12-1-2016

COMPLIANCE WITH HAND HYGIENE POLICY IN A NURSING HOME: A PILOT STUDY

Nina Ling

COMPLIANCE WITH HAND HYGIENE POLICY IN A NURSING HOME: A PILOT STUDY

by

NINA P. LING

Presented to the Faculty of the Honors College of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements

for the Degree of Nursing

HONORS BACHELOR OF SCIENCE IN NURSING

THE UNIVERSITY OF TEXAS AT ARLINGTON

December 2016

ACKNOWLEDGMENTS

I would like to convey my appreciation to my mentor, Dr. Kathryn Daniel, who has shown her support and passion in geriatric nursing research. She continually assisted me in this journey, and conveyed spirit in regard to teaching and research. Without her supervision and constant help, this project would not have been possible.

I would also like to express my sincere gratitude to the College of Nursing and Health Innovations Honors Coordinator, Dr. Deborah Behan, for her continuous support of my research. Her patience, motivation, and immense expertise helped me in my research and writing of this project. I could not have imagined having a better advisor for my project.

Lastly, I would like to express my sincere thanks to my beloved parents. Their unconditional love and support have guided me in these years. Their continuous encouragement and attention becomes a light in my journey. They are always here for me when I am going through a tough path. They are always here for me to dry my tears when I am lost. Without them, I could never accomplish this much in my life.

I also place on record, my sense of gratitude to one and all, who directly or indirectly, have helped me in this venture.

May 11, 2016

ABSTRACT

COMPLIANCE WITH HAND HYGIENE POLICY IN A NURSING HOME: A PILOT STUDY

Nina P. Ling, B.S. Nursing

The University of Texas at Arlington, 2016

Faculty Mentors: Deborah Behan and Kathryn Daniel

This project investigated the unanswered question of nursing staff's practice and attitudes toward hand hygiene policy in a nursing home. Hand hygiene is the most essential measure known to limit nosocomial infection (Eveillard et al., 2011). The gerontologic population is one of the biggest population segments in the healthcare system due to the period of the baby boomers (Eveillard et al., 2011). This population is known to have a weaker immune system in comparison to younger generations (Travers et al., 2015). Infection prevention is especially important to prevent the geriatric cascade, and the decline in quality of life (Travers et al., 2015). Hand hygiene will help to prevent this cascade, and possibly even death of the geriatric patient.

Although there are many studies conducted about hand hygiene compliance, there are very few studies conducted at nursing homes (Eveillard et al., 2011). My project

contributes to the body of knowledge in geriatric nursing by examining the nursing staff's attitude and performance of hand hygiene on a daily basis. In an environment like geriatric nursing facilities, where it is meant to feel like a home more than a hospital unit, how often do the nursing staff perform infection control procedures after interacting with residents? If hand hygiene is poorly practiced, future exploration of possible precipitating factors should be investigated, and hopefully stimulate a discussion and awareness in the nursing home setting.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background

High compliance with hand hygiene policies are known to prevent and control infection transmission (Takahashi & Turale, 2010). In fact, hand hygiene is widely recognized internationally as the simplest, most low-cost, effective practice to stop pathogens from cross-transmitting in health care settings (Randle, 2010). However, as nursing staff get into the momentum of their duties and tasks, how many actually perform hand hygiene as recommended? There are many studies focused on compliance of hand hygiene in a clinical setting, such as hospital units (Randle, 2010). However, there are very few studies conducted in nursing homes where hand hygiene should be more emphasized due to decreased immune system and long-term care of older adults.

1.2 Literature Review

The gerontological population (65+ years old) in nursing homes has continued to increase as the result of the baby boomer population following World War II (Valiathan, Ashman, & Asthana, 2016). According to Valiathan et al. (2016), the aging population will be around 20 percent of the total population in the United States by 2030. One problem noted in the geriatric population is the decline in immune system functions, which is often part of aging (Valiathan, Ashman, & Asthana, 2016). Furthermore, they say that many physiological factors contribute to increasing susceptibility to infections in the geriatric population (Valiathan, Ashman, & Asthana, 2016). Physiological aging also

affects the circulating lymphocytes that affect the body's overall immune function (Valiathan, Ashman, & Asthana, 2016). As individuals age, their immune system begins to weaken due to loss of lymphoid tissues that in the younger adult forms an immune response and protects individuals from infection and foreign bodies (Valiathan, Ashman, & Asthana, 2016). The decreased level of immune response increases the susceptibility of elder adults (geriatric) to a number of infectious diseases, such as MRSA, autoimmune diseases, and malignancies (Valiathan, Ashman, & Asthana, 2016). These complications that can occur as a secondary infection to a simple diagnosis such as the flu, and it can be fatal for the geriatric population.

Besides the loss of adaptive immune function in the gerotological population, decreased vaccine efficacy also plays a role of increasing susceptibility to infectious disease (McElhaney & Effros, 2009). The decrease in both innate and adaptive immune function reduces the effectiveness and response to vaccinations that can help to prevent any secondary complications (McElhaney & Effros, 2009). The occurrence and severity of infectious illness are based on age-dependent alteration in immune function (Miller, 1991). In order to protect geriatric clients from potential exposure of degenerative, infectious illness, good hand washing is the very first defense (Miller, 1991). Nurses are taught in their nursing programs what good hand washing technique is as an early learning experience. The expectation is that all nurses will follow good hand washing technique as they care for any type of patient, but especially those who are more susceptible to infections and complications such as infections. The group of people who assist nurses, such as Nurse Aides and Patient Care Technicians (PCT), are also taught good hand washing technique and expected to follow that technique at all times.

According to Travers (2015), very complex nursing skills are needed to protect geriatrics immunity. However, a skill that is as simple as hand washing can heavily influence the outcome of geriatric patients (Travers et al., 2015). Hand washing is so important for this population, and it is a mandated policy practiced in acute care settings. However, we do not know if the same values are in place in a nursing home as in the acute care setting. Moreover, nurse's attitude toward patient safety affects their hand washing hygiene practice (Eveillard et al., 2011). If they do not value the practice of hand washing from patient to patient in a nursing home, it might affect the geriatric patients and even cause the death of a patient.

According to Eveillard and her fellow researchers (2011), their study showed a difference in hand washing before contacting the patient and after contacting the patient; hand-washing compliance was significantly higher after contact with a patient. Their conclusion about this result is that the motivation to perform hand washing was influenced by an innate desire to clean oneself after contacting the patient, instead of having the desire to protect the patient from infection (washing hands before entering the room) (Eveillard et al., 2011). The authors believed that the nursing staff's self-protection attitude was the main driver of their hand washing, which is part of the purpose of hand washing hygiene practice, but with the patient as the focus. Additionally, another finding that Eveillard and her fellow researchers observed from their attitude assessment is that nursing staff often lack awareness or education of basic hand washing practices (2011). The lack of awareness includes the attitude of others being dirty, but not thinking about their own ability to carry microorganisms on their skin from patient to patient. They report that multiple-resistant bacterium can colonize on patients as well as their surroundings, such as tabletops,

doorknobs, and chair arms. Furthermore, they discuss how poor hand washing hygiene practice can spread these bacteria to other people and other surfaces, which reinforces the importance of hand washing between patient rooms (Eveillard et al., 2011). They used scenarios for educational purposes in their study in order to resemble everyday practice and strengthen their hand washing hygiene compliance (Eveillard et al., 2011). This helped to reduce bacteria that get passed from patient to patient and/or to a surface, and then get picked up by a caregiver or patient who touches the surface.

Self-perception of one's hand washing hygiene practice can also affect improvement of compliance. According to Takahashi and Turale (2010), they used self-report surveys to evaluate nursing staff hand washing hygiene habits. However, self-reported hand washing compliance was rated higher than the researchers' direct observations, which implies that the staff's awareness of hand washing may not reflect their actual practice (Takahashi & Turale, 2010). Self-report data, such as surveys and questionnaires, are interpreted cautiously in studies, which indicates observations may be needed to accurately know if the practice of handwashing is actually valued or not (Takahashi & Turale, 2010). In addition, according to Sahud and his fellow researchers (2010), the result of direct observation can also be affected by the perception of being observed. In the current study, we will use observations and a self-survey to determine if there is a difference in what they say and what they do.

Skin care also affects hand-washing behavior; it is one of the factors that are most likely to be overlooked regarding reasons that one might or might not have good hand washing hygiene. Following the frequent hand washing guidelines, constantly washing hands with soap and water in an eight-hour shift can cause hand dryness and irritation

(Creedon, 2005). Additionally, dry hands are more prone to tears and injuries, which increases the potential spread of infection (Felembam, John, & Shaban, 2012). According to Creedon (2005), compliance to hand washing hygiene guidelines increases after staff notices a decrease of skin irritability and an improvement in their own skin condition. Using mild moisturizers can improve skin integrity by counteracting the drying effect (Helms, Dorval, Laurent, & Winter, 2010). Hand washing behavior can be improved in simple ways like placing moisturizers at the nurse's station, or even hanging them on the wall next to the alcohol-based foam (Helms et al., 2010).

1.3 Study Aim

Compliance of hand washing hygiene practices were assessed in this study by direct observation followed by a short survey after each observation session. The aim of this study is to better understand nursing staff's hand washing practices and attitudes toward infection control, and observe actual practices in order to open a discussion of hand hygiene habits in a long-term care facility. We know the above information from an acute care perspective, but we do not know if the same values and attitudes persist in a long-term care facility such as a nursing home.

CHAPTER 2

METHODOLOGY

2.1 Study Design

This study involved a blinded, direct observational study. The researcher followed nursing staff for four hours to observe hand-washing behavior. A short survey was then provided for those observed after each four-hour session in order to assess the self-reported hand washing behavior in this long-term care facility. Subjects were not told observations of hand washing were being recorded so as not to bias the results.

2.1.1 Direct Observation

In order to investigate the level of hand washing compliance at a nursing home, direct observation of staff could show their actual practice. In addition, staffs were informed that the researcher was inspecting daily tasks at the nursing home in order to reduce bias, or in more specific terms, reduction of the Hawthorne effect. The Hawthorne effect happens when a subject knows they are being studied and for what they are being studied. It will bias the results, and a true assessment of the attitudes and observations are not known. This effect described the subject's exceptional behavior due to their awareness of being observed and introduces bias to the study results.

A single staff member was followed for four hours at a time, and a time table was used to record all of his/her daily tasks related to direct care of the long-term care nursing home residents (see Appendix A). Detailed information about their behavior and tasks were recorded; however, only data related to hand washing was used in this project. The

duration of the observation was four hours, which was half of an eight-hour shift. This data was collected from both day and night shifts. Direct observation gave an objective viewpoint of staff's hand washing habits and the tasks performed with the residents.

2.1.2 Survey

After reviewing the literature on hand washing hygiene and attitudes, the researcher constructed survey questions. Two out of five questions on the survey were used to examine staff's attitude toward hand hygiene. Subjects filled out the survey at the end of the four-hour observation. He/she was asked to come to the break room to complete this survey. In contemplation of disguising the true meaning of the survey, two out of five questions were related to hand hygiene, and other three questions were related to other nursing knowledge and attitudes. If the subject was being observed for the first time, Survey I was used (see Appendix B). Similarly, if the subject was being observed for the second time, Survey II was used (see Appendix C). The maximum four-hour observation sessions of the same subject were a total of five times. Therefore, for the third observation, Survey III was used (see Appendix D); for the fourth observation, Survey IV was used (see Appendix E); and finally, for the fifth observation, Survey V was used (see Appendix F). The end-of-observation survey gave information about the staff's self-perception, and precipitating factors of excellent or poor compliance with hand hygiene.

2.1.3 Setting

The nursing home facility was located on the second floor of a large continuing care retirement community. The nursing home, where more care was provided, was separated from the other retirement community where less care was provided. It had fifteen rooms in total; two private rooms and thirteen semi-private rooms (shared with one

roommate). The nursing home had a total of forty-eight beds, with an average census of forty-one residents. Each room had one private restroom that would be shared with a roommate if it was a semi-private room. Each resident had one hospital bed, closet, drawers, adjustable table, and flat screen TV. The nursing home also had one dining area, one recreational area, and one nursing station that could be used by all residents.

2.1.4 Participants

Participants were recruited at the monthly staff meeting, whereby most nurses and nursing assistants on day and night shift were present. After the researcher introduced herself and discussed the purpose of this research, a form was provided with available timeslots for staff to sign up. Some subjects were recruited from word-of-mouth by others, but especially by the researcher there to collect data on another nurse/nurse assistant. Participants were allowed to sign up for more than one timeslot, and each participant was followed, at most, five times for four-hour sessions. It was decided that Nurses, Patient Care Technicians, Physical Therapists, Occupational Therapists, and any employee that provided direct care to residents would be welcomed to participate in this study. The researcher only observed and did not participate in patient care.

2.2 Ethical Considerations

This research received Institutional Review Board (IRB) approval from the University of Texas at Arlington. The researcher completed the 3000-level nursing research course, in addition to two hours online IRB training to prep for ethical considerations for this study. In order to begin this study, the researcher also submitted a Proposal for Research involving Human Subjects, Informed Consent Document, and

Approval document from the nursing home. All documents were approved before beginning data collection.

Participation was voluntary. Since collected data could influence employment and professionalism, subjects would remain anonymous, which meant that the researcher would not link any personal information with the collected data. Therefore, we had no way to identify collected individual data. However, subjects could refuse to participate any time before or during the observation phase. Subjects would have personal information on the consent form, but their personal information did not link to their personal individual data that was collected for the observations, nor for the survey.

CHAPTER 3

RESULTS

There were a total of eleven Patient Care Technicians observed for a period of four hours. There was one healthcare provider who was followed five times, five healthcare providers were followed four times, and seven healthcare providers were followed three times. There were seven healthcare providers followed two times, and ten healthcare providers followed one time. The total sample size was thirty observations (1+5+7+7+10=30) with eleven subject being observed. The result of the direct observation was that healthcare providers did not strictly adhere to the rule of washing hands before and after entering the room. Most staff washed their hands when they performed tasks that involved close contact; for example, giving a bath, applying lotion, changing the linens, etc. Other tasks like combing hair, putting on a sweater, or helping residents to maneuver in a wheelchair were observed and some staff foamed in or out, but did not wash their hands.

On the another hand, every staff answered two out of two hand hygiene questions as true on the survey. They said that they did good hand washing hygiene practices. There were no outliers. However, the statements on the survey were simply to assess their attitude. There were no right or wrong answers. It was obvious that they knew that theoretically they should observe good hand washing practices; however, the observations indicated different practices.

CHAPTER 4

DISCUSSION

4.1 Compliance with Handwashing Guidelines

Participants were observed washing their hands whenever hands were visibly soiled, or after removing gloves, etc. According to Randle and his fellow researchers (2010), compliance of hand hygiene was 75% for nursing staffs in a hospital setting. In this study, Randle and his fellow researchers examined hand washing habits in five different moments: compliance before a procedure was 100%, after body fluid exposure was 93%, after patient contact was 80%, before entering a patient's room was 68%, and after contacting patient's surroundings was 50% (2010). This supports our study results. Although the healthcare providers were not strictly following hand hygiene guidelines like healthcare providers in acute care at hospitals they were doing some hand washing. Since this is a long-term care facility, most subjects in the study know all the long-term care nursing home residents very well. Similar to a mother caring for her child, it is strange to adhere to strict infection control in a long-term care nursing home that is supposed to feel like home. Participants in this current study were noted to wash their hands at some times, but not all times did they use good handwashing hygiene. For example, staff always washed their hands after changing a patient when they had soiled their clothes. However, they did not always wash their hands when they provided other care, such as combing hair.

According to the self-report survey, all participants answered two out of two of hand hygiene questions true regarding washing hands. For example, one hundred percent of the staff admitted that he/she washed their hands more often when exiting the room than they did when entering the room. This is not what is taught in nursing schools, and is not the best practice as a nurse. All healthcare providers should perform some kind of hand hygiene both upon entering and exiting the patient's room. Therefore, the hand washing rate should be the same whether entering or exiting the room. Further, one hundred percent of healthcare providers admitted that his/her hand washing habits depended on the tasks performed inside the patient's room. There is congruence with the direct observations because healthcare providers did not always wash their hands upon leaving a room if they combed someone's hair, or helped them put their clothes on.

Participants acknowledged that they did not strictly adhere to the hand hygiene expectation. However, all healthcare providers washed hands as they felt was needed according to the situation and their professional judgement. Therefore, in the current study direct observations of hand washing hygiene as well as a survey of attitudes on hand washing hygiene were utilized, and there was a noticeable difference between these two sets of data, which is supported in previous research that observed hand washing compliance as higher in self-report than observed (Sahud et al., 2010).

4.2 Handwashing due to Different Tasks

It should be noted that tasks were the main factor that affected hand hygiene adherence. On the survey, one hundred percent of the subjects reported that they washed their hands before entering the room to prevent infection, however, it was not a rule that all of them strictly followed. All subjects washed their hands after performing "dirty" tasks,

like assisting with toileting. It showed that most staff washed their hands for self-protection, rather than infection control. For other tasks, like helping residents maneuver to the dining area, there was very low percentage of staff that performed any type of hand washing hygiene when going in and out of rooms rapidly.

4.3 Response Rate

Besides observation and attitude, the low response rate was an unexpected finding. There was a total of thirty observations and survey responses; however, response rates were low, and most staff refused to participate. Since participation is completely voluntary, there was only 37% response rate from all available healthcare providers. This possibly reflected that staff members didn't feel comfortable being observed for a period of time. Although they are performing the same duties, the awareness of being watched can definitely affect performance.

4.4 Attitude and Beliefs

Hand washing hygiene, according to the survey responses, were such that the healthcare providers believed it was necessary. Some healthcare providers performed more meticulous hand washing than others. In addition, older staff members tended to perform less strict hand washing hygiene than the younger staff members. One interpretation could be differences in environment of long term care nursing home versus acute care hospitals, or the time period during which they trained as the attitude of not needing to always use good handwashing. Another factor noticed was that healthcare providers who worked in the long term care nursing home environment for a longer period of time tended to not wash their hands as much as those who had worked less time in that environment. The only explanation is that individual healthcare providers may get busy and not take the time to

use good hand washing hygiene because they rationalize that they just performed a task that did not include a dressing, or contact with body fluids.

4.5 Study Limitations

One of the study limitations was lack of participation. There were only eleven healthcare providers out of twenty-nine that originally agreed to participant in this study. In order to have thirty observations, most healthcare providers were followed more than once. Another limitation would be the subject's awareness of being observed. Although this is a blinded study, subjects tend to perform differently when a researcher is present, and after the first observations and self-reports they spoke to each other about the survey questions. Even though the survey was different each time, similar questions were posed regarding hand washing hygiene beliefs and attitudes, which could be ascertained as the real reason for the observations.

CHAPTER 5

CONCLUSION

In this study, hand washing hygiene in the nursing home were assessed by observation and survey. The result of self-report survey and observation were different. From the result of the survey, healthcare providers reported that they followed a strict hand hygiene guideline with slight variation, compared to hand hygiene performance in the hospital setting. However, observation showed that staff members actually only washed their hands as they felt was needed, or less than their self-report assumptions.

In long–term care facilities, like a nursing home, residents were treated more like an elderly family member instead of a patient, since most staff knew the residents very well and developed social relationships. Healthcare providers also know that residents are staying at this facility due to their needs of daily living, instead of an acute disease process. Therefore, most healthcare providers are possibly not as particular in hand hygiene as healthcare providers working in a hospital. However, hand hygiene is one of the most effective tools available in the prevention of infectious disease. Absence of current illness should not affect the need for proper hand washing practice. On the other hand, maybe staff members believe in their self-report behavior, but fail to execute some of their expectations in actual practice. In academia nursing students need to learn the importance of good hand washing hygiene for every type of patient. This includes the neonate to the end of life. They also need to learn how important it is to prevent complications and how microorganisms can be transmitted and carried from surfaces as

well as patients to other patients when their hands are not washed. More research needs to be done regarding long-term care facilities and infections that may be acquired due to poor hand washing hygiene.

Further, maybe a more specific hand hygiene guideline should be developed as a standard for healthcare providers working at long-term facilities. According to Haas and Larson (2008), the standard hand hygiene guidelines in clinical settings are: "routinely uses alcohol-based hand foam, and washes hands when visibly soiled" (p. 41). However, this is a very broad statement. As mentioned before, nursing staff come from different walks of life; they all have different backgrounds and cultures. Nursing staffs have different perceptions of what is "soiled," and take different actions accordingly. According to Travers et al. (2015), if nursing support staff came from a culture that doesn't discuss medical issues, such as the importance of infection control, some nursing support staff may just simply not follow the hand washing guideline because they didn't see a reason to do so. Since long-term care nursing homes have a different setting and atmosphere compared to acute care hospitals, a more specific and detailed guideline might be helpful in this clinical setting. For example, healthcare providers must use alcohol-based foam after contacting residents and their surroundings. Ongoing staff development programs, monitoring programs, and continuing education will also reinforce hand hygiene as well.

APPENDIX A

ACTIVITIES RECORDING TIMELINE

Activities Recording Timeline

Type of staff being observed:	
0100	
0200	
0300	
0400	
0500	
0600	
0700	
0800	
0900	
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	
2400	

APPENDIX B

END OF OBSERVATION SURVEY I

End of Observation Survey I

1. My workload during my shift is manageable.	Yes	No
2. I believe hand hygiene is a simple, effective way to prevent infection transmission.	Yes	No
3. I wash my hands when before I enter the client's room and when I leave the client's room.	Yes	No
4. I actively listen to each client's concerns.	Yes	No
5. I make sure clients feel comfortable and happy living in this nursing home.	Yes	No

APPENDIX C

END OF OBSERVATION SURVEY II

End of Observation Survey II

1. Resident's happiness and comfort are very important to me.	Yes	No
2. I frequently perform hand hygiene to prevent infection spread.	Yes	No
3. I wash my hands more often when I exit the room than when I enter the room.	Yes	No
4. I encourage clients to ambulate, if he/she is capable to walk with assistance.	Yes	No
5. I accept constructive criticisms; this is a great way to improve my own practice.	Yes	No

APPENDIX D

END OF OBSERVATION SURVEY III

End of Observation Survey III

1. I pay attention to infection control.	Yes	No
2. I always allow resident to perform daily tasks (like personal hygiene) independently if he/she is capable.	Yes	No
3. My hand washing habit depends on the tasks I have in the resident's room.	Yes	No
4. I always take client's complaints seriously.	Yes	No
5. I respect each client's values and beliefs.	Yes	No

APPENDIX E

END OF OBSERVATION SURVEY IV

End of Observation Survey IV

1. I expect myself to provide good quality care for each client.	Yes	No
2. I take standard precautions seriously in order to reduce the risk of infection transmission.	Yes	No
3. I wash my hands after I use gloves.	Yes	No
4. I encourage healthy lifestyle.	Yes	No
5. I report any suicidal thoughts promptly to the healthcare team.	Yes	No

APPENDIX F

END OF OBSERVATION SURVEY V

End of Observation Survey V

1. It is my responsibility to report any form of abuse.	Yes	No
2. Protecting client's privacy is an important aspect of care.	Yes	No
3. Good hand hygiene not only protects staff; it also protects clients from infections.	Yes	No
4. I wash my hands with soap and water when they are soiled.	Yes	No
5. I treat each client as an individual with a unique background of his/her own.	Yes	No

REFERENCES

Creedon, S. A. (2005). Healthcare workers' hand decontamination practices: Compliance with recommended guidelines. *Journal of Advanced Nursing, 51*(3), 208-216.

Eveillard, M., Raymond, F., Guilloteau, V., Pradelle, M., Kempf, M., Zilli-Dewaele, M., . . . Brunel, P. (2011). Impact of a multi-faceted training intervention on the improvement of hand hygiene and gloving practices in four healthcare settings including nursing homes, acute-care geriatric wards and physical rehabilitation units. *Journal of Clinical Nursing, 20*(19-20), 2744-2751.

Felembam, O., John, W. S., & Shaban, R. Z. (2012). Hand hygiene practices of home visiting community nurses. *Home Healthcare Nurse, 30*(3), 152.

Haas, J. P., & Larson, E. L. (2008). Compliance with Hand Hygiene Guidelines. *AJN, American Journal of Nursing, 108*(8), 40-44.

Helms, B., Dorval, S., Laurent, P. S., & Winter, M. (2010). Improving hand hygiene compliance: A multidisciplinary approach. *AJIC: American Journal of Infection Control, 38*(7), 572-574.

McElhaney, J. E., & Effros, R. B. (2009). Immunosenescence: What does it mean to health outcomes in older adults? *Current Opinion in Immunology*,*21*(4), 418–424.

Miller, R. (1991). Aging and Immune Function. *International Review of Cytology*, *124*, 187–215.

Randle, J., Arthur, A., & Vaughan, N. (2010). Twenty-four-hour observational study of hospital hand hygiene compliance. *Journal of Hospital Infection, 76*(3), 252-255.

Sahud, A. G., Bhanot, N., Radhakrishnan, A., Bajwa, R., Manyam, H., & Post, J. C. (2010). An electronic hand hygiene surveillance device: A pilot study exploring surrogate markers for hand hygiene compliance. *Infection Control and Hospital Epidemiology, 31*(6), 634-639.

Takahashi, I., & Turale, S. (2010). Evaluation of individual and facility factors that promote hand washing in aged-care facilities in japan. *Nursing & Health Sciences, 12*(1), 127-134.

Travers, J., Herzig, C. T., Pogorzelska-Maziarz, M., Carter, E., Cohen, C. C., Semeraro, P. K., . . . Stone, P. W. (2015). Perceived barriers to infection prevention and control for nursing home certified nursing assistants: A qualitative study. *Geriatric Nursing, 36*(5), 355-360.

Valiathan, R., Ashman, M., & Asthana, D. (2016). Effects of Ageing on the immune system: Infants to elderly. *Scandinavian Journal of Immunology*, *83*(4), 255–266.

BIOGRAPHICAL INFORMATION

Nina enrolled in the University of Texas at Arlington in Fall 2012, joined the Honors College in Spring 2012, and she graduates with an Honors Bachelor of Science in Nursing in Fall 2016. Her undergraduate nursing courses allowed her to explore different aspects of nursing, which determined her Honors project in gerontological nursing. This project is also dedicated to her grandmother, who had a peaceful time in a nursing home and passed away in 2014. Her plan after nursing school was uncertain; however, she would love to explore different specialties of nursing to find her passion. Hopefully, in the near future, she will have an opportunity to contribute her experiences and passion into teaching.