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Education Program on Safe Medication Administration for Nursing Assistants

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Education Program on Safe Medication Administration for Nursing Assistants

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Abstract

Background: Facility-based long-term care provide a variety of health care services, including medication management. However, medication errors are common and such errors contribute to disability and mortality. Due to an inadequate number of nurses, Washington State passed the Medication Assistant Endorsement law, allowing certified nursing assistants (CNAs) with specialized training as medication assistants (MAs) to administer certain medications under a register nurse's supervision in assisted living facilities and nursing homes. However, initial medication assistant training is limited. Providing continuing education for CNAs can address gaps in knowledge and skills needed for safe medication administration and help enhance patient safety. Furthermore, training CNAs as MAs allocates more time for licensed nurses to perform roles that require clinical judgment, reduces costs, and offers additional resources to MAs for career advancement.

Purpose: The purpose of this project was to develop an education program for certified nursing assistants to improve confidence in knowledge of medication management and skills in safe medication administration at an assisted living facility.

Methods: Based on research and staff input, an educational program was developed and disseminated to nursing assistants through an in-person presentation. Quasi-experimental pre- and post-test measured perception and confidence with a survey questionnaire, and skills related to safe medication administration via observation of nursing assistants at an assisted living facility in Washington State. Descriptive statistics and thematic analysis were conducted to analyze the data.

Results: 12 CNAs participated in the study. 11 themes were identified in perceptions on barriers to safe medication administration, with all participants reporting a lack of understanding in

administering different forms of medications as a barrier. Statistically significant improvement

was found in confidence on knowledge of medication management. Participants also showed

increased skills for safe medication administration after education intervention.

Conclusion: Addressing medication management challenges in assisted living facilities requires

collaboration between nurses and certified nursing assistants. With continuing education and

training, a culture of patient safety can be established, resulting in improved safe medication

administration practices by certified nursing assistants.

*Keywords***:** Medication Administration, Nursing Assistants, Medication Assistants,

Assisted Living Facility

Education Program on Safe Medication Administration for Nursing Assistants

Facility-based long-term care, such as assisted living and nursing homes, provide a wide range of personal and health care services. Among these, medication management is a major component, as more than 75% of residents require assistance with medications (Temkin-Greener et al., 2021). It is also reported that medication administration error rates in assisted living facilities have been shown to exceed 40%, with 7% of errors posing a moderate-to-high potential for harm (Temkin-Greener et al., 2021). In addition, the odds of medication errors double when medication management is done by staff with training lower than that of a licensed nurse (Temkin-Greener et al., 2021). Globally, medication errors, particularly during the administration phase, are recognized as a leading cause of disability and death (Fathi et al., 2017; Tsegaye et al., 2020).

While nurses typically have a comprehensive understanding of the medication administration process and are frequently the ones to administer medications and treatments, there is an inadequate number of nurses employed in assisted living facilities to attend to all residents requiring medication administration assistance daily (Bengtsson et al., 2021). For instance, at Aegis Living Ravenna, only one to two nurses are available eight hours per day for approximately 60 residents. One measure to address this challenge is that registered nurses can delegate certain medication administration tasks to non-licensed staff, such as certified nursing assistants (CNAs). In 2013, Washington State passed the Medication Assistant Endorsement law, enabling CNAs with specialized training as medication assistants (MAs) to administer certain medications and treatments in nursing homes under the supervision of a registered nurse (RN) (Dupler et al., 2015).

Nurses play a central role in maintaining and improving safety and have the responsibility of ensuring that non-licensed staff receive appropriate education and guidance (Bengtsson et al., 2021). However, judgement-based tasks that involve assessment, diagnosis, treatment, evaluation of patients, and medication calculations cannot be delegated to CNAs. By utilizing CNAs trained as MAs, licensed nurses can allocate more time to perform roles which require clinical judgment. This approach not only reduces costs but also expands the role of CNAs, creating opportunities for career advancement and pay improvement, which can contribute to enhanced working environments (Dupler et al., 2015).

In Washington State, CNAs applying for initial medication assistant endorsement are required to complete a one-time online state approved medication assistant education and training program (*Medication Assistant Endorsement and Nursing Assistant Frequently Asked Questions*, n.d.). However, medication management is a complex process, with each stage requiring knowledge of standard protocols, administration routes, interactions, patient context, and proper administration techniques (Kim & Lee, 2020; Odberg et al., 2018). Continuing education for CNAs can help address existing gaps in knowledge and skills needed for safe medication administration practices.

Project Purpose

The purpose of this project was to develop an education program for certified nursing assistants to improve confidence in knowledge of medication management and skills in safe medication administration at an assisted living facility.

Project Aims:

1. To assess certified nursing assistants' perception on barriers to safe medication management.

2. To assess certified nursing assistants' confidence on their knowledge in medication

    management.

3. To assess certified nursing assistants' skills for safe administration of medications.

Theoretical Framework

The theoretical framework used to guide this DNP Project was the Plan-Do-Study-Act

(PDSA) Improvement Cycle (*Plan-Do-Study-Act (PDSA) Directions and Examples*, n.d.). The

plan component (P) included research, collection of data, and the development of an educational

training program on safe medication administration. The do component (D) was implementing

the educational program and documenting observations. After implementation, the study

component (S) involved analyzing data to identify barriers to safe medication administration,

assess if there were significant changes in confidence of knowledge on medication management,

and evaluate if there were improvements in safe medication administration skills. The act

component (A) was gathering all the information learned from the project, to conclude what the

limitations were and offer insight on needed improvements for the education program. This aided

the consideration of adopting this project at other Aegis Living locations.

Literature Review

Factors Contributing to Medication Errors

Medication errors will inevitably occur, as nurses and medical personnel are human, and

therefore prone to error (Bengtsson et al., 2021). Examples of human error are lack of medical

knowledge, lack of skill/training, lack of attention to detail, failing to verify information to save

time, disorganization, and/or miscommunication (Sameera et al., 2021). These errors can be

caused by wrong planning, knowledge gap, and lack of access to training and resources (Sameera

et al., 2021). Relating to medication management in nursing homes, errors are perceived to be

attributed to human shortcomings, delegation of drug administration to non-licensed staff who

may lack the knowledge and understanding of the difficulties involved in handling drugs, the

inadequate ability to control delegation, and lack of safety awareness among staff members

(Bengtsson et al., 2021). It is crucial to identify the mistakes that occur in medication

management for them to be prevented (Mutair et al., 2021).

Components of Safe Medication Administration

Medication administration in assisted living facilities and nursing homes is a complex

process, as elderly patients often have multiple comorbidities and typically take many

medications, some of which are poorly tolerated in older populations (Junius-Walker et al.,

2021). This population also have higher incidences of memory impairment, and often are not

able to advocate for themselves effectively (Qian et al., 2021). The impact is that many people

suffer from medication administration errors and adverse drug events in long-term care, which

can cause major morbidity lasting weeks or months (Junius-Walker et al., 2021).

Research acknowledges the importance of the nurse role in promoting safe medication

administration and patient safety (Kowalski & Anthony, 2017; Odberg et al., 2018; Smeulers et

al., 2014). It is standard during nursing education to receive instruction on a guide to clinical

medication administration and to uphold patient safety, known as the "rights" of medication

administration. Various studies name anywhere from 5 to 10 rights guiding safe medication

administration (Mula et al., 2019; Tsegaye et al., 2020; Wondmieneh et al., 2020). These include

right patient, right medication, right time, right dose, right route, right education/advice, rights to

refuse, right assessment, right evaluation/response, and right documentation (Mula et al., 2019;

Tsegaye et al., 2020; Wondmieneh et al., 2020). Errors in medication administration can occur

through failures in any of these rights (Hanson & Haddad, 2022). One study showed that nurses

who did not use the guidelines for medication administration in comparison to those that did

were two times more likely to make medication administration errors, were three times more

likely to make an error than those who had been trained, and when interrupted during

administering medications were almost three times likely to make an error (Wondmieneh et al.,

2020). Thus, it is important to understand the components of safe medication administration to

help reduce medication administration errors.

Continuing Education for Nursing Assistants

The literature suggest that CNAs generally do well with the task of medication

administration in assisted living facilities (Budden, 2012; Carayon et al., 2014; Duplet et al.,

2015; Kim & Lee, 2020). However, it is noted that issues related to medication management

have become a risk factor, leading to an increase in medication administration errors in nursing

homes (Bengtsson et al., 2021). Thus, registered nurses are responsible for ensuring that non-

licensed staff receive proper education so that medication administration can be conducted

appropriately, safely, and in accordance with evidence-based practice (Bengtsson et al., 2021).

Continuing education programs can increase the confidence and competence of health workers

by providing staff with up-to-date knowledge and skills to provide quality service to the

populations they work with (Mlambo et al., 2021). Nursing assistants play an essential role

within the nursing team and providing opportunities for them to improve their knowledge and

skills, ultimately help to maintain and improve quality of care (Cheong & Hsu, 2021).

Additionally, continuing education programs for nursing assistants have shown several

benefits, such as improved working conditions and career recognition (Cheong & Hsu, 2021).

Regarding training methods, nursing assistants reported they preferred hands-on training, and the

most valuable learning moments were associated with on-the-job experiences (Douglas et al.,

2019). Simultaneously, by involving healthcare staff in the selection of learning methods and allowing them to offer input on learning objectives has been found to produce more effective learning outcomes (Trinkoff et al., 2017). Also, care skills and performance are more likely to improve if training was provided in the workplace or a similar environment (Trinkoff et al., 2017).

Methods

Design and Setting

This quality improvement project was a mixed methods study with quasi-experimental one group pre- and post-test design, to evaluate the implementation of an education training program on safe medication administration for certified nursing assistants at Aegis Living Ravenna, an assisted living community in North Seattle.

Participants

Participants included all certified nursing assistants who were working as medication assistants at Aegis Living Ravenna. Inclusion criteria included: 1) currently employed and worked at least once a month at Aegis Living Ravenna, 2) is a certified nursing assistant working as a medication assistant, 3) completed signed informed consent. Exclusion criteria included certified nursing assistants not working as medication assistants. A convenience sample of 23 certified nursing assistants working as medication assistants that fit the inclusion criteria were asked to participate in this study during daily shift meetings and via email. However, 12 out of the 23 medication assistants were willing to participate for the full duration of the study, and thus 12 participants were recruited for this study.

Intervention

The author developed and implemented a safe medication administration education program to help CNAs administer medications safely to residents at the assisted living facility (see Appendix A). The components of the education program were informed by the findings from the semi-structured interviews, and it incorporated the knowledge and skills participants identified they needed to improve on. This included the following: an understanding of their scope of practice at the facility, defining the 7 rights of medication administration, how to read and clarify prescription orders on the electronic medication administration record (eMAR), understanding how to administer different forms of medications through appropriate routes, understanding most common classes of medications used at the facility and what side effects to look for, and when to administer specific as-needed medications commonly used at the facility (see Table 1).

The education program was presented by the author in a conference room at Aegis Living Ravenna. A total of four single, independent educational sessions were completed by participants over the course of three weeks from the middle of March to the beginning of April 2023. Each session lasted about 30 minutes, with an additional 10 minutes added at the end for questions. All participants in this study were allowed to attend one of the four scheduled sessions.

Data Collection Procedures and Tools

After recruitment of eligible participants, semi-structured interviews were conducted in a private room to assess CNAs' perception on barriers to safe medication management. The interview consisted of open-ended questions and lasted about 5-10 minutes each. Topics of the interview included views on barriers to safe medication administration, discussions on areas needed improvement, what resources were missing, and what method of education training

delivery was preferred (such as in-person PowerPoint presentation, virtual training, e-learning through the use of YouTube videos, one-on-one teaching, small group workshop, etc.), and in general, what they would like to improve on in terms of medication administration (see Table 1). The open dialogues provided the freedom to make deviations in the flow of the interview and a rough outline of questions asked help to ensure all perspectives were addressed for each certified nursing assistant participating.

To assess CNAs' confidence in medication management, a printed survey questionnaire was developed by the author and was administered both before intervention (pre-test) and after intervention (post-test). The questionnaire consisted of six questions and participants were able to complete it within four minutes. The questionnaire asked participants to evaluate their confidence levels across different aspects of medication management, and this was measured by a Likert rating scale of 1-5 (1 being not at all confident to 5 being extremely confident) (see Appendix B).

To assess CNAs' skills in administering medications safely, the author developed the Revised Safe Medication Administration Assessment Checklist (see Appendix D). The checklist was used by the author to observe CNAs while they administered medications to residents during either morning or afternoon medication passes. This revised checklist was designed to measure the completion of specific skills related to safe medication administration pre- and post-intervention. The components of the revised checklist were based on the Patient Safety Assessment in Medication Administration (ASPAM tool) developed in 2019, which has been shown to be a valid and reliable assessment tool (Araujo et al., 2019) (see Appendix C). However, certain questions were omitted from this tool due to limitations on what medication administration tasks CNAs were legally permitted to perform.

Data Analysis

After each semi-structured interview with CNAs, responses were documented and grouped into themes using inductive thematic analysis to identify common concepts and participant insights on barriers to safe medication administration. The qualitative data were formatted into a table to aid with analysis.

The pre- and post-intervention surveys were analyzed using the Wilcoxon signed ranks two-tailed test in Microsoft Excel, with the alpha for significance set at 0.05. The test statistic "W" was defined as the smaller of the sums of the positive and negative ranks. For this test with a sample size (n) of 12 and $\alpha=0.05$, the critical value of W was 13 (see Appendix G). The decision rule was to reject the null hypothesis (H_0) if W was less than 13, indicating a significant difference between pre- and post-intervention survey responses. Utilizing Wilcoxon signed ranks two tailed test helped identify if there were significant differences between pre- and post-intervention responses. Additionally, quantitative data from the pre- and post-intervention surveys were analyzed with descriptive statistics to evaluate changes in confidence on knowledge of medication management.

Lastly, quantitative data from direct observational survey were analyzed with descriptive statistics to assess changes in pre- and post-intervention performance of each skill domain for safe medication administration, measured by the Revised Safe Medication Administration Assessment Checklist. The information was presented in a clustered column chart to aid with analysis.

Timeline of DNP Project

The DNP proposal presentation was completed, and application was sent to Seattle University Institutional Review Board at the end of December 2022. From mid-January to the

end of February, participant recruitment, semi-structured interviews, and research were

completed; and the education program was developed. Between February to April, pre-surveys

assessing confidence on knowledge and pre-surveys assessing skills by direct observation of

medication passes were completed. Concurrently, the education program was implemented for

those who completed the pre-surveys. All post-surveys were completed by the end of April. Data

analysis and evaluation were completed by mid-May. In June, the findings were presented to the

Health Services Director and General Manger at Aegis Living Ravenna, and the project was

presented on Scholarship Day at Seattle University (see Appendix E).

Institutional Review Board and Informed Consent

This project was submitted to Seattle University Institutional Review Board (IRB) for

review. On January 18, 2023, Seattle University IRB identified the study as "Not Human

Participant Research (NHPR)." Informed consent to participate in this study, including

explanation of the option to withdraw at any point without penalty, was obtained from all

participants prior to starting interviews and pre-intervention surveys. See Appendix F for a copy

of the informed consent statement received from participants.

<div align="center">Results</div>

Aim 1: To Assess Certified Nursing Assistants' (CNAs) Perception on Barriers to Safe Medication Management

12 CNAs participated in semi-structured interviews. Thematic analysis identified 11

themes (see Table 1). All participants expressed desire to understand how to administer different

forms of medications better and stated that they felt they had the resources they needed to

successfully administer medications safely. Additionally, as per the responses of participants, not

knowing what some of the medications do, not understanding what side effects to look for, and

knowing when to use certain "as needed" medications were the next three most listed barriers to

safe medication management. Less than half of participants identified a limited understanding of how to read prescription orders and not remembering all the safe medication administration rights as a barrier to safe medication administration. In terms of method of education delivery, a majority preferred an in-person presentation.

Table 1

A Summary of Responses to Semi-Structured Interviews with CNAs

Question	Themes with corresponding number of CNAs' response to each question
What do you think are barriers to administering medications safely to residents?	Not knowing what some of the medications do (9) Not knowing what actions CNAs can perform (5) Limited understanding of abbreviations used in prescription orders on the eMAR (4) Not remembering the rights of safe medication administration (3)
What medication administration skills would you like to improve on?	Understanding how to administer different forms of medications (12)
What resources are needed for you to safely administer medications?	Nothing (12)
What method of education training delivery do you prefer?	In-person presentation (7) One-on-one teaching (3) e-learning/virtual training (2)
What else would you like to improve on in terms of medication administration?	Understand what side effects to look for (9) When to use certain "PRN" medications (7)

Aim 2: To Assess Certified Nursing Assistants' Confidence Regarding their Knowledge in Medication Management

The Wilcoxon signed ranks test showed a significant improvement in CNAs' confidence regarding knowledge of medication management in post-intervention surveys compared to pre-intervention surveys (see Table 2). The null hypothesis was rejected as the test statistic (W=0) was less than the critical value (13).

Table 2

Pre-and Post-Intervention Survey Analysis: Wilcoxon Signed Ranks Test Results

Survey Item	Pre-Intervention (n=12) Mean (SD)	Post-Intervention (n=12) Mean (SD)	Difference	Positive	|Diff|	Rank	Signed Rank
How confident do you know the 7 rights of safe medication administration?	4.33 (0.78)	4.9 (0.29)	-0.57	-1	0.57	1	-1
How confident do you know how to read prescriptions on the eMAR?	3.08 (0.79)	4.83 (0.39)	-1.75	-1	1.75	5	-5
How confident do you know how to administer different forms of medications?	2.83 (0.83)	4.75 (0.45)	-1.92	-1	1.92	6	-6
How confident do you know the different types of medications and common side effects?	2.16 (0.83)	3.66 (0.49)	-1.5	-1	1.5	4	-4
How confident do you know when to administer as needed (or PRN) medications for residents?	2.5 (0.79)	3.75 (0.62)	-1.25	-1	1.25	3	-3
How confident do you know what specific medications and treatments you can administer as a medication assistant?	4.08 (0.67)	5 (0)	-0.92	-1	0.92	2	-2

0 *Positive Sum
-21 *Negative Sum
0 *Test Statistic

A total of 12 CNAs who met the inclusion criteria completed the pre- and post-intervention surveys. The survey items that showed the most improvement post-intervention was understanding how to read prescriptions on the eMAR (mean before: 3.08 [SD: 0.79], after: 4.83 [SD: 0.39]), and understanding how to administer different forms of medications (mean before: 2.83 [SD: 0.83], after: 4.75 [SD: 0.45]) (see Table 2). 83% and 75% of participants reported "extremely" confident in these areas, respectively, post intervention (see Figure 2).

The survey items that showed the least improvements were knowledge of different medications and their common side effects (mean before: 2.16 [SD: 0.83], after: 3.66 [SD:

0.49]), as well as administering "as-needed" medication (mean before: 2.5 [SD: 0.79]), after:

3.75 [SD: 0.62]). In these areas, 33% of participants reported feeling "somewhat" confident post

intervention, compared to 42% pre-intervention (see Figure 1).

　　　The areas that remained relatively the same were understanding the rights of safe

medication administration (mean before: 4.33 [SD: 0.78], after: 4.9 [SD: 0.29]), and scope of

practice (mean before: 4.08 [SD: 0.67], after: 5 [SD: 0]). These two survey items had the highest

percentage of participants reporting at least "moderately" confident pre-intervention and

reporting "extremely" confident post-intervention (see Figure 1 and 2).
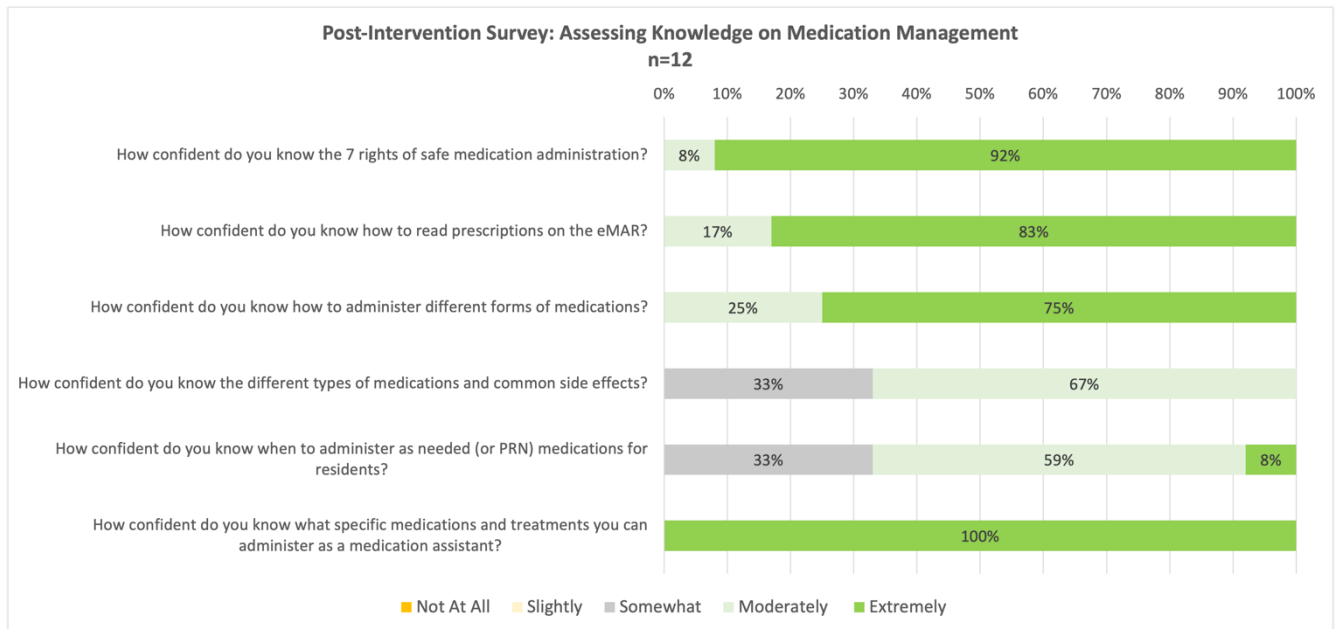
Figure 1

Pre-Intervention Survey Results: Assessing Knowledge on Medication Management
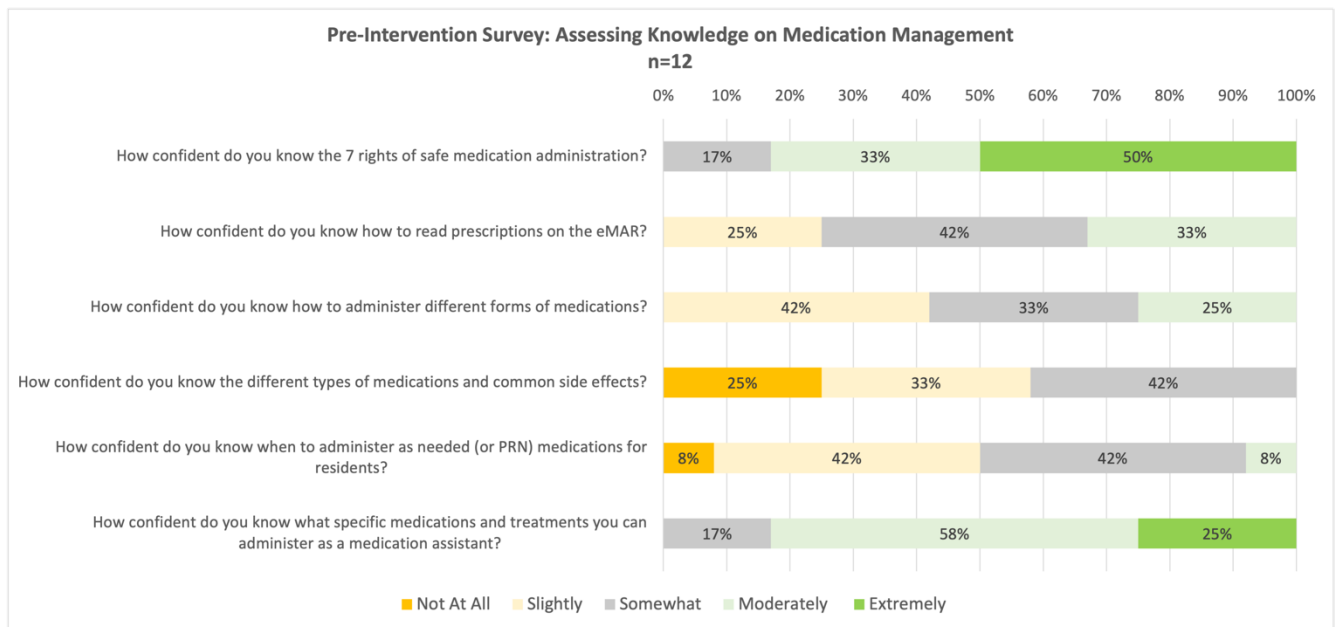
Figure 2

*Post-Intervention Survey Results: Assessing Knowledge on Medication Management*

Aim 3: To Assess Certified Nursing Assistant's Skills on Safe Administration of Medications

Observational data were collected by utilizing the Revised Safe Medication Administration Assessment Checklist (see Appendix D) when observing CNAs administer medications. 12 CNAs were observed, and each administered 3 doses of medications.

In observation, the skill domain that had the most improvement was hand hygiene, which went from 33% of participants performing hand hygiene pre-intervention to 100% of participants performing hand hygiene post-intervention. Other notable improvements included giving medications at the right time which had a 41% increase, and confirming the correct dose of medication which had a 33% increase. 100% of participants confirmed each medication was for the right patient and that each medication matched the eMAR pre- and post-intervention. Medications given at the right time was the only skill that did not have 100% of participants completing it post-intervention. Refer to Figure 3 for summary of results.

Figure 3

Pre- and Post-Intervention on Skills of Safe Medication Administration Results

SKILLS OF SAFE MEDICATION ADMINISTRATION
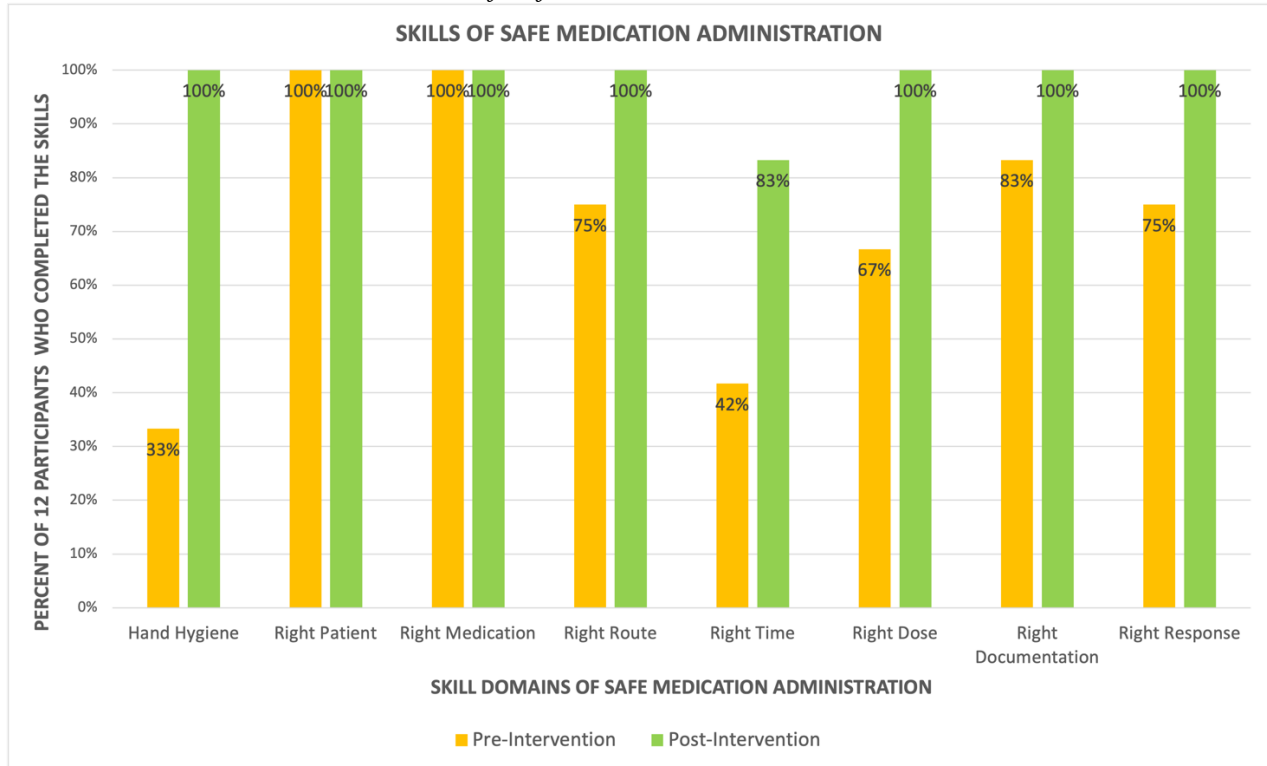
Discussion

This project identified and addressed barriers to safe medication administration through the integration of findings from semi-structured interviews into an education program. Results showed that CNAs who completed the education training had improved confidence in their knowledge of medication management and skills for safe medication administration. These results support findings in the literature that continuing education has been shown to increase confidence and competence of healthcare personnel, and that providing staff with up-to-date knowledge and skills can enhance health services (Cheong & Hsu, 2021; Trinkoff et al., 2017).

The project also provided a platform for CNAs to assess and report their confidence levels in medication management. The areas that had the most improvement was understanding how to read prescription orders and administering different forms of medications. One possible

explanation for this improvement is that these areas were extensively covered during the education presentation. The literature suggests that medication assistant trainings emphasize the importance of following directions as written on the eMAR, alongside simulation training on various medication administration techniques (Dupler et al., 2015; Trinkoff et al., 2017). However, these skills are only one component of the minimum 100 hours of training, which also includes didactic sessions. While the minimum required training may not offer sufficient practice, it provides a foundation for further improvement as seen in post-intervention survey results.

The areas that showed the least improvement were knowledge of the common side effects associated with various medications and understanding when to administer "as-needed" medications. Similarly, these were also the areas where participants reported lower levels of confidence in pre-intervention surveys. As a result, a component of the education program aimed to provide broad knowledge of pharmacology; however, given the complex nature of the subject, one session was insufficient for improving confidence drastically due to time constraints and limited opportunities for practical application during the education presentation session.

During the semi-structured interviews, participants did not identify inadequate staffing as a barrier to safe medication administration. However, during the direct observational survey, participants who were not able to administer medications at the right time according to the eMAR attributed this challenge to staff shortages. CNAs stated that each medication assistant was assigned to 20-30 residents per shift, leading to overlapping medication schedules. It was noted that some medications were administered two hours after the scheduled time indicated on the eMAR due to MAs needing to assist with activities of daily living for residents that were not attended to by other CNAs who were occupied with other residents.

Limitations of the Project

Several limitations were identified throughout the process of implementing this project. First, due to time constraints, the education program was limited to single sessions, which did not allow for practical skills demonstration to accompany the education presentation. Most participants reported in passing that having a skills lab after the education presentation would have been helpful for practice and to receive feedback on their performance. A second and related limitation of the project was that it lacked a follow-up component to assess longer-term impact of the education program.

A third limitation was that participants in this study were either currently enrolled in college or had already obtained a bachelor's degree. This may not be representative of all nursing assistants who work at other assisted living facilities, as CNAs are predominantly comprised of women, people from diverse racial and ethnic backgrounds, and those with lower levels of educational attainment (Ecker et al., 2021). Therefore, findings in this study may not be applicable to other CNAs working in other settings.

The fourth limitation is that this project had a small sample size and did not include every medication assistant working at the facility due to their varying work schedules. There may have been biases in the selection of participants through convenience sampling as majority of participants were recruited during staff meetings. A larger sample and less participant selection bias may provide a more accurate and comprehensive representation of the barriers to safe medication administration and may enhance the generalizability of the findings. The fifth limitation is that the pre- and post-intervention surveys relied on participants' self-reporting of level of confidence on knowledge of medication management, which may have introduced bias

as participants might have falsely provided desirable responses in post-intervention surveys

and/or some may not have accurately recalled their experiences.

Nursing Implications

This project will help create a more just and humane world by improving quality of care

for older adults. By addressing safety concerns, this project recognizes the needs of older adults

and is taking action to ensure that older adults receive equitable, person-centered, high-quality

care. One way to achieve this is through continuing education, which equips certified nursing

assistants with the knowledge and skills to deliver care safely to vulnerable populations. The

findings and limitations for this project highlight the need for ongoing comprehensive education

programs for CNAs working as MAs. By incorporating staff education and prioritizing safety

within nursing practice, nurses contribute to a culture of safe and effective care. Thus, nurses

have the responsibility of ensuring that CNAs receive appropriate education and guidance.

Conclusion

Addressing medication management challenges in assisted living facilities require

collaboration between nurses and certified nursing assistants. With continuing education and

training opportunities, there is potential for improvements in safe medication administration

practices. In this DNP project, an education program was developed for CNAs working as MAs,

and the results showed improvements for confidence in knowledge of medication management

and skills in safe medication administration after completing the program.

For future studies, there are several recommendations to aid in the expansion of current

research on safe medication administration in long-term care facilities. These include evaluating

the effectiveness of alternative and diverse training methods that can better meet different

learning needs of participants. Another includes incorporating a larger and more diverse sample

of CNAs to help capture a broader range of perspectives on gaps in knowledge and skills that need to be addressed to improve patient safety. Lastly, conducting follow up studies to evaluate long-term impacts of education programs can offer insight into the sustainability of knowledge and skills gained by CNAs.

Further research is needed for the development of evidence-based interventions and education programs that enhance patient safety. Currently, this education program is not yet ready for adoption in other assisted living facilities due to requiring further enhancement and evaluation. It is crucial to ensure that the program is effective, sustainable, and able to meet the unique needs of different Aegis Living locations before it can be widely implemented.

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Appendix A. Presentation Slides on Safe Medication Administration

Slide 1

EDUCATION PROGRAM ON SAFE MEDICATION ADMINISTRATION FOR NURSING ASSISTANTS

AMY TAY, BSN, RN
SEATTLE UNIVERSITY
DNP STUDENT, FNP TRACK, CLASS OF 2023

Slide 2

MEDICATION ASSISTANTS' SCOPE OF PRACTICE IN WASHINGTON STATE

Medication Routes	Yes	No
Oral	✔	
Topical	✔	
Nasal	✔	
Otic	✔	
Ophthalmic	✔	
Nebulizer	✔	
Injection		X
Rectal		X
Vaginal		X

Slide 3

ENSURING SAFE MEDICATION PREPARATION AND ADMINISTRATION

7 RIGHTS OF SAFE MEDICATION ADMINISTRATION

- Right patient
- Right medication
- Right dose
- Right time
- Right route
- Right form
- Right documentation

Slide 4

HOW TO READ PRESCRIPTIONS ON THE ELECTRONIC HEALTH RECORD

- A health care provider (MD, ARNP, PA), must write a complete and legible order for a medication before it is given.
- A complete order must have the following:
  - date of the order
  - name of the medicine
  - form
  - dose
  - route
  - time or frequency the medication should be taken
  - signature of the health care provider

Slide 5

COMMON ABBREVIATIONS

- Some prescriptions will include abbreviations. The most common abbreviations are:
  - Q.D.– every day (daily)
  - Q.O.D.– every other day
  - B.I.D.– twice daily
  - T.I.D.– three times daily
  - Q.I.D.– four times daily
  - P.R.N.– when necessary
  - P.O.– by mouth
- If the label is not clear or there is any doubt about a medication, ask or call nursing for further clarification.

Slide 6

ADMINISTERING DIFFERENT FORMS OF MEDICATIONS THROUGH APPROPRIATE ROUTES

Tablets	By mouth, orally, if crushed order present–give with pudding or apple sauce
Capsules	By mouth, orally
Liquids	By mouth, orally. Comes with medication cup, syringe, or dropper
Ointments	Topically. Okay to apply on intact skin
Creams	Topically. Okay to apply creams to intact skin
Drops	Ophthalmic or Otic
Patch	Topically. Okay to apply on clean, dry, intact skin.

Slide 7

CLASSIFICATION OF COMMON MEDICATIONS AND SIDE EFFECTS

- Analgesics: Drugs that help relieve pain (opioids, NSAIDs, acetaminophen)
  - Sedation, dizziness, constipation, abdominal discomfort, nausea/vomiting
- Antacids: Helps to reduce indigestion and heartburn (tums, milk of magnesia, pepto-bismol, Pepcid)
  - Constipation, diarrhea, abdominal discomfort/distention
- Antibiotics: Helps to control/treat infections (Keflex, Macrobid, Augmentin)
  - Decreased appetite, abdominal discomfort, diarrhea, nausea/vomiting, dizziness
- Anticoagulants: Helps to thin the blood, slowing clotting (Warfarin, Xarelto, Eliquis)
  - New bruises or bleeding
- Anticonvulsants: Control seizures (Lamotrigine, Depakote)
  - Rash, sedation, headache, malaise, abdominal pain, nausea/vomiting, depression
- Antidepressants: Helps treat depression and anxiety (Escitalopram, Sertraline, Fluoxetine, Mirtazapine, Trazodone)
  - Anxiety, agitation, insomnia, hallucinations/delusions, tremor, GI discomfort.

Slide 8

CLASSIFICATION OF COMMON MEDICATIONS AND SIDE EFFECTS CONTINUED…

- Antipsychotics: Treat the symptoms of schizophrenia, depression, bipolar disorder, and/or dementia with behavioral disturbance (olanzapine, risperidone, Seroquel)
  - Sedation, restlessness, anxiety, constipation, dry mouth
- Antihypertensives: Control blood pressure (lisinopril, metoprolol, losartan)
  - Low BP, dizziness, headache, cough, peripheral edema,
- Diuretics: To get rid of excess fluids (furosemide, hydrochlorothiazide)
  - Increase urine frequency, dizziness or headache, constipation, nausea/vomiting
- Antihyperlipidemics: to help reduce cholesterol (atorvastatin, ezetimibe)
  - Diarrhea, joint pain, pain in arm/legs, upset stomach
- Hypoglycemics: Drugs that lower glucose in the blood (metformin, glipizide, Jardiance, Tradjenta)
  - Low blood sugar, shaky, confusion, GI effects
- Laxatives: Increase the frequency and ease of bowel movements (senna, miralax)
  - Diarrhea, stomach pain/cramps, bloating

Slide 9

CLASSIFICATION OF COMMON MEDICATIONS AND SIDE EFFECTS CONTINUED…

- OTC (Over the counter)—vitamins and supplements
- Major side effects to watch for are:
  - Dizziness/fainting
  - Nausea/vomiting
  - Rash/hives/itching
  - Difficulty breathing
  - Headache
  - Drowsiness
- If there is a severe reaction to a medication (labored breathing, wheezing, increased heart rate, rash, confusion, loss of consciousness, nausea/vomiting), call for help immediately. If you are alone, call 911
- When assisting with pills and capsules, pay attention to the labels. Some pills cannot be crushed. If the word "enteric" is on the label, it can not be crushed. Enteric pills are coated to reduce stomach irritation

Slide 10

WHEN TO USE "AS NEEDED" MEDICATIONS

- A PRN (or as-needed) order is a prescription for medication to be administered when it is requested by, or as needed by, the patient.
- PRN orders are typically administered based on patient symptoms, such as pain, nausea, constipation, or itching. Refer to label and indication for each medication on EMAR and container.
  - An example of a PRN order for pain medication is "Acetaminophen 500 mg PO every 4–6 hours as needed for pain."
- When there is any uncertainty on when to use PRN medications, ask nursing for assistance.

Slide 11

EXAMPLES OF PRN MEDICATIONS

1. Acetaminophen or ibuprofen for pain relief
2. Benzodiazepines (e.g., lorazepam) for anxiety and agitation
3. Melatonin for insomnia
4. Docusate sodium for hard stool
5. Laxatives like senna and miralax for constipation
6. Antipsychotics (e.g., Seroquel) for behavior management in residents with dementia or other behavioral issues.

Slide 12

QUESTIONS?

THANK YOU!

Appendix B. Pre- and Post-Intervention Survey

Please rate on a scale of 1-5

1 = Not at all confident
2 = Slightly confident
3 = Somewhat confident
4 = Moderately confident
5 = Extremely confident

1. How confident do you know the 7 rights of safe medication administration?

    1   2   3   4   5

2. How confident do you know how to read prescriptions on the eMAR?

    1   2   3   4   5

3. How confident do you know how to administer different forms of medications?

    1   2   3   4   5

4. How confident do you know the different types of medications and common side effects?

    1   2   3   4   5

5. How confident do you know when to administer as needed (or PRN) medications for residents?
    1   2   3   4   5

6. How confident do you know what specific medications and treatments you can administer as a medication assistant?

    1   2   3   4   5

Appendix C. ASPAM tool

Chart 2 – Final version of the Patient Safety Assessment in Medication Administration (ASPAM) tool, Fortaleza, Brazil, 2016

Domain	Patient Safety Assessment in Medication Administration	Never (1)	Almost never (2)	Sometimes (3)	Almost always (4)	Always (5)
Right patient	1. Uses at least two identifiers (full name and medical record number) to confirm the patient before administering the medication.					
Right medication	2. Verifies the name of the prescription medication before administering it.					
	3. Brings to the bed only the medications prescribed to a single patient.					
	4. Administers medication by verbal order only in case of emergency.					
	5. Checks if patient is allergic to the prescribed medication.					
	6. Identifies the allergic patient in a differentiated way with a bracelet and a medical record, alerting the whole team.					
Right Route	7. Identifies the route of administration prescribed for the medication.					
	8. Checks if the prescribed route is technically recommended for administering the medication.					
	9. Washes hands before preparation and administration of medications.					
	10. Uses aseptic materials and techniques to administer medications.					
Right Time	11. Prepares the medication immediately prior to its administration.					
	12. Administers the medication at the right time.					
	13. Adjusts the administration times of the medications to the routine of use already established before the hospitalization.					
Right dose	14. Carefully checks the dose prescribed for the medication.					
	15. Checks the drip speed, programming and operation of continuous infusion pumps with the prescription.					
	16. Performs double check of calculations for preparation and for administration of potentially dangerous or high vigilance medications.					
	17. Uses standard measuring tools to prepare medications to measure doses accurately (e.g., millimeter syringes).					
	18. Returns leftover unadministered medications to the pharmacy.					
Right Record Of the Administration	19. Records the time of administration of the medication immediately after each dose.					
	20. Records all medication-related events (e.g., postponements, cancellations, shortages, patient refusals, side effects, and adverse events).					
	21. Notifies the Risk Management and/or Patient Safety Center of any incidents related to medication therapy.					

Domain	Patient Safety Assessment in Medication Administration	Never (1)	Almost never (2)	Sometimes (3)	Almost always (4)	Always (5)
Right Record Of the Administration	22. Keeps adequate records of prepared medications to be stored (date and time of the manipulation, concentration of the medication, name of the person responsible for the preparation and validity).					
	23. Keeps adequate records of prepared medications to be stored (date and time of the manipulation, concentration of the medication, name of the person responsible for the preparation and validity).					
Right Guidance	24. Clarifies doubts about prescribing before the prescriber before administering the medication (ex: Ineligibility of prescription, indication of the medication, dosage, "if necessary", "at medical discretion", unit of measures used, pharmaceutical form, route of administration and dose).					
	25. Guides the patient and the companion about the name of the medication administered, aspect (color and shape), justification of the indication, frequency with which it will be administered and expected effects.					
Right way	26. Checks if the medication to be administered is in a pharmaceutical form (e.g., Ampoule, vial, tablet) compatible with the prescribed route of administration.					
Right answer	27. Evaluates the patient to identify, if possible, whether the medication has the desired effect.					
	28. Informs the prescriber of all effects other than expected (in intensity and shape) for the medication.					

DISCUSSION

The results of the analysis of the items by the judges' committee indicate that the tool is representative of the relevance of the content; however, it needed reformulation as to the simplicity and clarity of the items that compose it. Therefore, in order to make the items considered unclear and of little simple language adequate, a good part of the judges' suggestions were accepted, including some items that had reached adequate levels of agreement were restructured, seeking a better understanding of the same, as already observed in the literature[9,18].

In response to the request of the judges, examples of identifiers were added in the description of item 1 because they believed that the term "identifiers" might not be clear to all professionals.

Patient identifiers aim to standardize the identification approaches among the different units and institutions within a health system[1]. The most well-known indicators among health professionals are "full name of the patient" and "record number" (medical record)[19], which were added as examples to item 1. For similar reasons, examples were also added of forms presentation to item 22.

It was also agreed to subtract from paragraph 3 the sentence "not using a tray containing several medications for different

Appendix D. Revised Safe Medication Administration Assessment Checklist

Number	Variable	Response	Frequency (*n = __*)	Percentage (100%)
1	Wash hands before administering medication	**YES:** **NO:**		
2	Right patient: Give medication to the right patient	**YES:** **NO:**		
3	Right medication: Verifies name of medication, brings the exact medications prescribed to a single patient	**YES:** **NO:**		
4	Right route: Identifies route of medication	**YES:** **NO:**		
5	Right time: Prepares the medication immediately prior to its administration, administers medication at the right time as listed on eMAR	**YES:** **NO:**		
6	Right dose: Carefully checks the dose prescribed for the medication and compare with the eMAR	**YES:** **NO:**		
7	Right documentation: Records the time medication was administered immediately after each dose and records if medication was administered	**YES:** **NO:**		
8	Right response: Checks if medication has the desired effect, informs nurse of all unusual effects	**YES:** **NO:**		

Appendix E. Timeline of DNP Project

Activities	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	June 2023
DNP project proposal presentation and submit application to IRB	▨	▨						
Reach out to participants, complete semi-structured interviews, develop an educational training program on safe medication administration			▨	▨				
Send out pre-surveys assessing knowledge, complete observational pre-surveys for skills assessment. Implement the education program				▨	▨	▨		
Send out post-surveys assessing knowledge and complete observational post-surveys for skills assessment. Data analysis and evaluation					▨	▨	▨	
Write paper and create PPT presentation							▨	▨
Present findings to health services director and general manager								▨
Presentation and Submission								▨

Appendix F: Informed Consent Statement

CONSENT TO PARTICIPATE IN RESEARCH

TITLE: Education Program for Safe Medication Administration for Nursing Assistants

INVESTIGATOR: Amy Tat, College of Nursing--Seattle University, phone: 206-631-238

ADVISOR: Mo-Kyung Sin, College of Nursing--Seattle University, phone: 206-296-5667

PURPOSE:	You are being asked to participate in a research project that seeks to investigate the use of continued education training to help improve safe medication administration for certified nursing assistants. You will be asked to complete an interview as part of this research, and the interview will take approximately 10 minutes to complete.
SOURCE OF SUPPORT:	This study is being performed as partial fulfillment of the requirements for the doctoral degree in nursing practice at Seattle University.
RISKS:	There are no known risks associated with this study. However, participants may feel uncomfortable sharing personal gaps in knowledge and skills, and/or sharing what the organization can improve on. As a reminder, there will be no identifiable participant information and interviews will be conducted in a private room.
BENEFITS:	The benefits of this project will be to improve the knowledge and skills of certified nursing assistants to help improve safety in medication administration. This project hopes to improve safe medication administration and reduce risk for medication administration errors.
INCENTIVES:	You will receive no gifts/incentives for this study. Participation in the project will require no monetary cost to you.
CONFIDENTIALITY:	Name and demographic information will not be collected. All research materials and consent forms will be stored in a locked cabinet and the primary investigator will be the only person who has access to consent forms. Human subjects research regulations require that data be kept for a <u>minimum</u> of three (3) years. When the research study ends, any identifying information will be removed from the data, or it will be destroyed. All of the information you provide will be kept confidential.
RIGHT TO WITHDRAW:	Your participation in this study is *voluntary*. You may withdraw your consent to participate at any time without penalty. Your withdrawal will not influence any other services to which you may be otherwise entitled.

SEATTLE UNIVERSITY, 901 12th Ave, P.O. Box 222000 Seattle, WA 98122

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SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request. You can contact Amy at telephone 206-631-0238 or at atat@seattleu.edu. Summary of results will be available to participants starting May 2023 to August 2023.

VOLUNTARY CONSENT: I have read the above statements and understand what is being asked of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason, without penalty. On these terms, I certify that I am willing to participate in this research project.

I understand that should I have any concerns about my participation in this study, I may call Amy Tat, who is asking me to participate, at (206) 631-0238. If I have any concerns that my rights are being violated, I may contact Dr. Michael Spinetta, Chair of the Seattle University Institutional Review Board at (206) 296-2585.

Participant's Signature   Date

Investigator's Signature   Date

IRB Updated July 2020

Appendix G: Critical Values of the Wilcoxon Signed Ranks Test

Critical Values of the Wilcoxon Signed Ranks Test

n	Two-Tailed Test		One-Tailed Test	
	$\alpha = .05$	$\alpha = .01$	$\alpha = .05$	$\alpha = .01$
5	--	--	0	--
6	0	--	2	--
7	2	--	3	0
8	3	0	5	1
9	5	1	8	3
10	8	3	10	5
11	10	5	13	7
12	13	7	17	9
13	17	9	21	12
14	21	12	25	15
15	25	15	30	19
16	29	19	35	23
17	34	23	41	27
18	40	27	47	32
19	46	32	53	37
20	52	37	60	43
21	58	42	67	49
22	65	48	75	55
23	73	54	83	62
24	81	61	91	69
25	89	68	100	76
26	98	75	110	84
27	107	83	119	92
28	116	91	130	101
29	126	100	140	110
30	137	109	151	120