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Improving Medication Safety in Elderly Care Homes: Utilizing Tablet Identification Tool in Dispensing Medicines - A Quality Improvement Proposal

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<p><i>Purpose and Aims:</i> This quality improvement project aims to improve medication safety in Kustaankartano Seniorikeskus by utilizing a medication tool that can help nurses and practical nurses in accurately identifying the medicines dispensed through an Automated Dose Dispensing Service or Multi Dose Drug Dispensing System.</p> <p><i>Methods:</i> This project will use an evaluation questionnaire that will be distributed after the initial period to check its effectiveness and the perception of the staff about the portfolio. A pareto analysis chart will be used to monitor the results in a six-month period.</p> <p><i>Results:</i> The result of the study will be analyzed in January 2024 after the implementation or initial period (June 2023 – December 2023) through proper evaluation of medication errors record in HAIPRO System. The result will then be compared from the baseline period (December 2022- May 2023).</p> <p><i>Conclusion:</i> Utilization of the portfolio and proper training of its use by the staff can improve the medication safety in Kustaankartano Seniorikeskus. A beneficial quality improvement project that can not only save patient's lives but indeed can enhance the standard of care of the nurses and practical nurses by guiding them in accurately identifying the medication prior to dispensing from an automated dispensing system or multi-dose drug dispensing preparation.</p>	
Key Words	healthcare staff, nurses, practical nurse, multidose drug dispensing, medication safety improvement

Tekijä	Etunimi Sukunimi
Otsikko	työn otsikko
Sivumäärä	xx sivua + x liitettä
Aika	pv.kk.vvvv
Tutkinto	tutkinnon nimi
Tutkinto-ohjelma	tutkinto-ohjelman nimi
Ammatillinen pääaine	ammattillisen pääaineen nimi (rivi poistetaan mikäli pääainetta ei ole)
Ohjaajat	tehtävänimike Etunimi Sukunimi tehtävänimike Etunimi Sukunimi
Avainsanat	

Table of Contents

1	Problem Statement and Background	5
	1.1 Problem Statement	5
	1.2 Background	6
2	Review of the Literature	7
	2.1 Search Strategy	7
	2.2 Summary of Outcomes of the Selected Studies	12
3	Aim and Objectives	18
4	Measurement, Design, and Strategy	18
	4.1 Measurement	18
	4.2 Design and Strategy	19
	4.3 Potential Barriers	22
	4.4 Proposed Timeline	23
	4.5 Analysis of Data	23
	4.6 Ethical Considerations	24
5	Reflections and Conclusions	24
	References	26

Chapter 1: Problem Statement and Background

1.1 Problem Statement

Working in an elderly care home is very meaningful, yet a challenging place to work in. When aiming to provide quality of care to elderly clients, nurses and practical nurses consider giving care holistically including proper medication management. Nonetheless, the number of errors in medication management in nursing homes is increasing, which may lead to harm (Bengtsson et al., 2021). One major problem that has been recognized in many elderly care homes worldwide is the identification of medication. This problem leads to wrong dispensing of medication, improper documentation and worsening of the condition of the patients. The Misuse of medication is a top priority issue with an effect that may result in adverse drug events (Cardarelli et al., 2011). It has been practiced in the elderly care homes that multiple medications are prepared in one packet according to their timing. This system is commonly known as automated dose dispensing or multi-dose dispensing. Although the use of Automated Dose Dispensing service may improve medication safety by reducing errors in documentation and decreasing medication use, there is still growing evidence that this currently used service does not prevent medication-related risk and problems in elderly home care (Bobrova et al., 2019). Moreover, it is probable for staff nurses and practical nurses to carry out mistakes with medication identification using this service because of the combination of different pills in one packet without a specific description.

This method of preparation can cause confusion for the healthcare staff, especially for the new ones, since there is no specific label for the certain medications that are in the sachets. Additionally, this can also be a problem when elderly people sometimes refuse to take their medications, and even throw out tablets if they are not in the right state of mind due to dementia, which is a common situation in elderly care homes. It is difficult to document which tablet was missing on a specific dose.

This is an incredibly significant area to improve to be able to provide efficient quality of care to elderly clients and will help avoid making mistakes and occurrence of medication errors to the elderly care homes by providing proper medication identification and improving medication safety. In this way, the goal of the health care team on health promotion and avoiding the recurrence of diseases of the elderly, especially dementia will be sustained, and this will support the nurses and practical nurses working in the field to be more confident and efficient in their work.

1.2 Background

Safety in Medication Administration is one of the most vital processes that has been strictly followed in all elderly care homes over time. That is why it is very necessary to follow regulations on safe medication practices. Nonetheless, errors in medication administration are inevitable and cases of this incidence are still happening up to present. The most common mistakes in medication management were recognized because of human shortcomings such as lack of knowledge and lack of understanding of the difficulties involved in handling the drugs (Bengtsson et al., 2021.) Improper identification of medication leads to inadequate knowledge, leading to errors in medication administration. Furthermore, there have been several studies that were conducted in determining ways to prevent medication errors and integrating medication risk management interventions. In Sweden, an interview study was done to explore concepts of errors related to medication management in nursing homes (Bengtsson et al. 2021).

In Finland, a review was conducted to evaluate the initiation phase on the use of multi-dose dispensing processes through a potentially inappropriate medication list (PIM) to determine its significance on reducing errors in medication to elderly people and to maintain proper medication management (Bobrova et al. 2019. Older adults using multi-dose dispensing are exposed to risk of potentially inappropriate medication). These studies were done to work out on these underlying issues related to medication errors and the safe use of medication which includes identifying ways in medication identification. This implementation of medication risk management interventions in regular home practice leads to effective practice of safe medication management and guides health care staff to dispense medication accurately. Medication risk management aspects should be emphasized more in the future automated dose dispensing service attainment processes and contracts. It is necessary to have continuing guidelines on the use of multi-dose dispensing to prevent risk of medication safety and provide proper medication identification and dispensing.

Various kinds of interventions and solutions on proper identification of medication to ensure safe and accurate administration have been developed and utilized regardless of the ways it was introduced, may it be through innovative processes, through proper communication or through proper education. Nevertheless, it summarizes down to the same goal which is to provide proper medication management and maintain safety medication practices. In elderly care homes with dementia, it is even more necessary to be accurate with the medications to be administered to avoid worsening of the symptoms and be more focused on improving and promoting health to the

elderly. The process of automated dose dispensing in elderly care homes is convenient for the nurses and practical nurses because it saves time in preparing medications, on the other hand, it lacks the foundation of more accurate medication identification since pills are put together in one sachet, which leads to, in some ways, discrepancies in administering and documenting the correct medications. Accordingly, the aim of this project is to enhance medication safety in elderly care homes by creating more user-friendly and appropriate identification tool for tablet identification.

2 Review of the Literature

The review was conducted to describe the current use of Multidose Drug Dispensing system and how these affects medication safety in elderly care homes. This literature review also seeks to identify existing tools or methods used in tablet identification and its future development.

In general, it aims to provide knowledge that can be used as background in this quality improvement project. Thus, the following review questions were formulated.

1. What is Multidose Drug Dispensing system and how this affects medication safety in elderly care homes?
2. What are the existing tablet identification tools or methods that can be adapted or utilized in elderly care homes?
3. How can tablet identification tools improve medication safety in elderly care homes?

2.1 Search Strategy

PEO analysis was used to search for articles in a more advanced manner wherein P stands for Population. Our population is the healthcare staff in elderly care homes who are responsible for giving medications. E is for Evaluation which is the Multi-dose Drug Dispensing System, and O is for Outcome or the medication safety improvement.

Moreover, key terms used which are shown in our Facet Analysis table below were being maximized and separated by Boolean operators for better searched articles.

Table 1 Facet Analysis

Population		Evaluation		Outcome
Healthcare Staff	AND	Multidose Drug Dispensing	AND	Medication Safety Improvement
OR		OR		OR
Health Personnel		Automated Dose Dispensing		Safety Enhancement
OR		OR		OR
Medical Staff		Dose Administration Aid		Advancement
OR		OR		
Medical Professionals		Drug Packaging		
OR				
Healthcare Staff				
OR				
Nurses				
OR				
Licensed Practical Nurses				

Database searches from CINAHL, PubMed, Medline and ProQuest were performed to gather relevant studies related to the topic. These articles were known to be the best sources of medical or health related articles. Furthermore, few articles from Google Scholar were considered and included as these provide relevant background information too regarding medication safety issues utilizing the multidose drug dispensing service in European Countries, especially in Finland.

Table 2 Database Searches

Database/ Date/ Limits	Search Phrase	Total number of hits/ citations	Papers/records included based on title*	Papers/records based on abstract*	Papers/ records included based on full text*
CINAHL / 19th November 2022 Limits: Abstract Available: Published Date: 2012-2022	“Multidose Drug Dispensing” OR Automated Medication Dispensing System AND Medication Safety in Elderly Care Home Nurses	13	1	10	4
PubMed /21st November 2022 Published Date: 2012 - 2022	“Multidose Drug Dispensing” OR Automated Medication Dispensing System AND Nurses Elderly Care Home	5	3	5	3
Medline / 13 th November 2022 Published Date:	Multi-dose Drug Dispensing OR Automated Medication Dispensing System AND Elderly Care	6	1	6	1

2012-2022	Home OR Nursing Home OR Home for the Aged				
ProQuest / 22nd November 2022 Limits: Peer Reviewed Published Date: Last 5 years	Multidose Drug Dispensing in Elderly Care Home	13	1	-	9
Records in Total		37	6	11	17
Records after duplicates removed	17				
Total Number of Included Studies	5				

To continue, some limitations were considered during the database search. Articles that were published within 2012-2022, peer-reviewed articles, the availability of abstract and free full text were carefully selected.

Furthermore, inclusion and exclusion criteria in the table below were used to screen articles and to narrow our scope. This enabled us to select only the studies that were significant to improving

medication safety in the elderly care homes, specifically those using multidose drug dispensing service.

Table 3 Inclusion and Exclusion Criteria

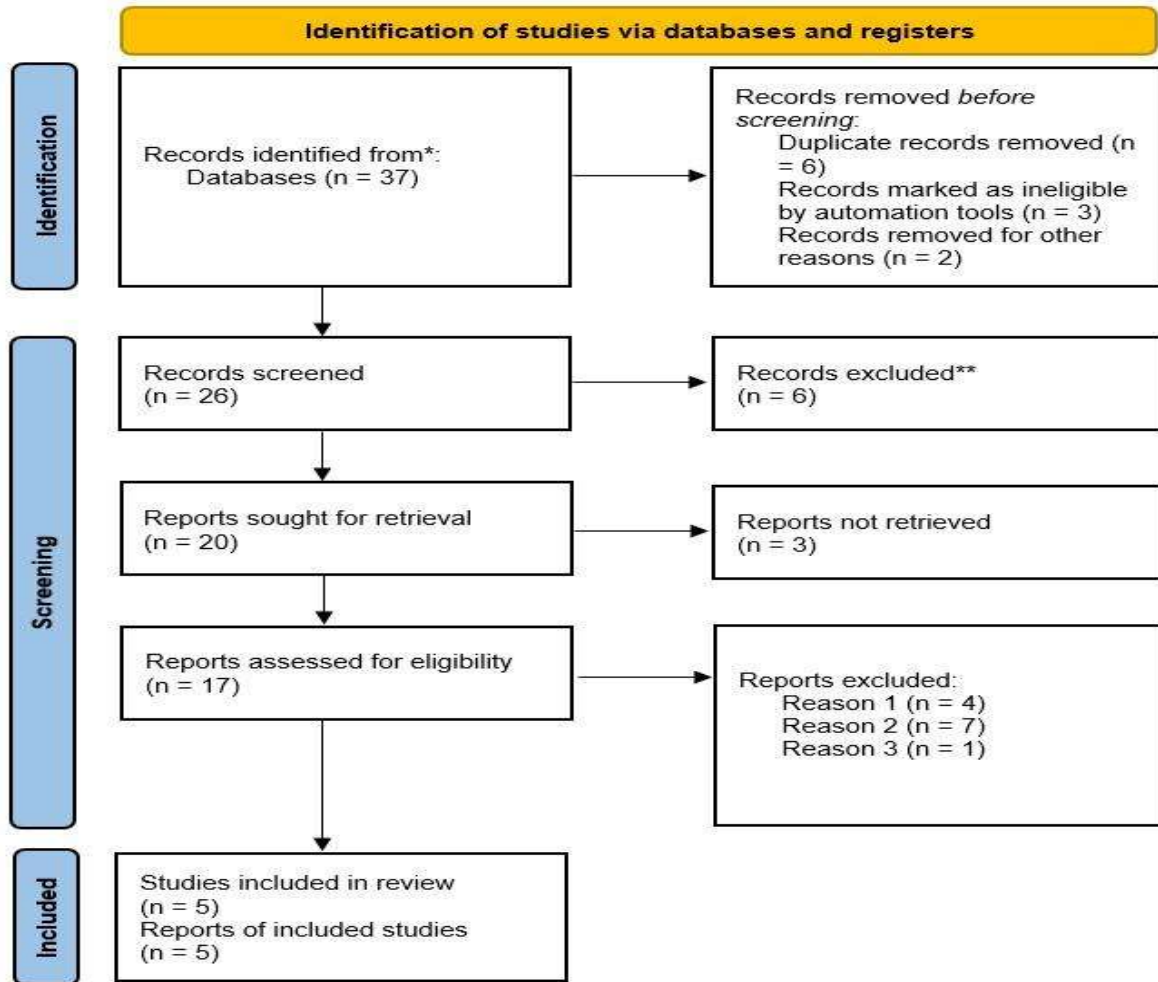
Inclusion	Exclusion	Rationale
Studies that focus on medication identification in elderly care homes.	Studies that focus on hospital and community settings.	The study aims to tackle improving medication safety in elderly care homes through utilizing medication identification tools.
Studies that focus on pill/tablet/capsule identification contained in a packet of medicine dispensed through Multidose Drug Dispensing.	Studies that focus on intravenous and oral liquid medications.	The study aims to identify better solutions or interventions in identifying multiple tablets in a single packet/package.
Studies conducted in European Countries.	Studies conducted outside Europe.	The study aims to identify which European countries are utilizing Multidose Drug Dispensing.
Qualitative and Quantitative Studies Conducted in Elderly Care Homes	Studies Conducted in the hospital.	The study aims to collect relevant articles that focus on elderly care homes.

In addition to this, a Prisma diagram below was also used in mapping out the number of records identified. 5 studies were selected to explore different interventions and solutions to improve medication identification in Automated Dose Dispensing packs.

The following articles are selected: “Errors linked to medication management in Nursing Homes: An Interview Study.” by Bengtsson et al., 2021 (Sweden); “Fast and Accurate Medication Identification” by Delgado et al. 2019 (USA); “Improving Accuracy of medication identification in an older population using a medication bottle color symbol label system” by Cardarelli et al., 2011 (USA); “Older adults using multi-dose dispensing are exposed to risks of potentially inappropriate

medications.” by Bobrova et al., 2019 (Finland); “Potentially Inappropriate Prescribing to Older Patients Receiving Multidose Drug Dispensing.” by Josendal et al., 2021 (Norway).

Prisma Diagram



2.2 Summary of Outcomes of the Selected Studies

Most of the patients from elderly care homes in Sweden, Finland and Norway are the ultimate users of Multidose Drug Dispensing systems (MDD). (Bardage et al., 2014; Josendal et al., 2020; Sinnemäki et al., 2014). Though MDD system improved patient safety, however, most healthcare

personnel perceived concerns about imprecise practices and responsibilities which should be considered. Patients got medicines as prescribed, fewer errors and enhanced medication management were noticed by healthcare staff as the benefits of MDD (Bardage et al., 2014; Herborg et al., 2008; Johnsen et al., 2018; Josendal & Bergmo, 2021; Nilsen & Sagmo, 2012; Wekre et al., 2012; Wekre et al., 2011). Furthermore, General Practitioners as well as nurses have a positive overview of patients' medication utilizing the MDD system and this is plainly stated in several studies. (Bardage et al., 2014; Bell et al., 2015; Bergmo et al., 2019; Frøyland, 2012; Wekre et al., 2012). Some nurses, however, were concerned that reducing manual dispensing would reduce their knowledge of drugs (Nilsen & Sagmo, 2012; Wekre et al., 2011), and others believed that the prescribing procedure was so complicated that it could jeopardize patient safety. (Bardage et al., 2014).

According to findings from a different study, medication identification errors are caused by similarity in appearance to other drugs. (Cardarelli et al. 2011). Three studies also noted that MDD was less adaptable to adjustments in medication or dosage. (Frøyland, 2012; Herborg et al., 2008; Wekre et al., 2011).

According to nurses and nursing assistants, MDD required less time than regular prescribing (Heier et al., 2007a), and the system did not restrict their contact time with patients (Bardage et al., 2014). As per research by Josendal and Bergmo (2021), the computerized prescribing system increased the workload for community pharmacists and home care nurses compared to the paper-based method since more clarifications were required. Similar outcomes are also discovered for the medical staff that give MDD to patients. Many were worried that the MDD system would make them less knowledgeable about medications. (Nilsen & Sagmo, 2012; Wekre et al., 2011).

The similarity in size or color of many medications, as well as manufacturer modifications, is a barrier to pharmaceutical recognition. In general, it was discovered in this study that the colors and symbols used in the suggested labeling scheme were straightforward, understandable, and pertinent. They observed that colors, such black for sleep aids or blue for respiratory treatments, were notably effective and that symbols were appropriate for both English speakers and non-English speakers (Cardarelli et al. 2011). Utilizing a prescription bottle color symbol label system to increase the identification accuracy of medications in an elderly population (BMC Fam Pract 12, 142).

The table below shows the summary of the outcomes of these selected studies.

Table 4 Review of Related Literature

Author(s), Year, Country	Title/topic PURPOSE	Methodology and Methods	Participants	Main outcomes
1. Cardarelli et al. 2011, USA	<p>“Improving Accuracy of medication identification in an older population using a medication bottle color symbol label system”</p> <p>To determine whether an adjuvant system of color-specific symbols added to prescription bottles would improve elderly's capacity to match their medication to the indication for which it was prescribed, this pilot study evaluated and improved the system.</p>	<p>Qualitative Study</p> <p>Triangulation Method</p>	<p>125 Participants</p> <ul style="list-style-type: none"> • First participants = 25 patients • Second participants = 100 patients 	<p>The findings of pilot research point to a hopeful advancement in attempts to combat prescription abuse in the home by improving medication labeling. The usefulness of the TCOM labeling system in practical contexts requires further investigation.</p>

<p>2. Delgado et al. 2019, USA</p>	<p>“Fast and Accurate Medication Identification”</p> <p>The increase of medication error in the health care setting is one of the leading causes of death. It is vital to provide the right treatment plan including identifying pills correctly. Different AI methods were utilized and compared to properly solve the problem of medication error and allow care teams to focus more on the patient and increase productivity and decrease the risk of error.</p>	<p>Quantitative Study</p> <p>Experimental Method</p>	<p>165 Participants</p> <ul style="list-style-type: none"> • Pharmacists • health care staff • patients 	<p>The following experiment done with the different innovative methods provides a realistic and fair evaluation. The survey shows that the existing CNN technology used for pill identification displays that recent advances in AI makes it easier to automate the task involving pharmacies, patients, first responders, and care providers.</p>
<p>3. Bobrova et al. 2019, Europe (Finland)</p>	<p>“Older adults using multi-dose dispensing are exposed to risks of potentially inappropriate medications.”</p> <p>To analyze if the medication use of the new MDD patients is appropriate in terms of drug-related concerns and to evaluate the initiation phase of the MDD service to older individuals 65 years.</p>	<p>Quantitative Study</p> <p>Retrospective Registry-based method</p>	<p>208 participants</p> <ul style="list-style-type: none"> • Patients aged 65-108 years 	<p>The findings imply that to prevent potential DRPs, the MDD service should be combined with a frequent medication review targeted to certain patient groups (e.g., older patients).</p>

<p>4. Josendal et al. 2020, Norway</p>	<p>“Potentially Inappropriate Prescribing to Older Patients Receiving Multidose Drug Dispensing.”</p> <p>To investigate potentially improper drugs, various approaches might be employed (PIMs). The Norwegian General Practice (NORGE) guidelines rate the effectiveness of general practitioners' prescriptions for older people [10]. Approximately one-third of the senior Norwegian population is exposed to PIMs based on these parameters [11]. However, patients utilizing regular dispensing are less likely to be exposed to PIMs than MDD users [12,13,14]. In 2009, not long after Norway's MDD system was put in place, a Norwegian study looked at the effectiveness of prescribing to patients receiving it and discovered a prevalence of PIMs of 26%</p>	<p>Quantitative Study</p> <p>A cross-sectional study using Norwegian General Practice Criteria</p>	<p>45, 593 participants</p> <ul style="list-style-type: none"> • Patients aged > 70 years old utilizing the MDD service 	<p>Since over half of the patients were exposed to DDIs and over one-fourth were exposed to PIMs, this study implies that potentially improper prescribing is frequent among older patients receiving MDD in Norway. Prior research, however, indicates that PIMs and DDIs are also frequent in patients not receiving MDD. The researchers observe the same difference in prescribing quality between patients with MDD and patients receiving standard care as has been demonstrated in Sweden when comparing our findings to earlier research conducted in Norway. The overall drug intake of MDD patients is higher than that of the general population, with roughly one-third receiving ten or more prescriptions regularly. Additionally, patients with MDD receive co-prescriptions for opioid and psychotropic medications more frequently.</p>
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	[2]. However, a partial list of medications was used for this investigation.			
5. Bengtsson et al. 2021, Sweden	<p>“Errors linked to medication management in Nursing Homes: An Interview Study.”</p> <p>The review focuses on exploring different perceptions of errors related to medication management in nursing homes by exploring perspectives from first-line registered nurses, registered nurses, and practical nurses</p>	<p>Qualitative</p> <p>Semi-structured interviews</p> <p>Deductive content analysis</p>	<p>21 participants</p> <ul style="list-style-type: none"> • First-line registered nurses • Registered nurses • Non-licensed staff 	<p>The participants involved in the study perceived that the factors related to errors in medication management are caused by human limitations or technical deficiencies. Working conditions can also facilitate the occurrence of malpractice. To minimize the occurrence of errors, the management should consider a systemwide perspective on safety issues. All the informants emphasized the need for a more thorough delegation training program that equips delegated NS with the necessary information to manage drug administration correctly and safely.</p>

Chapter 3: Aim and Objectives

The aim of this project work is to improve medication safety in Kustaankartano Seniorikeskus, specifically by reducing chances of errors in using Automated Dose Dispensing Service (ADD) or Multidose Drug Dispensing (MDD) System. This will be achieved by creating a portfolio of medications that can be used as a tool for accurate identification of medicines. The portfolio will be used in the elderly care unit by healthcare staff, especially nurses and practical nurses and with that the effects of the use of a new tool will be measured through data retrieved from HAIPRO incident reporting system. The main objective of this project is to reduce the number of errors and incidents within six months post-initiating the use of tablet identification tool.

Chapter 4: Measurement, Design and Strategy

4.1 Measurement

This project is proposed to start in June 2023 after several considerations and precisely identifying the opportunity for improvement based on the extensive review of literature.

To start with, baseline data will be established by monitoring the medication errors recorded in HAIPRO for the last 6 months which will cover the month of December 2022 to May 2023. From this data, we will then extract the number of medication errors that are linked or caused by pill misidentification contained in Multidose Drug Dispensing System monthly and will be analyzed using statistical information (Pareto Analysis) between the period of June 2023 to December 2023.

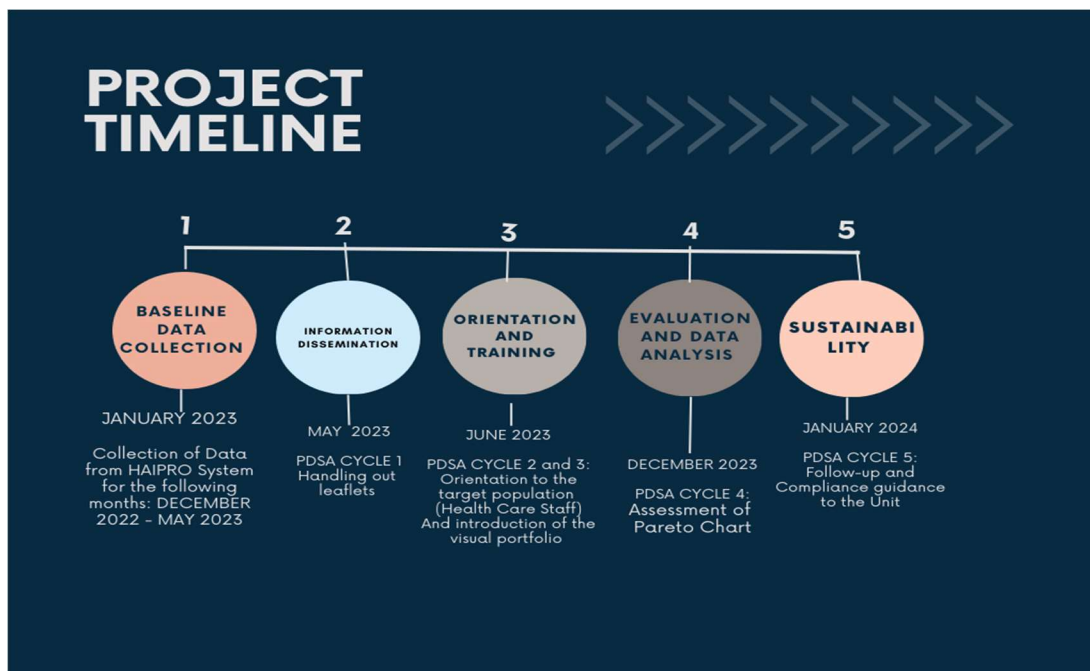
A Pareto Analysis is a simple technique that helps to focus efforts on the problems that have the greatest prospects for improvement by showing their relative prevalence or size in a descending bar graph. This analysis will be used to collect data for improvement.

The initial data that will be collected will be observed every month from June 2023 to December 2023 through the Pareto Analysis (Bar Graph) and compare the percentage of the incidence during those periods. This is to get concrete information on the comparability of the incidence whether the medication error increased or decreased each month after utilizing the portfolio. These data comparisons will then be compared from the data that will also be collected in the

same HAIPRO system after implementing the strategy with the following interventions: innovative ways (providing visionary images of the different medications commonly used in the

area) and implementing proper education and proper communication among Healthcare Staff. The data that will be collected after carrying out the interventions in comparison to the previous data which will be from December 2022 to May 2023, will then be the basis of an improved medication safety by reduced numbers of medication errors in one area of the Elderly Care Home from June 2023 to December 2023. This data collected will then be analyzed using the same Pareto Analysis if the medication error incidence decreased from the baseline data gathered from the previous year.

Project Timeline






4.2 Design and Strategy

This quality improvement project is designed and to be implemented in close collaboration with healthcare team members in an elderly care unit. A team who will supervise the project throughout is to be formed and participated in by the unit manager, head nurse, nurses, and practical nurses.

One principal intervention to be done is using the Plan, Do, Study, Act strategy as a guide in implementing the proposed portfolio through a step-by-step process utilizing the criteria for each step.

Below is a sample of visual portfolio to ease medication identification.

Drug Identification Portfolio 2023

NAME	DETAILS	IMAGE
Amlodipine Besylate (Norvasc)	Strength : 10mg Color : White Shape : Round	
Zolpidem (Ambien)	Strength: 10mg Color : White Shape : Oblong	
Bisoprolol (Zebeta)	Strength : 5mg Color : Pink Shape : Heart-shaped	

Disclaimer: "Sample Proposed Tool only."

In the planning phase, first we will identify the opportunity for improvement in one of the areas in an elderly care home. We will also include the resources needed as our guide for baseline data and other data needed for analysis. The next step during this phase is to identify the team members who will be involved in this quality improvement project. We will gather all the team members and conduct an orientation to explain how to properly utilize the proposed portfolio. In addition, training will be provided afterwards. The next step is to discuss with the team members and coordinate with them in getting the baseline data from HAIPRO regarding medication errors done due to inappropriate identification of medication. We will explain to them thoroughly the timeline for the whole process from gathering of baseline data, utilizing the portfolio, follow-up sessions and evaluations until data analysis. The final step on this phase is to explain the potential change strategies based on the problem identified. In this step we, together

with the team, will be able to assess an improvement or positive change in the record of the number of medication errors recorded while using the portfolio. In the second phase of the cycle, we will assess the utilization of the portfolio based on effectiveness from the health care staff's point of view by using a questionnaire to check how effective it is and how beneficial it is for staff in their work. We will also get comments and suggestions to better improve the tool. During the final phase, which is the study and act phase, we will assess the effectiveness of the portfolio by gathering data from HAIPRO and check if there are fewer medication errors and compare the data monthly using Pareto Analysis. This will be followed by a review of the successful change strategies through acknowledging the achieved goal.

Preparatory Phase

PDSA Cycle 1: A problem in the certain area in one of the elderly care homes specifically Kustaankartano Seniorkeskus is the inaccurate identification of medication tablets that were prepared through Multi-Dose Drug dispensing. A visual portfolio showing the common medications used in elderly care homes with the characteristics and description of their color, shape and size will be proposed to help identify medication tablets accurately and reduce incidence of medication error. To formally introduce the portfolio, a leaflet will be handed out to the team involved throughout this project as an invitation for an orientation. In the leaflet, brief information about the portfolio and the information of the upcoming orientation will be included.

PDSA Cycle 2: A one-hour orientation will be participated in by the Unit Manager, Head Nurse, Nurses, and Practical Nurses wherein the strategy will also be discussed. A thorough explanation of the risk of medication errors in relation to inaccurate pill identification will also be delivered. The medication tablets that will be included in the printed visionary portfolio will also be discussed. After the orientation, the participants will be asked to recap what has transpired in the orientation and a question-and-answer portion will also be done to make sure that all the information disseminated was fully understood. Participants will also be encouraged to share their own thoughts and ideas on how to adapt this to fit their care facility.

Intervention Phase

PDSA Cycle 3: A colored picture with specific name of the most used medication will be compiled in one portfolio and will be placed in the elderly care unit. This portfolio will serve as a guide for all the healthcare staff, especially in scenarios where individual pill identification is necessary. Participants will be encouraged to be honest and put a mark on the supplementary checklist provided whenever they will use the portfolio, what medication they have identified, and the reasons for pill identification.

Sustainability Phase

PDSA cycle 4: The visual portfolio will be designed, tested, and revised according to the needs and feedback of the healthcare staff. They will document most medications that need to be identified, the top reasons, and how this can help improve medication identification. This visual portfolio will be adjusted and placed in the unit as a simple solution in lieu or in addition to future online and AI developments in medication identification.

PDSA cycle 5: In addition to medication virtual portfolio, a Good Practice Guide on risk minimization and prevention of medication errors will be written and adapted as per European Medicines Agency's Pharmacovigilance Risk Assessment Committee (PRAC). A bi-annual regular review on general principles of effective communication on medication information will also be encouraged in all healthcare staff in the nursing home unit. Risk minimization measures and tools/forms will also be developed.

4.3 Potential Barriers

Analyzing and evaluating carefully the potential barriers is something we also need to consider in proposing this project. First to mention is the time and effort of the staff involved in complying to utilize the proposed portfolio. Second, the participation of healthcare staff during orientation and training due to the work schedule. Third, the possibility of denial to request in accessing the HAIPRO data by the head of the unit and the administration. Lastly, the possibility that not all medications used in the elderly care homes will be available to the visual portfolio due to multiple dosages availability and the manufacturer's production.

4.4 Proposed Timeline

Our portfolio utilization will initially take place in June 2023 and the measurement of the effectiveness of this project will happen in six months' time. The baseline data collection will cover from the month of December 2022 and will end in May 2023. The collection of this baseline data will start on January 2023. Initial data collection will cover from the month of June 2023 where we will first implement the portfolio usage and it will end in December of the same year. Within six months duration, we will surely be able to evaluate and analyze the data of the effectiveness of our proposed project or measure the changes in the number of medication error incidence brought by misidentification of the drug in an automated drug dispensing. By January 2024 we will differentiate the record of initial data from baseline data and starting from this month sustainability period will take place. From then, future follow-ups with our project will happen every 6 months with the help of the unit manager.

4.5 Analysis of the data

To be able to determine the effectiveness of the portfolio and to describe the health care staff's point of view while utilizing the said portfolio, we will hand out questionnaires so we can analyze the satisfaction of the health care staff and the effectiveness of the said portfolio. The first assessment to be done will be after the first week of utilizing the portfolio. All the healthcare staff who used the portfolio in a certain area of the elderly care home will be handed a questionnaire through which they will answer each question with a score of 3 as "very helpful", 2 as "slightly helpful" and 1 as "not helpful". The answers will then be tallied and the most score will be the final assessment for data analysis. This evaluation will again be done during the sustainability phase. The same questionnaire will be handed out and healthcare staff will answer the same as how it was done previously. The same analysis will also be done on the outcome of the questionnaire. Through this, we can compare if there is satisfaction among the healthcare staff and if they find it very useful in utilizing the portfolio from the beginning until the final phase of implementation.

A pareto analysis will also be used to evaluate the effectiveness of the use of the portfolio. This analysis is shown through a bar graph showing the percentage of medication errors from the month of December 2022 up to May 2023 which serves as the baseline data. Another bar graph will be done showing the percentage of medication errors from the month of June 2023 up to

December 2023, in which the beginning of using the portfolio has been implemented. The two bar graphs from the baseline data and from the implementation months will then be analyzed by comparing the value of percentage whether the number of medication errors have decreased while utilizing the portfolio. A decrease of medication error indicates that the portfolio has been a useful and effective tool to identify tablets accurately.

4.6 Ethical Considerations

One of the major prerequisites to comply prior to the implementation of our project is the approval coming from the elderly care home specifically the Kustaankartano Seniorkeskus. Since this quality improvement project will involve gathering of data from HAIPRO and from healthcare staff in Kustaankartano Seniorcare Home, we will secure a research permit from the City of Helsinki by submitting the research proposal or application through its IRB (Institutional Review Board). After the committee checks whether our research aims, and design are ethically acceptable and ensures that it follows the institution's code of conduct, research approval is secured.

As per institutional guidelines, we will also send proper communication letter to the specific department of Kustaankartano where the quality improvement project will be conducted. This ensures that the research materials and procedures are in line with the senior care home's code of conduct and therefore, ease the full cooperation of the healthcare staff.

To guarantee collaboration, a meeting will be held where ethical considerations will be properly discussed and to assure voluntary participation of the parties involved. Informed consent, anonymity, confidentiality, and the assurance that this project will not do any harm to the patients, staff, and the institution will be expressed in writing as necessary according to the Data Protection Act 1050, 2018. Safe handling of data collected, and proper communication of results will also be taken into consideration.

Chapter 5: Reflections and Conclusions

Saving lives and maintaining patient's health and safety are a few of the nurses' priorities in the medical field. Our quality improvement project focuses on the help of utilizing the tool for dispensing medicines to improve medication safety in elderly care nursing homes. After a

thorough search of some reliable sources that could strengthen our quality improvement project, we've learned that there are certain methods and tools being used already in some nursing homes in dispensing the medicines such as colored medicine cups.

Multi-dose drug dispensing is indeed widely used in Finland especially in nursing homes. It is a way of packing multiple drugs in one packet. There are advantages when it comes to this kind of dispensing like it will save the time of the nurses or practical nurses in giving the medications, minimize error of giving medications to the wrong patients since the packet is well-labeled with the information of the patient and as well as the drug important notes including the time, date and the names of the drugs inside the packet. However, disadvantages such as proper identification of medication are highly observed and the fact that the 10 rights of medication administration were violated.

With this observation, we formulated a quality improvement of somehow which we think can help in addressing the disadvantages of multi-dose drug dispensing. We proposed to use pictures which are to be posted in an area where drug preparation is done to decrease the occurrence of drug error, easily identify the drugs available in packet and to become a competent and confident staff in administering the medicines of the patients. In this way, the staff will easily identify the drug particularly in some cases if the drugs inside the packet need to be controlled or removed due to health condition changes, such as if a patient has hypotension and the drug packet contains medicine for hypertension.

This project will be very beneficial not only in elderly care homes but also to other health care facilities by improving the quality of care through patient safety and helping reduce medication errors. Through this QI project, we will be able to help the health care staff not only in providing quality of care to the patients, but they will also gain knowledge on the different kinds of medications specifically with the appearance. This QI project can be utilized in the future most especially to the health care professionals who are just new to the work environment of elderly care homes and are still adjusting to these unfamiliar ways of dispensing medication. Although this project may still need to be improved and the implementation still need to be approved and adapted vigorously, but the knowledge on how to identify the medications accurately using the tools mentioned in this project to help identify properly these medications are the most practical way to deal with this major problem encountered most especially in the elderly care homes. We

believe that this will be successfully taken advantage of in the different health care facilities in the future.

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