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, Bielena & Filova, 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 question13, 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, Progano 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 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, andabout97% 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 score95.76) 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. Forquestion5 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 20–30years 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 over25 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 21years 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 (Teker 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 of30–40 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.

References

Abdraboh, S. N., Milaat, W., Ramadan, I. K., Al-Sayes, F. M., &Bahy, K. M. (2016). Hand hygiene and health care associated infection: An intervention study. *American Journal of Medicine and Medical Sciences, 6*(1), 7-15.

Alfahan, A., Alhabib, S., Abdulmajeed, I., Rahman, S., &Bamuhair, S. (2016). In the era of corona virus: health care professionals' knowledge, attitudes, and practice of hand hygiene in Saudi primary care centers: a cross-sectional study. *Journal of community hospital internal medicine perspectives*, *6*(4), 32151.

Al Ra'awji, B. A.,Almogbel, E.S., Alharbi, L.A., Alotaibi, A.K., Al-Qazlan, F.A., &Saquib, J. (2018). Knowledge, attitudes, and practices of health-care workers regarding hand hygiene guidelines in Al-Qassim, Saudi Arabia: A multicenter study. *International Journal of Health Sciences. 12*(2), 1-6.

Appleby, B., Roskell, C., & Daly, W. (2016). What are health professionals' intentions toward using research and products of research in clinical practice? A systematic review and narrative synthesis. *Nursing open, 3*(3), 125-139.

Apisarnthanarak, A. & Weber, D.J. (2018). Environmental cleaning in resource-limited settings. *Current Treatment Options in Infectious Diseases, 10* (1), 48-54.

Ataee, R. A., Ataee, M. H., Tavana, A. M., &Salesi, M. (2017). Bacteriological aspects of hand washing: A key for health promotion and infections control. *International Journal of Preventive Medicine,* DOI: 10.4103/2008-7802.201923, p31-40.

Arntz, P. R. H., Hopman, J., Nillesen, M., Yalcin, E., Bleeker-Rovers, C. P., Voss, A., Edwards, M., &Wei, A. (2016). Effectiveness of a multimodal hand hygiene

improvement strategy in the emergency department. *American Journal of Infection Control* [Online], *44*(11), 1203-1207

Awoke, N., Geda, B., Arba, A., Tekalign, T., &Paulos, K. (2018).Nurses 'practice of hand hygiene inHiwotFanaspecialised University Hospital, Harari Regional State, Eastern Ethiopia: Observational study. *Nursing Research and Practice*.https://doi.org/10.1155/2018/2654947

Brink, H., Van der Walt, C., & Van Rensburg, G. (2012).Fundamentals of Research Methodology for Health Care Professionals (2nd ed.). Cape Town: Juta.

Brink, A., Feldman, C., Duse, A., Gopalan, D., Grolman, D., Mer, M., Naicker, S., Paget, G., Perovic, O.& Richards, G. (2006). Guideline for the management of nosocomial infections in South Africa.*Southern African Journal of Epidemiology and Infection, 21*(4), 152-160.

Burns, N., & Grove, S.K. (2010) *Understanding Nursing Research: Building an Evidence-Based Practice*.St Louis, MO: Elsevier Health Sciences.

Chuc, N.T.K., Hoa, N.Q., Lan, P.T., Thoa, N.T.M., Riggi, E., Tamhankar, A.J., &Lundborg, C.S. (2018). Knowledge and self-reported practices of infection control among various occupational groups in a rural and an urban hospital in Vietnam. *Scientific Reports, 8*(1), 5119.

Clack, L., Passerini, S., Manser, T., & Sax, H. (2018). Likelihood of infectious outcomes following infectious risk moments during patient care. An international expert consensus study and quantitative risk index. Infection Control and Hospital Epidemiology,39(3), 280-289.

Contzen, N., &Mosler, H.J. (2015). Identifying the psychological determinants of hand washing: Results from two cross-sectional questionnaire studies in Haiti and Ethiopia. *American Journal of infection control, 43*(8),826-832.

Corace, K., Smith, J., MacDonald, T., Fabrigar, L., Saedi, A., Quirk, J., MacFarlane, S., Valickis, D., & Garber, G. (2017). What Psychological Theories of Behavior Change Can Teach Us about Improving Hand Hygiene Adherence: Do We Mean What We Say? *Open Forum Infectious Diseases*, *4*(1), S409. https://doi.org/10.1093/ofid/ofx163.1024

Croker, C., Hathaway, S., Marutani, A., Hernandez, M., Cadavid, C., Rajagopalan, S., Hwang, B., & Kim, M.(2018). Outbreak of Hepatitis A virus infection among adult patients of a mental hospital—Los Angeles county, 2017. *Infection Control and Hospital Epidemiology*, *39*(7), 881-881.

Davis, K.K., Harris, K.G., Mahishi, V., Bartholomew, E.G., &Kenward, K. (2016). Continuing nursing education. Perceptions of culture of safety in haemodialysiscentres. *Nephrology Nursing Journal*, 43(2), 119-182.

Derhun, F.M., de Souza, V.S., Costa, M.A.R., Inoue, K.C., & Matsuda, L.M.(2016). Knowledge of nursing professionals regarding hand hygiene. *CogitareEnferm*, *21*(3), 1-7.

Diwan, V., Gustafsson, C., Klintz, S. R., Joshi, S. C., Joshi, R., Sharma, M., Shah, H., Pathak, A., Tamhankar, A.,&Lundborg, C. S. (2016). Understanding healthcare workers self-reported practices, knowledge and attitude about hand hygiene in a medical setting in rural India. *PLoS One*, *11*(10), 1-15.

Dreidi, M., Alrimawi, I., Saifan, A., &Batiha, A. (2016). Hand hygiene knowledge, practices and attitudes among nurses and physicians. *Health*, *8*(5), 456-462.

Duedu, K.O., Peprah, E., Anim-Baidoo, I., &Ayeh-Kumi, P.F. (2015). Prevalence of intestinal parasites and association with malnutrition at a Ghanaian orphanage. *Human Parasitic Diseases, 7*, 5.

Effa, E.E., Okokon, E.E., &Oduwole, O.A. (2013).Hand washing practice among healthcare providers in a teaching hospital in Southern Nigeria.*International Journal of Infection Control*, *9*(4), 1-7.

Foote, A., & El-Masri, M. (2016). Self-perceived hand hygiene practices among undergraduate nursing students. *Journal of Research in Nursing, 21*(1), 8-19.

Fox, C., Wavra, T., Drake, D.A., Mulligan, D., Bennett, Y.P., Nelson, C., Kirkwood, P., Jones, L., & Bader, M.K. (2015).Use of a patient hand hygiene protocol to reduce hospital-acquired infections and improve nurses' hand washing. *American Journal of Critical Care, 24*(3), 216-224.

Fukuta, Y., &Muder, R.R.(2013). Infections in psychiatric facilities, with an emphasis on outbreaks. *Infection Control & Hospital Epidemiology, 34*(1), 80-88.

Garba, M.B., &Uche, L.B. (2019) Knowledge, attitude, and practice of hand washing among healthcare workers in a tertiary health facility in NorthWest Nigeria. *Journal of Medicine in the Tropics, 21*(2),73-80.

Gluyas, H. (2015). Understanding non-compliance with hand hygiene practices. *Nursing Standard, 29*(35),pp. 40-6.

Graveto, J.M.G.D.N., Rebola, R.I.F., Fernandes, E.A., & Costa, P.J.D.S. (2018). Hand hygiene: Nurses' adherence after training. *RevistaBrasileira de Enfermagem, 71*(3),1189-1193.

Grayson, M. L., Stewardson, A. J., Russo, P. L., Ryan, K. E., Olsen, K. L., Havers, S. M., Greig, S.& Cruickshank, M.(2018). Effects of the Australian National Hand Hygiene Initiative after 8 years on infection control practices, health-care worker education, and clinical outcomes: A longitudinal study. *The Lancet Infectious Diseases, 18*(11), 1269-1277.

Grove, S., Burns, N., & Gray, J.R. (2013).*The Practice of Nursing Research, Appraisal, Synthesis and Generation of Evidence* (7thed.)Elsevier Saunders.

Haque, M., Sartelli, M., McKimm, J., & Bakar, M.A. (2018).Health care-associated infections–an overview. *Infection and Drug Resistance, 11*, pp. 2321-233.

Houser, J. (2013). *Nursing Research: Reading, using and creating evidence*. Colorado: Jones & Bartlett Publishers.

Iliyasu, G., Dayyab, F.M., Habib, Z.G., Tiamiyu, A.B., Abubakar, S., Mijinyawa, M.S., & Habib, A.G. (2016). Knowledge and practices of infection control among healthcare workers in a Tertiary Referral Center in North-Western Nigeria. *Annals of African Medicine, 15*(1) ,pp. 34-40.

Jeong, S.Y., & Kim, K.M. (2016). Influencing factors on hand hygiene behavior of nursing students based on theory of planned behavior: A descriptive survey study. *Nurse Education Today, 36*, 159-164.

Johnston, R.J., Gregory, D., & Smith, D. M. (Eds.) (1997). *Blackwell's Dictionary of Nursing.* Oxford: Blackwell Science.

Jones, D., Martello, M., Biron, A., & Lavoie-Tremblay, M. (2017).A systematic review on the effectiveness of interventions to improve hand hygiene compliance of nurses in the hospital setting. *Journal of Nursing Scholarship, 49*(2), 143-152.

Karadag, M., Iseri, O.P., Yildirim, N., &Etikan, I. (2016). Knowledge, beliefs and practices of nurses and nursing students for hand hygiene. *Jundishapur Journal of Health Sciences, 8*(4): e36469. doi: 10.17795/jjhs-36469.

Kelcikova, S., Mazuchova, L., Bielena, L., &Filova, L. (2019). Flawed self-assessment in hand hygiene: A major contributor to infections in clinical practice? *Journal of Clinical Nursing, 28*(11/12), 2265-2275.

Khanal, G., &Thapa, S., (2017). Awareness of hand hygiene among health care workers of Chitwan, Nepal. *SAGE Open, 7*(4).doi:10.1177/2158244017735141

Khan, H.A., Baig, F.K., &Mehboob, R. (2017). Nosocomial infections: Epidemiology, prevention, control and surveillance. *Asian Pacific Journal of Tropical Biomedicine, 7*(5), 478-482.

Kim, J.H., & Lee, K. U. (2017). Influenza A (H1N1) outbreak at a psychiatric closed ward and infection control. *Journal of Korean Neuropsychiatric Association, 56*(4), 203-210.

Kingston, L.M., Slevin, B.L., O'Connell, N.H., & Dunne, C.P. (2017). Hand hygiene: Attitudes and practices of nurse, a comparison between 2007 and 2015.*American Journal of Infection Control, 45*(12), 1300-1307.

Korhonen, A., Ojanperä, H., Puhto, T., Järvinen, R., Kejonen, P., &Holopainen, A. (2015). Adherence to hand hygiene guidelines–significance of measuring fidelity. *Journal of Clinical Nursing, 24*(21-22), 3197-3205.

Kurjenluoma, K., Rantanen, A., McCormack, B., Slater, P., Hahtela, N., &Suominen, T. (2017). Workplace culture in psychiatric nursing described by nurses. *Scandinavian Journal of Caring Sciences, 31*(4), 1048-1058.

Labi, A., Obeng-Nkrumah, N., Nuertey, B. D., Issahaku, S., Ndiaye, N. F., Baffoe, P. ...& Enweronu-Laryea, C. (2019). Hand hygiene practices and perceptions among healthcare workers in Ghana: A WASH intervention study. *The Journal of Infection in Developing Countries*, *13*(12), 1076-1085.

Langoya, C.O., & Fuller, N. J. (2015). Assessment of knowledge of hand washing among health care providers in Juba Teaching Hospital, South Sudan. *South Sudan Medical Journal*, *8*(3), 60-62.

Laskar, A. M., Deepashree, R., Bhat, P., Pottakkat, B., Narayan, S., Sastry, A. S., &Sneha, R. (2018). A multimodal intervention to improve hand hygiene compliance in a tertiary care center. *American Journal of Infection Control*, *46*(7), 775-780.

Lee, S. S., Park, S. J., Chung, M. J., Lee, J. H., Kang, H. J., Lee, J., & Kim, Y. K. (2014). Improved hand hygiene compliance is associated with the change of perception toward hand hygiene among medical personnel. *Infection & chemotherapy*, *46*(3), 165-171.

Li, P.H., Wang, S.Y., Tan, J.Y., Lee, L.H., & Yang, C.I. (2019). Infection preventionists' challenges in psychiatric clinical settings. *American Journal of Infection Control*, *47*(2), 123-127.

Loftus, M. J., Guitart, C., Tartari, E., Stewardson, A. J., Amer, F., Bellissimo-Rodrigues, F., ...& Pittet, D. (2019). Hand hygiene in low-and middle-income countries: A position paper of the International Society for Infectious Diseases. *International Journal of Infectious Diseases*. 86(25-30).

Lowman, W. (2016). Active surveillance of hospital-acquired infections in South Africa: Implementation, impact and challenges. *South African Medical Journal*, *106*(5), 489-493.

Loyland, B., Wilmont, S., Hessels, A. J., & Larson, E. (2016). Staff knowledge, awareness, perceptions, and beliefs about infection prevention in pediatric long-term care.Nursing research, 65 (2), pp. 132-41

Luangasanatip, N., Hongsuwan, M., Limmathurotsakul, D., Lubell, Y., Lee, A.S., Harbarth, S., Day, N.P., Graves, N., & Cooper, B.S. (2015). Comparative efficacy of interventions to promote hand hygiene in hospital: systematic review and network meta-analysis. *British Medical Journal, vol.351*, pp.3728.

Mada, P.K., Saldana, D., Castano, G., Malus, M., &Adley, N.P. (2018). Influenza outbreaks with a focus on closed psychiatric units: A review article. *Global Journal of Infectious Diseases Clinical Research, 4*(1), 001-003.

Maheshwari, V. (2014).A study to assess knowledge and attitude regarding hand hygiene amongst residents and nursing staff in a tertiary health care setting of Bhopal City. *Journal of Clinical and Diagnostic Research, 8*(8), DC04.

Martischang, R., Pires, D., Masson-Roy, S., Saito, H., &Pittet, D. (2018). Promoting and sustaining a historical and global effort to prevent sepsis: The 2018 World Health Organization SAVE LIVES: Clean Your Hands campaign. Critical22 (1):92. doi: 10.1186/s13054-018-2011-3

McKenna, L., Vanderheide, R., & Brooks, I. (2016). Is graduate entry education a solution to increasing numbers of men in nursing? *Nurse education in practice, 17*, 74-77.McLaughlin, A.C., Walsh, F.& Bryant, M. (2013). Effects of knowledge and internal locus of control in groups of health care workers judging likelihood of pathogen transfer. *Human Factors*, 55(4), 803-814.

Mohesh, G., &Dandapani, A. (2014). Knowledge, attitude and practice of hand hygiene among medical students – a questionnaire-based survey. *Unique Journal of Medical and Dental Science, 2*(3), 127-31.

Muller, M.P. (2016). Measuring hand hygiene when it matters. *The Lancet Infectious Diseases*, *16*(12), pp.1306-1307.

Nabavi, M., Alavi-Moghaddam, M., Gachkar, L., &Moeinian, M. (2015). Knowledge, attitudes, and practices study on hand hygiene among Imam Hossein Hospital's residents in 2013. *Iranian Red Crescent Medical Journal*, *17*(10), pp. e19606.

Nair, S. S., Hanumantappa, R., Hiremath, S. G., Siraj, M.A., & Raghunath, P. (2014). Knowledge, attitude, practice of hand hygiene among medical and nursing students at a tertiary health care centre in Raichur, India. ISRN Preventive Medicine, 2014, e608927.

Nematian, S.S.S., Palenik, C.J., Mirmasoudi, S.K., Hatam, N., &Askarian, M.(2017). Comparing knowledge and self-reported hand hygiene practices with direct observation among Iranian hospital nurses. *American Journal of Infection Control*, *45*(6),e65-e67.

Niu, Z., Wang, T., Hu, P., Mei, J., & Tang, Z. (2020). Chinese Public's Engagement in Preventive and Intervening Health Behaviors During the Early Breakout of COVID-19: Cross-Sectional Study. *Journal of medical Internet research*, *22*(8), e19995.

Nováková, V., Cantero-Caballero, M., Zoni, A.C., Plá-Mestre, R., del Carmen Olmedo-Luceron, M., & Rodríguez-Pérez, P. (2013). Epidemic keratoconjunctivitis outbreak in a closed psychiatric ward. *Infection Control and Hospital Epidemiology*, *34*(7), 764-765

Oh, H.S. (2019). Knowledge, perception, performance, and attitude regarding hand hygiene and related factors among infection control nurses in South Korea: A cross-sectional study. American journal of infection control, 47(3), 258-263.

Osman, M.E.B., Rahimtullah, H., Moahamed, L.A.L., Ismail, M.A.M., &Abdelkarim, A.N.A. (2017).Knowledge, attitude and practice of hand hygiene among medical care providers in (Bashaier) Teaching Hospital, Khartoum, Sudan. *European Journal of Pharmaceutical and Medical Research, 4*(1),140-114.

Ott, M. & French, R. (2009). Hand hygiene compliance among health care staff and student nurses in a mental health setting. Issues in *Mental Health Nursing, 30*(11), 702-704. doi: 10.1080/01612840903079223

Oxford Mini Dictionary for nurses(2011). Six edition, 2011. Published July 7th 2011 by Oxford University Press, USA.ISBN13: 9780199695515

Piai-Morais, T. H., Fortaleza, C. M., &Figueiredo, R. M. (2015). Good Practices for infection prevention and control at a psychiatric hospital in Brazil. *Issues in Mental Health Nursing, 36*(7), 513-517. doi: 10.3109/01612840.2015.1007539

Pineles, L., Robinson, G., & Morgan, D.J. (2017). New strategies to monitor healthcare workers' hand hygiene compliance. *Current Treatment Options in Infectious Diseases, 9*(1), 11-17.

Piras, S. E., Lauderdale, J., & Minnick, A. (2017). An elicitation study of critical care nurses' salient hand hygiene beliefs. *Intensive and Critical Care Nursing, 42*, 10-16.

Piras, S.E., Minnick, A., Lauderdale, J., Dietrich, M.S., &Vogus, T.J. (2018). The effects of social influence on nurses' hand hygiene behaviours. *The Journal of Nursing Administration, 48*(4), 216-221.

Pittet, D., &Allegranzi, B. (2018). Preventing sepsis in healthcare–200 years after the birth of Ignaz Semmelweis. *Euro surveillance, 23*(18).18-00222.

Pittet, D., Boyce, J.M., &Allegranzi, B. (eds.) (2017).*Hand Hygiene: A handbook for medical professionals* (Vol. 9). John Wiley & Sons.

Polit, D. F., & Beck, C. T. (2013). *Study guide for essentials of nursing research: appraising evidence for nursing practice*. Lippincott Williams & Wilkins.

Polit, D.F., & Beck, C.T. (2010). Essentials of Nursing Research Methods, appraisals and utilisation (6thed).Philadelphia: Lippincott Williams & Wilkins.

Rigby, R., Pegram, A., & Woodward, S. (2017). Hand decontamination in clinical practice: A review of the evidence. *British Journal of Nursing, 26*(8),448-451.

Rothan, H.A., & Byrareddy, S.N. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. Journal of autoimmunity, 102433.

Sahile, T., Esseye, S., Beyene, G., & Ali, S. (2016).Post-surgical infection and antibiotic susceptibility patterns of bacteria isolated from admitted patients with signs of infection at Jimma University specialized hospital, Jimma, Ethiopia. *International Journal of Tropical Diseases and Health, 17*(4),1-12.

Saito, H., Timurkaynak, F., Borzykowski, T., Kilpatrick, C., Pires, D., Allegranzi, B., &Pittet, D. (2018). “It’s in Your Hands–Prevent Sepsis in Health Care”; 5th May 2018 World

Health Organization (WHO) SAVE LIVES: Clean Your Hands Campaign. *KlimikDergisi, 31*(1),2-3.

Sarani, H., Balouchi, A., Masinaeinezhad, N., &Ebrahimitabs, E. (2016). Knowledge, attitude and practice of nurses about standard precautions for hospital-acquired infection in teaching hospitals affiliated to Zabol University of Medical Sciences (2014). *Global Journal of Health Science,* 8 (3), pp. 193-8.

Scott, E. (2013). Community-based infections and the potential role of common touch surfaces as vectors for the transmission of infectious agents in home and community settings. *American Journal of Infection Control, 41*(11), 1087-1092.

Sharif, A., Arbabisarjou, A., Balouchi, A., Ahmadidarrehsima, S., &Kashani, H. H. (2016). Knowledge, attitude, and performance of nurses toward hand hygiene in hospitals. *Global Journal of Health Science, 8*(8), pp. 53081-57.

Sharma, A.K., Saxena, S., & Sharma, S. (2016). Hand washing knowledge, attitude and practices among medical students. *Indian Journal of Scientific Research*, *7*(1), 159-164.

Smith, J.R. (2017). Hand hygiene: A back to basics Global Health Initiative. *The Journal of Perinatal and Neonatal Nursing, 31*(3), 198-199.

Sodhi, K., Shrivastava, A., Arya, M., & Kumar, M. (2013) Knowledge of infection control practices among intensive care nurses in a tertiary care hospital. *Journal of Infection and Public Health, 6*(4), 269-275.

Sondlane, T.H., Mawela, L., Razwiedani, L.L., Selabe, S.G., Lebelo, R.L., Rakgole, J.N., Mphahlele, M.J., Dochez, C., De Schryver, A., & Burnett, R.J. (2016). High prevalence of

active and occult hepatitis B virus infections in healthcare workers from two provinces of South Africa. *Vaccine, 34*(33),3835-3839.

Sundal, J.S., Aune, A.G., Storvig, E., Aasland, J.K., Fjeldsæter, K.L., &Torjuul, K. (2017). The hand hygiene compliance of student nurses during clinical placements. *Journal of Clinical Nursing, 26*(23-24), 4646-4653.

South African Nursing Council (2005).*Nursing Act, 2005*. Cape Town: Government Printer.https://www.gov.za/sites/default/files/gcis_document/201409/a33-050.pdf

Teker, B., Ogutlu, A., Gozdas, H.T., Ruayercan, S., Hacialioglu, G., &Karabay, O. (2015). Factors affecting hand hygiene adherence at a private hospital in Turkey. *The Eurasian Journal of Medicine,* 47 (3), pp. 208-12.

Tobi, K.U., &Enyi-Nwafor, K. (2013). Hand washing practices and compliance among health care workers in the intensive care unit of a teaching hospital in Nigeria. *Nigerian Medical Practitioner, 63*(4),82-89.

Tschudin-Sutter, S., Sepulcri, D., Dangel, M., Schuhmacher, H., &Widmer, A. F. (2015). Compliance with the World Health Organization Hand Hygiene Technique: A Prospective Observational Study. *Infection Control and Hospital Epidemiology, 36*(4), 482.483.

Van De Mortel, T.F., Kermode, S., Progano, T., &Sansoni, J. (2012) A comparison of the hand hygiene knowledge, beliefs and practices of Italian nursing and medical students. *Journal of Advanced Nursing, 68*(3), 569-579.

Vermeil, T., Peters, A., Kilpatrick, C., Pires, D., Allegranzi, B., &Pittet, D. (2019). Hand hygiene in hospitals: Anatomy of a revolution. *Journal of Hospital Infection, 101*(4), 383-392.

Winship, S., &McClunie-Trust, P. (2016). Factors influencing hand hygiene compliance among nurses: An integrative review. *Kai Tiaki Nursing Research, 7*(1), 19-26.

World Health Organization. (2009). *WHO Guidelines on Hand Hygiene in Health Care.* Geneva: World Health Organization.

Xiang, Y. T., Zhao, Y. J., Liu, Z. H., Li, X. H., Zhao, N., Cheung, T., & Ng, C. H. (2020). The COVID-19 outbreak and psychiatric hospitals in China: managing challenges through mental health service reform. *International journal of biological sciences*, *16*(10), 1741

Yadav, S.K., &Giri, A. (2018).Assessment of hand hygiene knowledge among residents and nursing staff at Nobel Medical College Teaching Hospital, Biratnagar.*Journal of Nepal Paediatric Society, 38*(2),69-73.

Zakeri, H., Ahmadi, F., Rafeemanesh, E., & Saleh, L.A. (2017). The knowledge of hand hygiene among the healthcare workers of two teaching hospitals in Mashhad. *Electronic Physician, 9*(8),5159-5165.

Zil-E-Ali, A., Cheema, M. A., Ullah, M. W., Ghulam, H., & Tariq, M. (2017). A survey of handwashing knowledge and attitudes among the healthcare professionals in Lahore, Pakistan. *Cureus*, *9*(3), pp. e1089.

Zhao, Q., Yang, M.M., Huang, Y.Y., & Chen, W. (2018). How to make hand hygiene interventionsmore attractive to nurses: A discrete choiceexperiment. *PloSOne, 13*(8).p.e0202014.

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 than1 year □ ; B. 1-5 □ ; C. 6-10 years □; D. 11-20; 21-30 □, E. Greater than 30 years□

7. Level of education

A. Grade8-12 □ ; 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 Staphyloccus aureus (MRSA), Vancomycin-resistant enterococcus	A	D	N/S

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?			

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
South Africa
T: +27 21 959 2988/2948
F: +27 21 959 3170
E: research-ethics@uwc.ac.za
www.uwc.ac.za

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.

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

PROVISIONAL REC NUMBER -130416-050

Western Cape Government
Health

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

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:

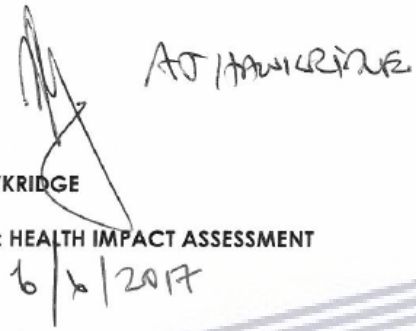
1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six 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 HAWKRIDGE

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 6/6/2017

L. Gething, M.Phil. (cum laude)

WHIZZ@WORDS

PO Box 1155, Milnerton 7441, South Africa; cell 072 212 5417

---

30 May 2020

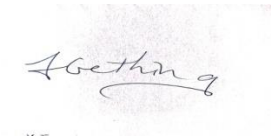
Declaration of Editing of Editing of mini thesis:

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 leverne@eject.co.za