SA *Medical Journal*, 10 years heading the corporate communication division at the SA Medical Research Council), who specialises in Science and Technology editing – but am adept at editing in many different subject areas. I have previously edited much work for various faculties at universities across South Africa. I am a full member of the South African Freelancers' Association as well as of the Professional Editors' Association.

Yours sincerely



LEVERNE GETHING

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