



MUTESI PATRICIA

**USING MEDICINE DISPENSERS IN HOME HEALTHCARE
SERVICES FOR PEOPLE WITH DEMENTIA**

Benefits, Challenges and Strategies

*A Thesis Submitted in Partial Fulfilment of the Requirement for the Award of
the Degree of Masters in Applied Social Sciences (International Social
Welfare and Health Policy) Faculty of Social Sciences,
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DECLARATION

STUDENT'S DECLARATION

I, MUTESI PATRICIA, hereby declare that this is my original work and has not been submitted to any other college, institution, or university for any other purpose other than Oslo Metropolitan University for academic award.

Signed _____ **Date:** _____ **May, 2021**

Mutesi Patricia

SUPERVISOR'S DECLARATION

This research project has been presented for examination with my approval as the appointed university Supervisor.

Signed _____ **Date:** _____ **May, 2021**

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DEDICATION

I dedicate this thesis to my children Ellen Mugizi and Evan Mugizi, I love them dearly. To my husband Gidi Mugizi who encourages and supports me, God bless you. To my parents, thank you for the prayers, love and kindness you have shown to our entire family.

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I would like to thank the Almighty God who has protected and given me strength to complete this academic work especially during this challenging time of Covid- 19 pandemic.

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Lastly but not least, I thank my classmates for fruitful discussions, good advice, phone calls and video chats during social distancing in Covid-19 pandemic, their presence kept me going.

ABSTRACT

The focus of this study was to investigate the perceptions of healthcare workers in the use of medicine dispensers in the provision of home healthcare services to people with dementia. Specifically, the study put emphasis on the following research questions: (1) What are the benefits of using medicine dispensers to people with dementia? (2) What are the challenges faced by people with dementia and the operating nurses in the process of using medicine dispensers? (3) What are the strategies for improving on the use of medicine dispensers?

The social model of disability which highlights the inconsistencies of the medical model of disability was used as a theoretical framework of this study.

This study was carried out in the District of St.Hanshaugen in Oslo Municipality. Six home healthcare workers who comprised of four registered nurses and two nursing aids were purposively selected for interviews. A qualitative design was used to gain a rich detailed understanding of how medicine dispensers are used in the provision of home healthcare services to people with dementia.

During this study, conducting face to face interviews was a great concern due to Covid – 19 pandemic. However, this concern was reduced by strict adherence to infection control measures such as use of face masks and keeping distance between the interviewer and the informants.

Findings of the study indicate that, the use of medicine dispensers has had some positive impact in medicine administration like reducing medication errors, improving patient's independence and saving healthcare workers' time. However, the study also revealed that there are some challenges encountered when using medicine dispensers like, technical problems and lack of enough training for healthcare workers.

The findings also show equipping healthcare workers with enough training, evaluation of patients before they start using medicine dispensers and introducing medicine dispensers earlier before the dementia becomes severe, as some of the strategies identified.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

Introduction

This thesis is about welfare technology, more specifically the use of medicine dispensers by people with dementia living in their homes. It is intended to investigate and document the benefits, challenges and strategies for improvement on the use of medicine dispensers in homecare health services.

1.1. Background of the study

As the aging population increases worldwide, the number of people with age-related conditions like dementia also increases. The increasing number of the elderly population combined with a shrinking number of health care workers will likely put pressure on healthcare services. This pressure on the healthcare workforce is a critical aspect that threatens healthcare services of people with dementia. Welfare technology is one of the innovations that is believed to contribute to solving this problem. The aim of welfare technology is to enable elderly people live safer and independently in their homes before moving to care institutions.

There are many types of welfare technologies used by people with dementia like safety alarms, GPS (Global Positioning Systems), smart home solutions, digital calendars and many others. This thesis will mainly focus on the use of medicine dispensers because first, they are one of the most used welfare technologies in home health care services and second, they have challenges that need to be identified.

Welfare technology is believed to benefit elderly or other people with cognitive impairments and disabilities to lead a more secure and independent life. Enabling people with dementia to continue living independently in their homes is regarded in health care as a strategy for improvement on their health and wellbeing. However, there are challenges associated with the use of medicine dispensers such as; technical problems, stress, design, to mention but a few.

Present situation of people with dementia

Worldwide, it is estimated that there are more than 35 million people living with dementia. Unfortunately, this number is set to double every after 20 years. Studies show that dementia is imposing a great burden on the economies of many countries in terms of medical and social care (Wimo, Jönsson, Bond, Prince & Winblad, 2013).

Dementia is defined as a syndrome due to a disease of the brain, usually of a chronic or progressive nature, in which there is a disturbance of multiple higher cortical functions, including memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgement (Topo & Östlund, 2009).

According to Harding (2017) dementia is put into three stages; mild, moderate and severe. With mild dementia, a person may be able to function independently but faced with short term memory lapses, anger, depression, difficulties in problem solving and challenges in expressing emotions or ideas. Moderate dementia is where the impacted person may need some assistance from health care providers or family members. At this stage, a person is faced with challenges of poor judgement, memory loss, confusion and personality changes. Severe dementia is characterised by continuous decline in mental and physical functions, which leads to difficulties in activities like walking and the person will need full time assistance. With severe dementia, it becomes necessary to seek admission of the patient to a nursing care institution.

Currently, there is no known cure for dementia though there are some drugs that can slow the progression of some of its symptoms for a period of time (Harding, 2017). However, even if dementia is associated with a lot of challenges, many people with this diagnosis are preferring to live in their homes for a longer time before moving to institutions and enabling them to do so, is one of the aims of healthcare policies. Today, welfare technology is one of the innovations that is believed to help in the delay for entry in institutional care, reduce the burden of caregivers and improve on the quality of life for people with dementia (Bennett et al., 2017). Having described the three stages of dementia, the focus of this study is on people with mild and moderate dementia because they are the ones who can live in their homes independently.

Dementia care in Norway

Dementia care in Norway is organized in three forms. The first form of dementia care is provided in organised institutions commonly known as nursing homes. In these care institutions dementia patients receive care in all activities of daily living due to physical or mental health deterioration. Ågotnes (2017) points out that nursing homes provide a level of care between hospitals and home-based healthcare. In Norway, there are both public and private nursing homes and all are subject to national health legislation. The staff in nursing homes range from registered nurses with a minimum of three years university/university college education, assisting nurses with two year secondary school education and assistants with out relevant formal qualifications.

The second form of dementia care is provided in assisted homes. These are residential that are put in place to help citizens who have healthcare needs and difficulties living in their own homes. Here, residents have their own small and self-contained apartments usually with a living room, kitchen, bedroom, and a bathroom. People who live here may need moderate help from homecare nursing services.

The third form of dementia care is provided by home healthcare services in peoples' own homes. The services vary according to the people's needs and resources, which may include; activities of daily living like bathing, dressing, nutrition guidance, medical treatment, activity, to mention but a few. Receiving these services at home promotes security, independence and helps in reducing unnecessary hospitalizations.

The focus of this study will be on the second and third forms of dementia care. The reason for focusing on the two forms is because these patients are the ones who use medicine dispensers while other healthcare systems have got healthcare workers who administer their medications all the time.

The role of home health care workers

In Norway home health care services became part of municipalities public health care services in 1972. Norwegian inhabitants have, according to the Health Care Act, a legal right to home care services irrespective of age, gender, social economic status or other differences (Holm, Mathisen, Sætertrand, & Brinchmann, 2017). The services provided vary according to the patient's needs and resources, these include; assistance in activities of daily living like

bathing, dressing, guidance on nutrition, medical treatment like medicine administration, dialysis treatment, wound dressing, guidance on physical activity, to mention but a few. These services are provided by professionals like registered nurses, licenced practical nurses, physiotherapists, ergo therapists and nursing aids. The services may last for a short or long period of time, depending on the user's condition, which range from chronical illnesses, impaired health, old age or other factors (Holm et al., 2017).

1.2. Medicine dispensers in the provision of care for people with dementia

Medicine dispensers are digital devices that deliver medicines at a predetermined time. They are welfare technology devices that help in improving independent living of people with cognitive impairments such as dementia and they are a way of supporting caregivers and families. The dispensers are programmed to release medicines at a specific time and day. This reduces the problems of errors of medication like taking double doses and forgetting to take medicines on time. The use of medicine dispensers helps in reducing the workload of care givers like health care workers who would otherwise pay frequent visits to their patients to administer medicines. In addition, the use of medicine dispensers helps patients to maintain their privacy, autonomy and good quality of life.

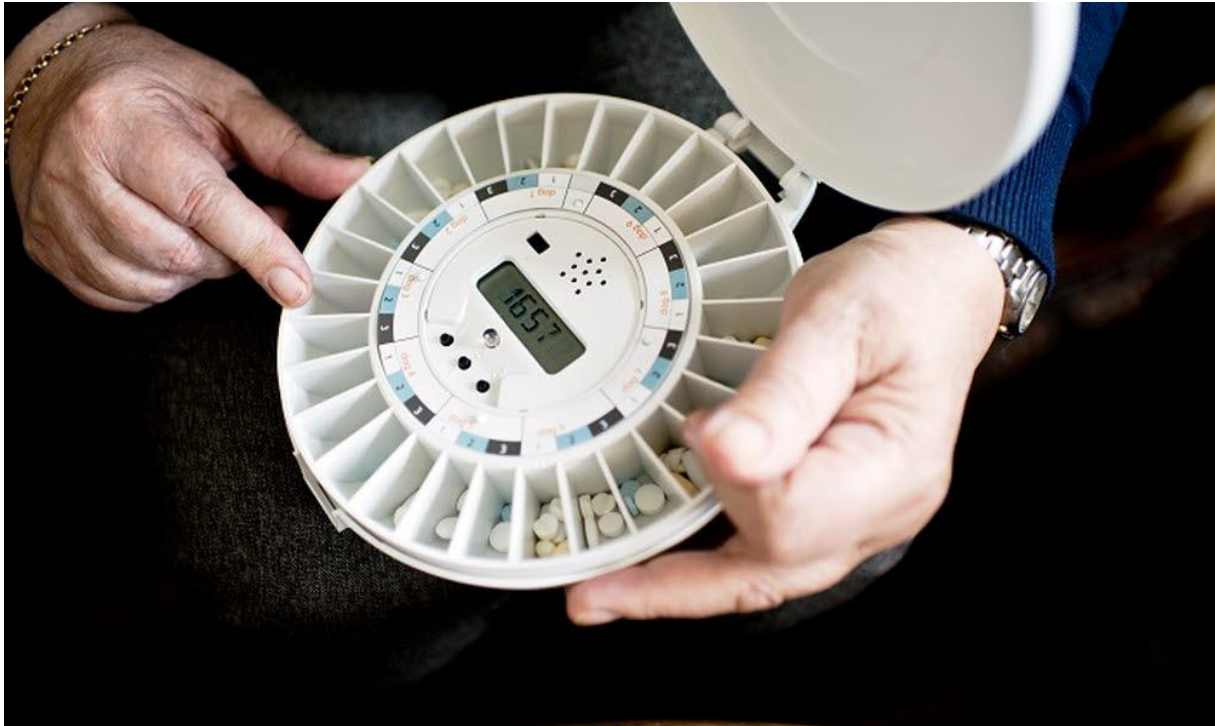
Using medicine dispensers

The dispenser is remotely updated by medical staff workers on the medication schedule, while system settings, embedded programs and operational errors are remotely managed by system operators. Medicine dispensers are programmed in such a way that when it is time for the medicine to be taken, the dispenser makes an alarm, which reminds the patient to take their medicines which are automatically released from the dispenser (Pak & Park, 2012). Medicine dispensers being a recent innovation in the provision of health care services, both the patients and health care workers have different experiences in operating them. Since they are kept in patients' homes, it becomes easy for patients to take their medication on time. Medicine dispensers being automatically operated are useful for patients with dementia who have cognitive impairments that make them forget to perform some activities of daily living.

Common types of medicine dispensers

The two most common types of medicine dispensers used by people with dementia are *Pilly* and *Evondos*. These two types of dispensers are the ones mostly used according to the respondents of this study.

Figure 1. An example of pilly medicine dispenser



Source; <https://www.ks.no/fagomrader/helse-og-omsorg/velferdsteknologi3/nasjonalt-velferdsteknologiprogram/felles-anskaffelse-av-elektroniske-medisindispensere-frist-6.-april/>

A Pilly is an automated pill dispenser which has 28 chambers where pills taken out of prepacked medicine sachets are placed in a form of carousel. The prepacked and easy to tear roll is labeled with patients' name, medication, dosage and time the medication should be taken. Prepacked medicines are prepared by pharmacies according to the list of medicines prescribed by the patients' physician. After preparing the dispensers, health care workers deliver them to the patients' homes. One must have a special key to open and close the medicine dispenser. In case the medicines are not taken out at the scheduled time, a message is sent to a pre-defined telephone number, which is usually home care service providers, family member's or the patient's number.

Figure 2. An example of Evondos medicine dispenser



Source: https://www.researchgate.net/figure/Evondos-E300-Medicine-Dispensing-Robot-with-Multidose-Sachets-Salo-Finland-The_fig1_316338373

Evondos is a medicine-dispensing robot where medicines packaged in a roll are placed. The dispenser delivers medicines when it is time for taking them and it gives instructions on how to take the medicines. It has a large button that flashes a green light and it makes an alarm when the medicine is ready. If the medicines are not taken as instructed, they are transferred to a locked container that can only be opened by staff. A message is sent and alerts the staff in case the medicines have not been taken or if there is any technical problem. In practice, the two types of dispensers operate in the same way but they have some differences, for example, the Evondos is bigger in size, runs on electricity, gives instructions on how the medicine should be taken and a whole medicine roll is put inside. As for the Pilly, medicines are first removed from the prepacked sachets and placed in the chambers of the pilly and it runs on batteries.

In summary, keeping dispensers in patients' homes, using prepacked medicines, dispensers making alarms when it is time for taking medicines, and dispensers being automatically operated are identified as facts on how medicine dispensers are used in the provision of healthcare services to people with dementia.

1.3. Justification, problem statement and research questions

Although there are many studies done on dementia and welfare technologies in the provision of healthcare services for example, Spilker & Norby (2018) and Sánchez et al., (2019), there seems to be a few studies done specifically on medicine dispensers and dementia in Norway. Therefore, this study is intended to investigate and document the use of medicine dispensers specifically their benefits, challenges and strategies for improvement as reported by the nurses who interact with dementia patients and their dispensers. The errors in medicine administration that arise in absence of medicine dispensers make this study relevant. The information generated from the study may therefore be used to initiate innovations and interventions in the use of medicine dispensers.

In Norway, like in many other countries, there is a growing concern of the increasing number of people with dementia which is likely to outstretch the capacity of healthcare workers in the years ahead. The use of medicine dispensers is presented as one such solution and in addition, they contribute to independent living and good quality of life. However, introducing medicine dispensers as a new technology requires increased competency of healthcare workers in the operation of these medicine dispensers. The main problem to look at in this thesis is the following:

How do nurses working with medicine dispensers experience this new technology when it comes to benefits for patients, challenges in operation and strategies for improvement?

This problem statement can be divided into three more specific research questions, which have guided the interview and the analysis. These three questions concern both the operating nurses and the patients, as conceived by the nurses.

The research questions are as follows:

- (1) What are the benefits of using medicine dispensers to people with dementia?

(2) What are the challenges faced by people with dementia and the operating nurses in the process of using medicine dispensers?

(3) What are the strategies for improving on the use of medicine dispensers?

Answering these questions will give us knowledge that can be useful to improve on the use of dispensers and their operation by the nurses. That is the aim of this study.

1.4. Scope of the study

According to Bryman (2012), scope refers to the details and boundaries of the research problem to be investigated. The importance of details and boundaries is to limit the study to a specific group of people, a geographical area or a phenomenon. Thus, this study was done in home healthcare services in Oslo Municipality in the District of St.Hanshaugen. It specifically focused on healthcare workers perceptions of the use of medicine dispensers by people with dementia. It did not include people with dementia in nursing homes since they do not use medicine dispensers because of the presence of nurses in nursing homes all the time. It also did not include welfare technologies other than medicine dispensers. The study was conducted by interviewing six healthcare workers who were four registered nurses and two nursing aids. All informants had a working experience of at least three and above years working with people with dementia who use medicine dispensers. The informants of the study did not include people with dementia themselves since they have limited ability to provide the needed information. Also, the study did not cover issues of elderly people with other health conditions living in their homes since this was outside the objectives of the study. Finally, related literature and the disability theory with its two models; social disability model and medical disability model were used as a basis of this study.

Information about St. Hanshaugen district

St.Hanshaugen district is one of the 15 districts in Oslo municipality. It stretches from Pilestredet in downtown Oslo to Marienlyst. The district has a population of about 40,000 inhabitants. The popular and frequently visited St.Hanshaugen park is located in the district and is one of the biggest parks.

St.Hanshaugen district like other districts in Oslo Municipality has a responsibility to offer home care services to the elderly or other people with disabilities that require health care services. It is in this district where the study was carried out on one of the home healthcare services.

1.5. Definition of concepts

Below, concepts are explained in detail in relation to how they are used in this study.

Welfare technology

The increase in the aging population together with increased demand for health care services has led to the creation of innovations like welfare technology. Welfare technology is all technologies that are used to improve lives, maintain security and activity especially to the elderly or people with disabilities. Its main purpose is to facilitate independent living, provide safety and reduce caregiver burden. The ability for older people to stay longer in their homes has many advantages like decreasing the risk of contracting infectious diseases, increasing independence, and is cost effective.

Medicine dispensers

The purpose of medicine dispensers is to assist the elderly or other people who may suffer from cognitive impairments to remember to take their medicines on time. This constant reminder provided by medicine dispensers helps in improving the quality of life for the users. Having medicine dispensers also relieves family caregivers of the worry that their loved ones may forget or take a wrong amount of medication. Using medicine dispensers promote patient's independence and helps in maintaining medicine adherence. Care givers can automatically receive updates or warnings that their loved ones have not taken medications, which gives both elderly and caregivers a sense of security and safety.

Elderly people

Elderly people are according to this study, people aged 65 years old and above, staying in their homes and receiving home healthcare services. It is mainly due to health-related issues that elderly receive healthcare services in their homes. These issues range from short to long term health conditions. Being in one's home creates a sense of safety and comfort and it helps the mind to relax, which is why these days many old people prefer staying longer in their homes. Another reason why elderly receive home healthcare services is that being in a familiar environment reduces stress. Similarly, elderly receiving home healthcare services have freedom to do as they wish, and this builds confidence and promotes wellbeing.

Health care worker

Is someone who provides home health care services, and in this study, it refers to registered nurses, licensed practical nurses and nursing aids who assist people who receive home healthcare services. The services provided include; medicine administration, taking the patient's vital signs and recording them, collecting samples for testing, helping in hygiene, dressing wounds, guidance on proper nutrition, guidance on activity and training, mental support, helping the patient prepare meals, assisting the patient by going with them to doctor's visits and shopping.

Home healthcare services

These are services provided by municipalities to the people who need therapeutic, rehabilitative and activities of daily living (ADL) while in their homes. The services might be short or long term depending on the need. They include physician care, which means that a doctor may visit a patient at home to provide medical services, nursing care, physical, occupational and social services. In home healthcare services old people live independently in their homes and healthcare givers pay visits periodically depending on their healthcare needs.

Figure 3. Structure of homecare services

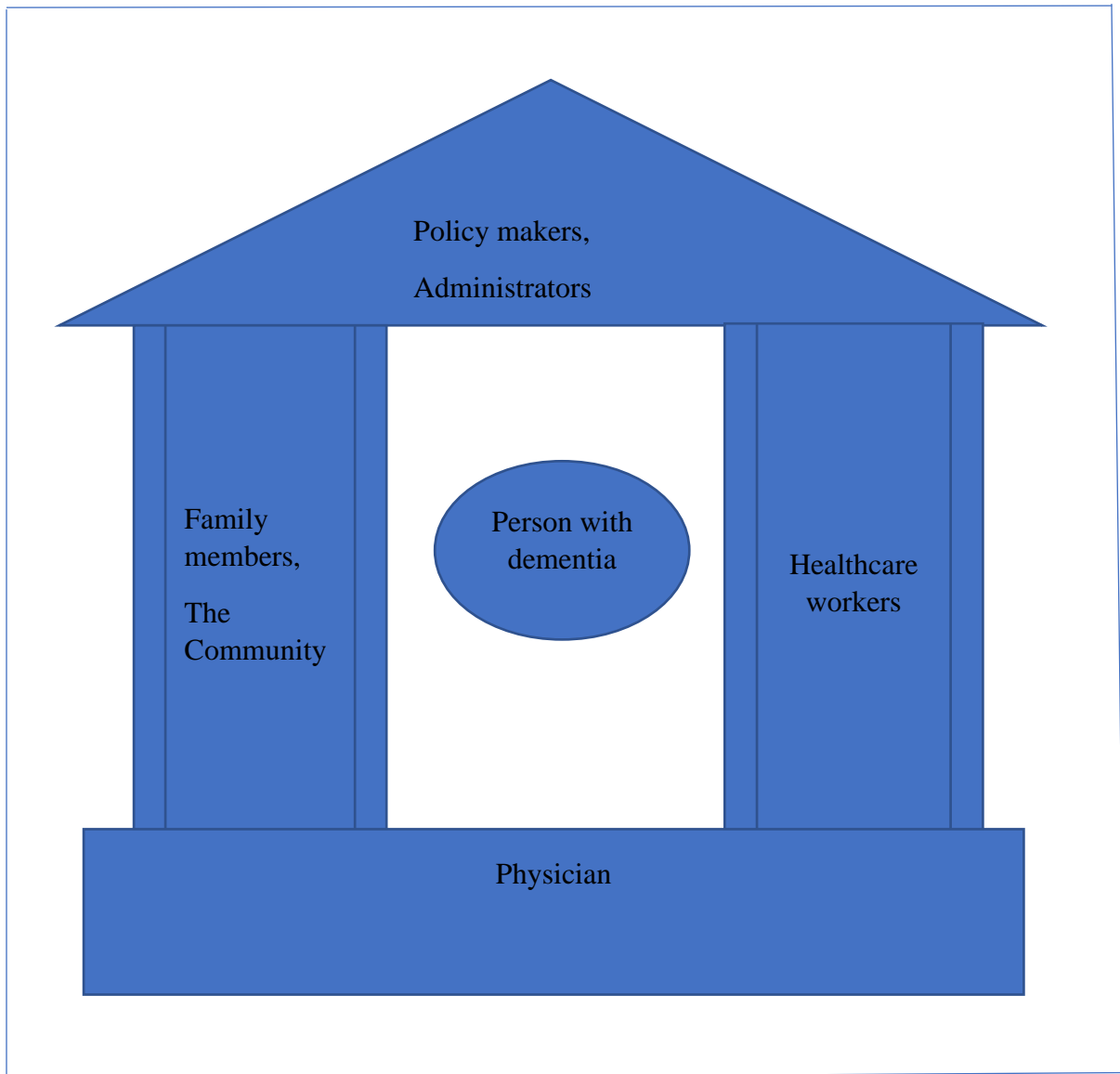


Figure 3 illustrates the relationships between the patient and the healthcare providers. According to the illustration, the patient is the focus for all the actors in the figure and there is an interconnection between all the actors mentioned in the illustration especially in information sharing that concerns the patient.

Policy makers make laws that govern the homecare services and administrators govern the provision of healthcare services.

Family members help in providing general information about preferences, likes or dislikes and habits of people with dementia. A physician helps in supporting people with dementia by offering treatments, referrals, advice and information in management of their condition. A healthcare worker helps people with dementia and their carers or family to access what they need at the right time and offers the support that they need to live independently.

Nursing homes

These are healthcare institutions where old people with different health problems who can no longer live in their homes stay to receive healthcare services. Services offered in nursing homes include administering and monitoring medicines, personal care, which includes nutrition, bathing, clothing and toilet assistance, 24- hour emergency care, social and recreational activities. The staff that offer these services include registered nurses, licensed practical nurses, licensed vocational nurses and nursing aids.

Independent living

According to this study, independent living is any housing arrangement designed to accommodate older persons who are able to live independently. With independent living, the residences are often more compact, easy to navigate, friendlier, arranged and designed exclusively for old people. In these communities, residents get the opportunity to socialise with peers, participate in activities and other social gatherings.

Medicine administration errors

These are mistakes that occur in the process of medicine administration. Some of these mistakes can be fatal or can lead to patients being admitted in hospitals. These mistakes may happen as a result of failure in one of the five “rights” which are; right patient, medication, dose and route. To reduce medicine administration errors there is need for assessment of the causes.

Wellbeing

Wellbeing for elderly living in their homes may mean various things. Firstly, being able to maintain a healthy lifestyle is important. Maintaining good nutrition helps to curb chronic illnesses. While regular exercises minimise a risk of depression and anxiety. Having strong networks and maintaining social interaction reduces loneliness and helps elderly with cognitive impairments like dementia to live comfortably, happy and healthy in their homes.

Prepacked medicines

These are medicines that are packed in plastic sachets by pharmacists according to a patient's prescription. They bear the identification of the patient, date and time when the medication is to be taken. This system is especially useful for people with cognitive impairments like dementia who tend to forget their medications. In most cases healthcare workers deliver prepacked medications to patients' homes.

1.6. Organisation of the thesis

After this introduction, the thesis continues with Chapter 2 which presents theories and literature addressing issues pertaining the use of medicine dispensers for people with dementia in relation to their benefits, challenges and strategies for improvement. Chapter 3 presents the methods used in conducting this study. Chapter 4 presents the presentation of data and analysis. Chapter 5 presents the discussion of the findings, conclusion and recommendations.

1.7. Special circumstances of the study

Due to Covid – 19 pandemic, conducting face to face interviews was a great concern. However, this concern was reduced by strict adherence to infection control measures such as use of face masks and keeping distance between the interviewer and the informants.

Also, people with dementia would have been the best informants but because of their limited abilities to provide required information, they were not interviewed and instead health care workers who know them well were interviewed.

CHAPTER TWO: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Introduction

This chapter takes us through two models of disability, the medical model and social model. The models reveal two different ways of how disability is seen or understood. It also discusses related literature which will help the researcher to relate the research findings to the existing knowledge.

2.1. The disability theory

Disability theory is a body of research and reflection on the meaning, nature and consequences of disability. The two models of disability to be discussed below are the Medical model of disability and the Social model of disability. The models highlight the opposing views of disability.

2.1.1. The medical model of disability

This model suggests that disabled people should be pitied because of their damaged bodies and it considers disability as primarily a medical issue that needs to be treated, thus creating a foundation of prejudice and discrimination (Dirth & Branscombe, 2017). As discussed by Shahrestani (2017), the medical model was widely recognised after the 1980 WHO classification called The International Classification of Impairments, Disabilities and Handicaps (ICIDH). The term impairment is defined as any loss or abnormality of psychological, physical, or anatomical structure or function. The term was considered an after effect of an impairment preventing a person from the ability to perform normally. For instance, people with dementia are at times not given the opportunity to explore their abilities to the fullest because of the fear that they will hurt themselves. This makes them more disabled and dependent since most of the activities of daily living are taken over by others (Topo et al., 2009).

In relation to assistive technologies, the medical model may be regarded useful because of the attention it renders physical and functional limitations demonstrated by people with disabilities. The medical model has influenced the introduction of innovations like screen

readers and personal augmentative communication devices. These innovations provide opportunities for measurable results. However, there is a concern that if the medical model prevails, there is a possibility that a person with disability may be asked to forego his/her autonomy forever (Mankoff, Hayes & Kasnitz, 2010).

Based on the way the medical model has been viewed by many researchers, it has been considered oppressive. That is why much emphasis has been put on the social model of disability, which considers physical and social barriers as being created by society rather than the individual's impairment but also being careful in including the medical perspective.

2.1.2. The Social Model of Disability

The theoretical framework of this study is based on the social model of disability which considers a person as being disabled mainly because of barriers set by society. The model focuses on society's perception on disability rather than physical impairments. In 2004 Oliver made a clarification on the social model of disability as: "nothing more complicated than a clear focus on the economic, environmental and cultural barriers encountered by people who are viewed by others as having some form of impairment – whether physical, mental or intellectual." (Barnes & Mercer, 2004). The social model of disability was introduced to highlight the misconceptions of the so-called medical model of disability which suggested that being impaired is an abnormality that causes major problems and limitations.

Disability has been looked at as a matter that needs medical intervention and described as a personal misfortune or individual defect. However, disability studies do not treat disease or disability hoping to cure them, rather, it aims at studying social meanings, symbols and stigmas attached to disability identity and questions their relationship with enforced systems challenging the widespread belief that an able body and mind determines whether one is a quality human being. The main purpose of disability studies is to reverse the negative connotations of disability. However, disability theory has both positive and negative elements. For instance, some people with disabilities do not consider their disability a flaw or personal defect, they are comfortable with who they are and do not wish to be cured (Siebers, 2008).

The social model of disability applies to dementia in such a way that people living with dementia face challenges of social barriers like being treated as passive and dependent or not being able to give their own opinions about issues that concern their lives. There are also other institutional and collective barriers faced by the people with dementia like failure to

design or adapt items, interiors, buildings, and technological barriers, to enable people with dementia remain active, engaged, and comfortable. By removing institutional and social barriers, people with dementia can remain active, engaged, and comfortable. Use of medicine dispensers is one way of enabling people with dementia keep their autonomy and independence, if provided in the early stages of the diagnosis. The key aspect of this model is that people with disabilities should be heard and facilitated. Thus, the model suggests that, appropriate measures like empowerment and involving people with disabilities like dementia in decision making, innovative and imaginative should be undertaken as a means of helping them live a more independent life (Milligan & Thomas, 2016).

Welfare technology supports family caregivers and contributes to improvements in accessibility, utilization of resources and quality of services. It provides solutions that prevent the need for community services or transition to institutions (Holthe & Wulf-Jacobsen, 2016).

The selection of this model is based on the need for describing, analysing, understanding, and developing strategies to address the problems that occur as a result of dementia. It offers an understanding of dementia as a disability and how to develop strategies to address such problems. This model helps to explain how and why people with dementia need to be helped with welfare technologies like medicine dispensers to enable them to live a relatively normal and independent life in society.

However, it is important to note that the social model does not disregard the medical model in a sense that, the experience of a disability will be invalidated if it is only defined according to society's views. This would also eliminate the need for medical treatment. The model therefore acknowledges that a disability exists as a result of a medical condition.

Therefore, the relevancy of models of disability to welfare technology is that welfare technology has got a potential to generate good quality, equal health, well-being and to develop and strengthen individuals' resources with the goal of increased independence and participation in society. It also helps in removing barriers encountered by disabled people in their daily life, thus promoting inclusion and a better quality of life.

2.1.3. The strength of the social model of disability

According to Shakespeare (2010), the social model has helped in building an effective political social movement for people with disabilities. The movement has enabled the generation of a clear agenda for social change.

Shakespeare further argues that the model has been an effective instrument in liberating disabled people by demonstrating the problems they face as a result of social oppression and exclusion. This demonstration encourages society to take a moral responsibility in removing the burdens imposed on disabled people that hinders them to participate.

Another argument presented by Shakespeare is that the social model has been a psychologically effective way of building a sense of belonging, collective identity and improvement of self-esteem of people with disabilities.

2.1.4. The weakness of the social model of disability

The social model's weakness is that it underrates people's medical disabilities pretending that the society can adopt to their needs and situations. This argument is supported by Shakespeare (2010) who says that the social model of disability neglects impairment as an important aspect in disabled people's lives. As stated by Crow (1992), "As individuals most of us cannot pretend with any conviction that our impairments are irrelevant because they influence every aspect of our lives. We must find a way to integrate them into our whole experience and identity for the sake of our physical and emotional well-being and subsequently for our capacity to work against Disability". However, it is perhaps possible for the social model to include the medical issues as it acknowledges that a disability exists as a result of a medical condition, thus the need for medical treatment.

Another weakness of the social model of disability is that it assumes that disabled people are oppressed, however, the model does not specify particular situations of oppression (Shakespeare, 2010).

Furthermore, the social model claims that society should create a barrier free environment for people with disabilities but in the real sense, such environment is difficult to create.

2.1.5. Comparison of the Medical Model and Social Model of Disability

Medical Model of Disability	Social model of Disability
Diagnosis	The person and society defines strength and needs
Classifying	Identifying challenges and looking for possible solutions
Disability becomes the focus	Focus is on what the person can do
Therapy and treatment is imposed	Opportunities and resources are made available to the person
The person is made passive for fear of hurting him or herself	Empowering the person to achieve independent living
Segregation and special treatment	Treating the person with dignity and providing assistive technologies
Permanent exclusion	Strengthening relationship with family and society
Attitudes towards the person remain unchanged	Society adopts to the persons situation

Table 1. Comparison of the Medical Model of Disability and the Social Model of Disability

Table 1 is a comparison of the two models of disability and I developed it after reading the comparisons of the two models by Dirth & Branscombe (2017) which explains how the person with a disability is looked at under the two different models of disability, where the medical model's main aspect is treatment of the person while the social model's main aspect is empowerment of the affected person.

2.2. Review of related literature

This part will discuss what other studies have found out in relation to how medicine dispensers are used, their benefits, challenges and strategies for improvement in healthcare services to people with dementia.

2.2.1. Benefits of using medicine dispensers

Kollak (2017) points out that new technological developments benefit people with dementia by improving on their safety and helps in delaying institutionalization. In addition, Pak & Park (2012) say that the use of medicine dispensers has been proven to be effective because they prevent overdosing, mis dosing and underdosing.

Forgetting to take medicines is common especially when one is cognitively impaired. A medicine dispenser will therefore help the users to remind them of their medications and this reduces the possibility of errors. The use of medicine dispensers helps the users to maintain their independence, self- reliance and reduces frequent visits from healthcare workers. Additionally, taking medicines at the right time helps in improving the quality of life (Svagård & Boysen, 2016).

The use of welfare technology of which medicine dispensers are included, promotes the autonomy and wellbeing of people with dementia (Kollak, 2017). With welfare technology, it is believed that many elderly and people with disabilities can live independently and secure in their homes. Kollak further argues that technological assistance contributes to an increase in security, safety, social participation, mobility, physical and cultural activities. This strengthens the individuals' ability to cope in everyday living, in spite of health challenges of decreased social, psychological or physical level of functionality. The idea of welfare technology has been embraced by people with dementia, their carers and the health care sector who emphasise that enabling people with dementia to stay longer in communities is more beneficial than sending them to institutions (Kollak, 2017).

All in all, the dominant view on the use of medicine dispensers is a promising innovation that enables people with cognitive impairments like dementia to live independently, securely and delays institutionalization.

2.2.2. Challenges encountered when using medicine dispensers

Between 2014-2015 in Drammen municipality a pilot project about the use of welfare technology in home healthcare was carried out. In the study, five persons with cognitive impairments receiving home healthcare services and their family caregivers were recruited to participate. Home healthcare workers participated in reflection meetings of the project. Among the findings of the project pointed out was that there is still need for proper training for healthcare workers operating welfare technology of which medicine dispensers are part of and continuous updates on upcoming innovations in technology. This they said will help them gain confidence (Anne, Bjørg & Torhild, 2017).

The use of medicine dispensers can trigger stressful situations to people with serious cognitive impairments. In such situations it becomes necessary for healthcare workers to pay frequent and unplanned visits to these patients (Svagård & Boysen 2016).

Cummings (2004) argues that automation does not replace the need for humans rather it changes the nature of the work of humans thus highlighting the importance of balance between automation and human control. The use of medicine dispensers reduces health care workers workload and human error but can create other problems like loneliness of patients, intentionally piling of medicines by patients, forgetting to take medications after getting them from dispensers and taking medicines in a wrong way. It is believed that incorporation of higher level of automation to support humans can cause new errors especially if one lacks enough training.

In brief, the use of medicine dispensers as a new technology reduces healthcare workers' workload but still faces challenges like lack of adequate training of healthcare workers in how to operate them, can trigger stressful situations to cognitively impaired and can in some cases lead to intentional pilling of medicines.

2.2.3. Strategies for improvement

Svagård et.al (2016) say that introducing welfare technology earlier helps people with dementia to get used to it despite their cognitive impairment, and they are able to keep the activity in their daily routines.

Department of Health UK (2005) recommended a person centered approach with an emphasis on empowering the person with dementia to participate in decisions where possible.

This helps in identifying the right patient to use medicine dispensers. Before implementing any new technology, it is therefore important to first evaluate the person's abilities. This helps to know whether it will complement the care and support already being provided by healthcare workers or families. In addition, identifying who will benefit from the technologies helps to make good use of it.

According to Bygstad & Lanestedt (2017) there is need to learn more about research in digital infrastructures which deals with not only single applications but also with large, interconnected socio technical structures. They further outline measures that can contribute to the improvement of welfare technology innovation. These include; the civic society should play a greater role, welfare technology (simple solutions) should be widely adopted, the elderly should be encouraged to continue to live at home and be supported with services, innovations and research should be strengthened, particularly associated to municipalities and a market for services catering for the elderly should be developed.

When considering the use of technology to assist in dementia care, it is important to consider continued monitoring of the devices such that if users are not coping well with the new technology, healthcare workers make needed interventions. Consistency in monitoring of the new technology can also contribute to healthcare workers keeping in touch with their patients.

In order for medicine dispensers to improve on good quality of life and independent living of people with dementia, training of healthcare workers in how to operate them is crucial.

Another strategy viewed by previous studies also include evaluation of patients to identify the needs of particular patients before they begin using medicine dispensers.

CHAPTER THREE: METHODOLOGY

In this chapter the design used is presented and the reasons for it given. This is followed by the methods used to collect data, population of study and sample, pilot study, data collection, the description of how I analysed my data and issues related to reliability and validity.

3.1. Research design

A research design is a plan a researcher follows in a study process right from the first stages of the study to its end, should contain all the necessary items needed for the interview and it is a memory aid that guides the researcher to carry out the study in the process of collecting, analysing, interpreting data and its conclusion (Magnusson & Marecek, 2015).

This thesis is based on a qualitative study design. Bryman (2012) defines qualitative research as a strategy that emphasises on words rather than quantification. It is usually done using a relatively small but focused number of participants as a qualitative research is concerned with in depth rather than quantity of findings. The reason for choosing a qualitative research design is therefore to gain a rich detailed understanding of how medicine dispensers are used in the provision of home healthcare services to people with dementia.

The research questions we have defined could be a little modified, perhaps also be answered in a survey study with quantitative data. However, my aim has been to know more in detail how the nurses experience, perceive and judge the situation, and to this end, qualitative interviews seem more appropriate. In addition, doing a quantitative survey, would pose practical problems in the context of this thesis of 30 ECTS, since data would have to be collected especially for the study.

3.2. Population of this study

A population means an entire group you want to draw conclusion about. Bryman (2012) defines population as a theoretically specified group of individuals from which the sample of study is selected.

The population of this study is all health care workers of people with dementia living in their homes and receiving healthcare services.

3.3. Sampling procedure

A sample is a specific group that a researcher collects data from. In this study purposeful sampling was used. Purposive sampling is an intentional selection of informants based on their ability to answer the questions that are being posed. Purposive sampling helps the researcher to learn about peoples' different experiences and it is a procedure which enables the researcher to select informants that are likely to be information rich in respect to the purpose of the study (Magnusson & Marecek, 2015). Healthcare workers who were purposively selected for this study had working experience of three and above years, were of different genders, age and different educational background.

Step 1 Sampling districts in Oslo municipality

There are 15 districts in Oslo Municipality namely; Alna, Bjerke, Frogner, Gamle Oslo, Grorud, Grunerløkka, Nordre Aker, Nordstrand, Sagene, St.Hanshaugen, Stovner, Søndre Nordstrand, Ullern, Vestre Aker and Østensjø. It was therefore not possible for me to conduct the study in all these districts. Therefore, St.Hanshaugen district was purposively selected for this study because of its conveniency and accessibility to the researcher, in terms of movement due to Covid 19 pandemic.

Step 2 Sampling informants

Six healthcare workers from St.Hanshaugen district; four registered nurses and two nursing aids were purposively identified as informants of this study because of them being information rich informants.

Criteria for selecting informants

To qualify for this study as an informant, the following were considered:

- (1) They should be speaking English or Norwegian language.
- (2) They should have a working experience of three and above years in home healthcare institution.
- (3) They should have knowledge on medicine dispensers.
- (4) They should have worked on people with dementia who use medicine dispensers.

3.4. Interviews as a method of data collection

An interview is a conversation between two or more people where questions are asked to obtain information from the interviewee. Kvale (1996) defines an interview as a conversation that has a structure and a purpose which goes beyond the spontaneous exchange of views as in everyday conversation and becomes a careful questioning and listening approach with a purpose of obtaining thorough tested knowledge.

I used a semi-structured interviews in data collection of this study. According to Bryman (2012), a semi-structured interview is an interview where the researcher has a list of questions or fairly specific topics to be covered often referred to as an interview guide but the interviewee having a great deal of leeway in how to reply. Bryman (2012) further says that questions not included in the guide may be asked as the interviewer picks up on things said by the interviewee.

Interview method was used because interviews allow more deep probing using open - form questions to obtain additional information. The interviewer can also see the facial expressions and other observable characteristics as the interview goes on which can be used to give more information about the problem. Also, this method allows the interviewer to rephrase his or her question where the interviewee has not understood.

3.5. Developing research instruments

While designing the interview guides, I used my experience as a home health care worker working with people with dementia where medicine dispensers are used. I also read through other people's research like Saikat M. (2019) to come up with questions that could bring up rich information, direct the conversation towards the topics and issues I was investigating, guide me to ask questions in a sequency and how to pause follow up questions. Reading through other people's research helped me to know what to do or say next after the informant finished answering the last question.

I put research questions in the guide under the following topics:

- (1) What are the benefits of using medicine dispensers to people with dementia?
- (2) What are the challenges faced by people with dementia and the operating nurses in the process of using medicine dispensers?
- (3) What are the strategies for improving on the use of medicine dispensers?

3.6. Pretesting the interview guide

I conducted a telephone interview with a fellow course mate who is a nurse by profession using the same questions in the guide before doing a pilot study. This was done in order to minimize misunderstanding of the questions in the interview guide. This helped me to get comments on which questions work and which ones do not work. After that, I made some adjustments on the interview guide in order to make it clear to the informants.

According to Magnusson & Marecek (2015), interviewing is a skill one acquires through experience. The importance of pretesting helps the interviewer to develop interviewing skills and gain experience.

3.7. Pilot study

A pilot study helps to check the wording of your interview questions, the order of the questions, and the scope of the contents of the interview guide, and then to make changes that are necessary (Magnusson & Marecek, 2015). Therefore, after pretesting my interview guide, I conducted a preparatory study before embarking on the main study in order to identify some of the problems which would affect the collection of useful data. The pilot study was conducted on a homecare health worker from Stovner District of Oslo Municipality who shared the same characteristics with the informants of this study. The main criteria for selecting this informant in the pilot study were; she was a homecare health worker and was willing to participate. The pilot study consisted of an interview with questions similar to the ones for the main study and after the interview the data was analyzed. This was done to refine data collection plans with respect to both the content of the data and the procedures to be followed.

3.8. Practical obstacles in piloting

The following obstacles were met during the piloting of this study:

- (1) It took so long to begin the interview as the informant in the pilot study was at home and had other duties to attend to.
- (2) The interview guide had some questions which needed rephrasing because of the way they were asked.

(3) It took long to get a participant in the pilot study. This was mainly because of people being cautious of Covid-19 pandemic.

After the pilot study, I analyzed the results of the interview, checking question by question in the interview guide referring to my guiding research questions and made some adjustments to the questions that were not clear.

3.9. Main study

After discussing with my research advisor and agreeing on the procedures to be followed in the data collection process and on modifications made in the instruments, I proceeded for the actual data collection.

Permission to reach out to healthcare workers was sought from the Norwegian Centre for Research Data (NSD). After getting official permission to conduct interviews on home care health workers in Oslo, I had telephone contact with my informants and requested them for a face-to-face interview. All my informants accepted to have face to face interviews after agreeing on measures of infection control precautions due to Covid-19 pandemic.

I gave all my informants pseudo names as it is an ethical issue particularly in the data presentation, analysis, and discussion. The use of pseudo names safeguards the anonymity and confidentiality of the informants as individuals (Magnusson & Marecek 2015).

The table below shows how the pseudo names were used against the informants.

Table 2. Pseudo names

Informants no.	Pseudo name
1	Tom
2	Paul
3	Ida
4	Dan
5	Brenda
6	Ruth

The table above shows that pseudo names of Tom, Paul and Dan were given to male informants. Ida, Brenda and Ruth were given to female informants. All the informants had 3 and above years of working experience. Tom, Paul, Ida and Brenda were registered nurses whereas Dan and Ruth were nursing aids.

3.10. Data collected by use of Audio recorder

All the data from the six interviews were labeled using the pseudo names for easy identification which helped me to maintain anonymity during the analysis. The recorded data was transcribed into detailed notes and data from Brenda which was in Norwegian language was thereafter translated into English.

I translated the notes of Brenda from Norwegian to English myself since I understand both languages. After translating Ruth's data, I listened to her Norwegian audio data more than twice. The purpose of this was to make sure that the translated work did not change the original message of Brenda.

3.11. Data analysis and procedure

Thematic analysis was used to analyse the collected data. Thematic analysis is where the researcher closely examines the data to identify common themes or topics, ideas and patterns of meaning that appear again and again (Bryman, 2012).

Data was organized according to themes and topics, which were generated from the research problem. This helped me to focus on data that was only relevant to the study while ignoring others. Analyzing data helps in answering researchable questions and understanding participants' meaning-making. This is important especially when there is a large chunk of data collected (Magnusson & Marecek, 2015).

3.12. Reliability and Validity

Reliability refers to the demonstration that the operation and procedures of the research inquiry can be repeated by other researchers which then achieve similar findings, in other words it means the degree to which the researcher manages to be consistent and accurate throughout the whole process (Riege, 2003).

After formulating the interview guide, a pretest was done before proceeding to data collection. This was meant to collect the weakest points of the guide to make sure that it measured what it was supposed to measure according to the purpose of the study.

During the interviews, I made sure that my presence did not lead the informants to give me the answers that they thought I wanted.

Validity refers to the degree to which the obtained data is credible enough to support the conclusions drawn from it (Riege, 2003). Therefore, validity of this research refers to the degree to which the research instruments and procedures managed to reveal what was the benefits and challenges of using medicine dispensers and the strategies for improvement on their use.

In an attempt to ensure that I collect sufficient information on the topic of study and research questions, healthcare workers that were purposefully selected as informants are those that spoke the languages that I understand; that is English and Norwegian. This is because I did the interviewing, transcribing, and translating by myself.

I also audio recorded the interviews but with the consent of the informants to increase on validity. However, the validity of this study might have been affected by a small number of healthcare workers that were interviewed since they did not represent the views of the whole population.

3.13. Ethics and informed consent

According to Magnusson & Marecek (2015), each participant should be informed about what would occur during the research study. They further say that intended use of the research data to be collected should be explained and the informants must also give their consent.

Before I went to the field work to collect data, I sought for approval from the Norwegian Center for Research Data (NSD) and it was granted.

The purpose of the study was explained to each informant before conducting an interview with them. They were also informed that I would record the interviews using an audio recorder. I informed them that participation in this study was voluntary. Each individual's decision to participate or not, would not have any effect on them and that any information obtained in connection with this study which could be identified with them would remain confidential and that it would be disclosed only with their permission and for academic purposes.

Finally, I was cautious not to use words and language that seem to be insensitive to religion, gender, age, ethnicity, or tribe.

CHAPTER FOUR: FINDINGS AND ANALYSIS

Introduction

This chapter analyses the findings based on the purpose of the study, which is to find out experiences, benefits and challenges of using medicine dispensers by people with dementia in the provision of home health care services and looking into possible strategies for improvement. Several studies have shown that people with dementia can be able to maintain a relatively independent life in their own homes with the help of welfare technologies like medicine dispensers.

Information from the six informants about the use of medicine dispensers by the elderly people with dementia is presented and analysed. It is then put into the following four categories: Background information, benefits of medicine dispensers, challenges of using medicine dispensers and the strategies for improving on the use of medicine dispensers. Tables in this chapter were used to analyse data presented.

4.1. Background information of informants

Table 3. Background information

Informants	Age range	Education	Experience	Sex
Tom	30-40	Registered Nurse	9 years	Male
Paul	30-40	Registered Nurse	12 years	Male
Ida	30- 40	Registered Nurse	10 years	Female
Dan	20-30	Nursing Aid	8 years	Male
Brenda	40-50	Registered Nurse	20 years	Female
Ruth	30-40	Nursing Aid	3 years	Female

Table 3 explains the background of the six health workers. It shows that four of the six informants were between the ages of 30- 40, one was between 20- 30 and another one was between 40- 50. They were four registered nurses and two nursing aids. They were three females and three males. Four of the informants had a working experience of 8 – 10 years, one had a working experience of 20 years and another one of 3 years. Therefore, the informants in this study were relatively experienced and in the best age to work.

4.2. Findings on the benefits of medicine dispensers

In relation to the question of benefits of medicine dispensers to the users in home health care services, informants identified a number of them as presented below:

The first benefit to be noted is that dispensers keep medicines in a safe and secure way as indicated by Tom, Paul, Ida, Dan and Brenda. They said that medicines in a dispenser can not be misplaced because it is only the health care workers that have access to open and close the medicine dispenser. Patients only get medicines automatically from the dispensers at specific times.

Another benefit of medicine dispensers according to Tom, was that the dispensers release the right dosage at the right time. He said:

Keeping medicines in these dispensers helps in quality control of the medications and ensures that people who use dispensers can take medications at the right time.

This is in line with what Kollak (2017) mentioned that medicine dispensers contribute in keeping medicines in a safe way.

On the same issue of safety of medicines, Brenda said that medicine dispensers help to keep medicines safely. She said:

We have patients with dementia who forget and misplace or hide things, they can sometimes hide medicines too. But with medicine dispensers, the medicines are safely kept, and it is only the health care personnel who have access to them.

The findings further indicate that medicine dispensers boost patient's independence. Health care workers interviewed indicated that patients who use and manage to take medicine when

they are released from medicine dispensers, do not have to wait for health care workers to help them. In relation to patients' independence, Tom mentioned that:

Having medicine dispensers gives patients the autonomy, freedom and independence in the way they take their medications.

Svagård & Boysen (2016) agrees with this finding by indicating that the use of medicine dispensers helps patients in maintaining their independence and self-reliance.

As someone who works closely with welfare technology at his workplace, Dan explained that, as patients become confident in using medicine dispensers, the need for frequent visits by healthcare workers reduces. On this issue, Dan said:

As patients gain confidence in using medicine dispensers, visits from health care workers become less, which is advantageous for the patients to live a normal life without disturbance from outside.

As mentioned, medicine dispensers enable patients to have freedom and independence in managing their medicines.

Another benefit of medicine dispenser according to the findings is that they help in taking medicines at the right time and this was mentioned by Tom, Brenda, and Ruth. Svagård & Boysen (2016) are of the same view that dispensers help in taking medicines at the right time. Taking medicines at the right time reduces inconsistencies in medicine taking which are associated to problems like reduced effect of medicines. Dan mentioned that:

For the patients with cognitive impairments like dementia, who can forget and take double doses, the dispensers help them in taking the right medicine at the right time.

Another benefit of medicine dispensers highlighted in the interviews is that the use of medicine dispensers saves time. This was mentioned by Tom, Paul, Ida and Dan. By time saving, it is believed that medicine dispensers help in reducing the time health workers used in preparing medicines and delivering them to patients. This is what Paul said on saving time:

Medicine dispensers save time as they release medicines automatically without having to wait for health workers to operate them.

Another benefit of medicine dispenser indicated in the findings by Dan is reducing of errors. As Pak & Park (2012) put it, medicine dispensers prevent overdosing, mis dosing and underdosing. These are the errors that mostly occur which medicine dispensers help in

reducing since they release automatically the right doses of medicines at the right time. As Dan observed, patients with cognitive impairments like dementia can forget and take double doses, the dispensers help in taking the right medicine at the right time.

On the same note, Paul mentioned that medicine dispensers help in reducing errors in medication. He said:

One of the reasons for using medicine dispensers is that patients get the right medicines. Each dispenser is programmed to accept prepacked medicines with a patient's name and date of birth. Because of this, a patient cannot be given another patient's medicines by mistake.

Findings also show that the use of medicine dispensers reduce frequent visits of health care workers to patients' homes as indicated by Tom and Dan. This helps patients to maintain their private life, which is an important aspect of a good quality of life. Also, Svagård & Boysen (2016) share the same idea that use of medicine dispensers help in reducing on health care workers' visits and maintain patients' self-reliance. Tom said:

Using medicine dispensers reduces frequent visits by health care workers since patients can get the medicines themselves from the dispensers. It saves health care workers' time and increases on patient's privacy.

Table 4 on the next page is a summary of presentation and analysis of information on the benefits of using medicine dispensers as collected from the informants.

Table 4. Benefits of medicine dispensers

Informants	Keeps medicine in a safe way	Helps in taking medicine on time	Reduces errors	Reduces visits by health workers	Time saving	Boosts independence of patients	Total
Tom r	X	X		X	X	X	5
Paul r	X		X		X		3
Ida r	X				X		2
Dan n	X			X	X	X	4
Brenda r	X	X	X			X	4
Ruth n		X				X	2
Total	5	3	2	2	4	4	20

Key:

X means benefits of medicine dispensers identified by health care workers.

r means health care workers who are registered nurses.

n means health care workers who are nursing aids.

In the table above, five of the six health care workers identified keeping medicine in a safe way as a benefit of medicine dispensers, helps in taking medicines on time was mentioned by three health care workers of those interviewed and reducing errors as a benefit of medicine dispensers was mentioned by two of the six health care workers. Four of the six health care workers interviewed mentioned time saving as a benefit of using medicine dispensers. Of the six health care workers interviewed, four mentioned boosts independence of patients as a benefit of using medicine dispensers.

4.3. Challenges of medicine dispensers

This part focuses on challenges of medicine dispensers mentioned by health care workers and responses that were repeatedly mentioned will be presented and analysed.

The six health care workers that were interviewed reported that medicine dispensers cause stress to patients. All of them unanimously agreed on this. Tom pointed out that;

Some patients with dementia have paranoia to the medicine dispensers they have a hard time to understand and apprehend the meaning of the object in their home.

Tom further stressed that, elderly with severe dementia easily get disturbed by the lights and sounds of alarms made by dispensers when medicines are ready to be taken. He said:

Dispensers make sounds and have a green light when it is time to take the medication. Patients with severe dementia have a hard time to understand or comprehend what they are seeing in their house. What does that green button mean? Does it mean that my house is burning?

Medicine dispensers can trigger stressful situations to people with serious cognitive impairments. This stress could be triggered by dispensers making alarms and flashlights which patients with dementia may relate with a door alarm or something burning respectively (Svagård & Boysen, 2016).

As patients' dementia gets severe, they become more dependent on healthcare workers or family members. It becomes hard for them to understand why they have medicine dispensers and how they are used. The sight of a blinking light or alarms from the dispenser make these patients stressed and they sometimes unplug the power cable because they think that the blinking light is a fire hazard. All the six health care workers unanimously mentioned this as a challenge.

In addition to stress, all the interviewees apart from Tom indicated that the lack of enough training of workers was a challenge in the use of medicine dispensers.

Paul cites lack of enough training for health care workers in operating the medicine dispensers. On this issue, Paul mentioned:

It requires an ample amount of training to get used to these dispensers, or to know how to fix them or get access to the medicine. If the employees do not know how to fix the dispenser, then we are more prone to human mistakes.

Brenda, who is one of the health care workers with a long experience in working with people with dementia using medicine dispensers, admitted that she still faces problems in operating a pillbox. On this issue of lack of enough training, she said:

Many part time workers get a brief training and they are given a sheet of instructions, which I do not think is enough...personally I still have problems in operating a pilly

Brenda explains that she faces problems when she is putting medicines in a pilly, she said that at times she gets confused whether she will begin from the right or left side and that it makes her feel nervous about performing this task.

Anne, Bjørg, & Torhild, (2017) agree with this argument that proper training of health care workers improves the effectiveness of medicine dispensers.

It was also indicated by four of the six interviewed health care workers that dispensers failure to work was among the challenges faced. Tom, Paul, Dan and Brenda said that when there is a technical problem, the medicine dispenser is rendered useless as it cannot perform its expected task. Causes of technical problems indicated above can be disruptions in electricity and software updates. On this issue, Tom said:

When there is an electrical disruption it affects the dispensers. When the electricity goes off it becomes impossible to take the medicines out.

However, this technical failure of dispensers can be solved by calling in technicians although sometimes it takes long for the problem to be solved.

Size of dispensers was also reported as a challenge especially to the elderly who like aesthetics and having organised living rooms. Tom mentioned that, some patients are bothered by the size of the dispensers because they occupy much space. While Ruth mentioned that because of the size of the dispenser it is not possible to go with it in case a patient wants to spent time outside their house. Five of the six health care workers who were interviewed mentioned that size of dispensers was a challenge.

The findings also showed that some elderly people were sceptical to new technology. Ida, Dan and Ruth mentioned this as a challenge. On this issue, Dan mentioned that:

Some elderly people do not like change in their routines, especially when it is new technology. It takes them time to adapt to new ideas because they fear making mistakes.

Elderly people are not used to new technology, they view gadgets like medicine dispensers as complicated and very advanced for them to learn.

In addition to being sceptical of the new technologies, some elderly with dementia had a negative attitude towards medicine dispensers. According to healthcare workers, some of their patients did not welcome the idea of medicine dispensers because they saw it as a burden.

The table below summarises the presentation and analysis of the challenges of medicine dispensers as collected from the six health workers.

Table 5. Challenges of using medicine dispensers

Informants	Stresses patients	Sceptical to new technology	Dispenser Size	Failure of dispensers to Work	Difficult to operate	Lack of training	Total
Tom r	x		X	X			3
Paul r	x		X	X		X	4
Ida r	x	X	X			X	4
Dan n	x	X		X		X	4
Brenda r	X		X	X		X	4
Ruth n	X	X	X		X	X	5
Total	6	3	5	4	1	5	24

Key:

X means that the challenge was mentioned by the health worker

r means that the health worker is a registered nurse

n means that the health worker is a nursing aid

As shown in table 5, several challenges were mentioned by the health workers. All the six healthcare workers interviewed said that medicine dispensers stress patients. Three health workers interviewed mentioned patients being sceptical to new technology as a challenge in the use of medicine dispensers and medicine dispenser size was mentioned as a challenge by five of the six health workers interviewed. Four of the health care workers pointed out challenges of medicine dispensers' failure to work while only one health care worker

identified difficult to operate as a challenge of using medicine dispensers. It was five of the six health care workers who identified lack of enough training of health care workers as a challenge in use of medicine dispensers.

4.4. Strategies for improving on the use of medicine dispensers

Providing enough training to healthcare workers in the use of medicine dispensers was mentioned as a strategy for improvement. Tom, one of the healthcare workers mentioned that:

I am one of the resource persons at our workplace that oversees welfare technology. I usually guide my colleagues whenever they meet challenges with dispensers. But this short guidance is not enough, there is still need for extensive training of health care workers.

Tom is also concerned about new healthcare workers who are not given enough training and he expressed a wish for a plan or programme for training but he has not yet seen or heard of any. On the same issue of training, Dan mentioned that:

I think we need more detailed and specific training for this project. Right now, we depend on each other according to the experience one has, but it would be much better if all healthcare workers got the right training right from the beginning.

According to Frennet & Baudin (2019), welfare technology as a concept is defined as the knowledge and use of a technology that can maintain and/or increase the feeling of safety, activity, participation and independence for a person of any age who has or is at an increased risk of having/developing a disability. Training of health workers can increase their confidence and improve their skills which helps providing better quality services.

Tom, Ida and Brenda mentioned covering lights of medicine dispensers as a strategy. This is because covering the lights minimises the disturbance they cause to the patients. Patients with severe dementia can be sensitive towards things like sounds and light, to minimise any stressful situation caused by medicine dispensers, health care workers cover lighting buttons or turn dispensers' lights to where they will not be seen by patients.

On this issue, Tom said:

We usually turn these dispensers away from patients' sight so that they are not disturbed by lights.

Evaluation of patients was also mentioned as a strategy for improving on the use of medicine dispensers. Paul, Dan and Brenda mentioned that it is important to first make a thorough evaluation of patients before they begin using medicine dispensers. The importance of this was getting to know who will make good use of medicine dispenser and who will not benefit from it. For instance, patients with severe dementia cannot benefit from medicine dispensers as they make them very confused and uncomfortable. Svagård & Boysen (2016) also suggest that it is important to first identify who will benefit from the technologies in order to make good use of it.

Early use of medicine dispensers was also mentioned by Ida and Brenda who had experienced that patients in their early stages of dementia are able to use medicine dispensers for a longer period of time as this task gets integrated in their daily routines.

On this issue Brenda said:

Patients in early stages of dementia can still learn new things and if they learn to use medicine dispensers as early as possible, it will help them keep that routine for a longer time.

This is backed by Svagård & Boysen (2016) who suggested that introducing welfare technology earlier would probably help the users to get used to medicine dispensers as early as possible.

Another strategy mentioned by health workers was reducing on the size of the medicine dispensers. As mentioned above, medicine dispensers especially Evondos is big in size and can be bothersome to some patients who like orderly living rooms. According to healthcare workers, some patients would appreciate smaller size medicine dispensers.

Health care workers said that based on the feedback from their patients, most of them were not satisfied with the size of evondos machine, they think it is big and occupies a lot of space.

In their discussion of social model of disability, Milligan & Thomas (2016) indicate that there are some institutional and collective barriers faced by people with dementia like failure to design or adapt items, interiors, buildings and many others, to enable people with dementia remain active, engaged and comfortable. Facilitating people with dementia with aids that fit their abilities can enable them to live longer in their homes. The importance of living in their own homes is the freedom and independence they maintain, and it gives a sense of belonging.

Table 6 shows a summary of the presentation and analysis of data collected on strategies of improving on the use of medicine dispensers.

Table 6. Strategies for improving on the use of medicine dispensers

Informants	Social strategies			Technical strategies		Total
	Enough training	Covering lights on dispensers	Evaluation of patients	Early use of dispensers	Reduce on size of medicine dispensers	
Tom r	X	X			X	2
Paul r	X		X			2
Ida r		X		X		2
Dan n	X		X		X	3
Brenda r	X		X			2
Ruth n	X	X				2
Total	5	3	3	1	2	14

Key:

x means the strategy identified by the informant

r means that the informant is a registered nurse

n means that the informant is a nursing aid

The table shows that altogether 14 strategies were mentioned by informants. Two main categories of strategies; social strategies and technical strategies were identified and five sub – categories that is; enough training, cover lights on the dispensers, evaluation of patients, early use of medicine dispensers and reducing on the size of dispensers.

Social strategies as a main category was sub grouped into three subcategories of enough training, covering lights on dispensers and evaluation of patients. Three health care workers interviewed identified a need for evaluation of patients as a strategy and five of the health care workers mentioned enough training of health care workers as a strategy for improvement. Three health care workers mentioned covering lights of dispensers by health workers. Early

use of medicine dispensers was mentioned as a strategy for improvement in the use of medicine dispensers by only one health care worker.

Technical strategy was sub-grouped into two subcategories that is; early use of dispensers and reducing on the size of medicine dispensers. Two health care workers mentioned early use of dispensers as a way of making patients familiar to the dispensers. While other two mentioned reducing on the size of medicine dispensers as a strategy for improvement.

All in all, one of the interesting findings of this study is that medicine dispensers cause stress to some people with dementia as indicated by healthcare workers who were interviewed, despite the benefits they contribute to the delivery of home healthcare services.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

Introduction

In this chapter, the findings are discussed and conclusions drawn based on theory, related literature, methodology and theoretical framework on the previous chapters.

In this study healthcare workers' perception on the use of medicine dispensers is described in relation to benefits, challenges and strategies for improvement.

In order to answer the above research problem, the following research questions were used:

- (1) What are the benefits of using medicine dispensers to people with dementia?
- (2) What are the challenges faced by people with dementia in the process of using medicine dispensers?
- (3) What are the strategies for improving on the use of medicine dispensers?

A case study with qualitative methods of data collection and analysis was used to study the phenomenon in depth and in its real context. Data was collected from six home health care workers using interview method.

The social model of disability was adopted. The model will be used in discussion of the findings to understand the perception of healthcare workers in relation to the use of medicine dispensers by people with dementia.

5.1. Benefits of using medicine dispensers to patients with dementia

Findings of this study reveal that medicine dispensers help in maintaining the safety of medicines. This is in agreement with Kollak (2017) who argues that new technological innovations like medicine dispensers contribute in keeping medicines in a safe way. The benefit of this result is to maximize patient safety and can be achieved through the choice of medicine dispensers which open only when medicines are ready and limit access to medicines that are not yet ready for taking to avoid overdose. Medicine dispensers control this because they have a lock system which is controlled by healthcare workers or family care givers, thereby reducing medication errors. With the advance of welfare technology in healthcare services, the implementation of medicine dispensers is a step towards keeping medicines safe and reducing errors in medicine administration.

Further still, the present study confirmed that, the use of medicine dispensers help in reducing frequent visits by health care workers. Svagård &Boysen (2016) share the same idea that use of medicine dispensers help in reducing on health care workers' visits and maintain patients' self-reliance and this saves health care workers' time which they can use to attend to other duties. The result of this analysis applies to the current situation of Covid-19 pandemic where social distancing is a necessity.

Further findings indicate that use of medicine dispensers boost patients' independence and makes them take control of their own life. This finding resonates with the social model of disability which clearly indicates that physical or mental disabilities should not be a hinderance of living a normal life. The model encourages a change in society's perception of disability by not dwelling much on the medical model which insists that disability is a medical problem that needs to be treated. It rather suggests taking appropriate measures like empowering and involving people with disabilities like dementia, in decision making as a means of helping them to live an independent life (Milligan & Thomas, 2016). This was also expressed by healthcare workers who were interviewed and is backed by Svagård & Boysen (2016) who argued that the use of medicine dispensers helps patients in maintaining their independence. For instance, patients get freedom to go out without having to wait for healthcare workers to help them with medications as was the routine before. Critically however, to be effective, this technology relies on the support of healthcare workers who can respond when a need arises, for example when there is a technical issue or when patients fail to take their medicines despite being released by medicine dispensers.

5.2. Challenges of using medicine dispensers

As any other new innovation, the study reveals that the use of medicine dispensers presents challenges too. Findings reveal stress caused by dispensers, especially to patients with severe dementia as a challenge in the use of medicine dispensers. Health care workers pointed out that dementia patients get disturbed by alarms and lights which leads them to unplug the dispensers. This finding supports earlier findings that medicine dispensers can trigger stressful situations to people with serious cognitive impairments (Svagård &Boysen, 2016). This finding leads to similar conclusion that stress could be triggered by audio and visual alarms which patients with dementia may relate to other things like a fire hazard.

Another finding was technical problems encountered in the use of medicine dispensers. Healthcare workers who were interviewed revealed that medicine dispensers get technical problems and fail to perform the way they are supposed to.

To sum up the above finding, when technical issues occur, it becomes impossible to take out medications, this means that a healthcare worker has to first go to the patients' home and solve the problem. This takes time and resources which would otherwise be located in other activities.

Another finding identified in the study was lack of enough training for healthcare workers in operating medicine dispensers. It was pointed out as a challenge that affects their confidence towards the use of medicine dispensers. From these findings, it is clear that operating medicine dispensers requires some knowledge for both healthcare workers and patients.

5.3. Strategies for improving on the use of medicine dispensers

Findings of this study revealed that there is a need for more training on how to use medicine dispensers. The importance of adequate training is also emphasized by Anne, Bjørg, & Torhild, (2017) who observe that proper training of health care workers contributes to the effectiveness of medicine dispensers. Despite the effectiveness of training to improve the performance in tasks in patients with dementia, findings revealed that there is still need for physical presence of healthcare workers.

The findings further revealed that there was need for evaluation of patients before they start to use medicine dispensers. This helps to identify patients with dementia who can ably use medicine dispensers. Health care workers pointed out that some patients had to stop using medicine dispensers only after a few days, because they could not handle having them around and this shows that there was poor evaluation or lack of evaluation at all. This is supported by Holthe & Wulf-Jacobsen (2016) who pointed out that for technology to be accepted and useful, it must be selected according to a person's needs, habits and preferences. This clearly shows that evaluation of patients is an important aspect to consider when introducing a new technology.

Findings also revealed that beginning to use medicine dispensers in the early stages of dementia is beneficial to them because the task becomes part of their daily routines.

The same view is shared by Svagård & Boysen (2016) who suggested that introducing welfare technology earlier would probably help the users to get used to medicine dispensers as early as possible.

Summing up the above findings, the evaluation of patients gives healthcare workers a clear picture of patients' needs. Further still, the declining cognitive ability is a challenge to people with dementia but with the early use of medicine dispensers, they can be able to recall this repetitive task and it eventually can be connected to their daily activities.

5.4. Conclusion

The issues concerning the use of medicine dispensers in relation to their benefits, challenges and strategies for improvement in Norway, have been cited and discussed based on relevant literature, experience, the findings of the present study and on the disability theory with its two models of social model of disability and medical model of disability.

From the results of this study, it is clear that the use of medicine dispensers helps in the effective administration of medicines to the people with dementia especially in reducing errors and increasing independence of the patients thus improving on their wellbeing.

Despite the benefits of using medicine dispensers, challenges continue to be reported and they appear to stem largely from medicine dispensers being a new technology thus needing a lot of training to both the healthcare workers and the patients on how to use them. Likewise, technical failures of medicine dispensers were continuously identified as a cause of challenges in the use of medicine dispensers.

Although there is a widespread talk about the importance of welfare technology, in this case medicine dispensers, not all patients were positive in using them. This means that there is still need for sensitization of both the patients and the home healthcare workers about the new technology.

5.5. Recommendations

Recommendations from the above discussions mainly concern healthcare workers, welfare technology manufacturers and policy makers.

From the findings of the study, it is evident that challenges in the use of medicine dispensers still persist and this draws some negative reactions from the patients with dementia.

The following recommendations should be put into consideration:

- Evaluation of patients with dementia should be emphasised in the selection process to identify those that are capable for using medicine dispensers.
- There is need for sensitization of patients about the benefits of using medicine dispensers. This may help reduce negative attitudes patients have on medicine dispensers as a new technology. Sensitisation should also be extended to health workers who view medicine dispensers as a waste of time and resources.
- In the production of medicine dispensers, manufacturers of welfare technologies should put into consideration the size and design of medicine dispensers that are seen not to be very big. The big size of medicine dispensers has been identified as a concern to some patients who claim that they occupy a lot of space in their living rooms. Additionally, some patients would like portable devices that they can be able to take out on walks.
- Policy makers and stakeholders should work together to support municipalities to enhance programmes like extensive training which equips healthcare workers with necessary knowledge and skills in the use medicine dispensers.
- A future study whereby relatives of people with dementia are involved would be of great importance as it can help get extensive information on people with dementia even before they were admitted in the home healthcare services.
- For future research, a more extensive study that covers the use of medicine dispensers in the whole of Norway and probably using quantitative method is highly recommended as it covers a big number of respondents.

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Appendices

Appendix 1

Interview guide questions for health care workers

Research questions:

1. Background experiences

1.1. Can you tell me about your professional background?

2. Use of medicine dispensers in the provision of care for people with dementia

2.1. What are medicine dispensers?

2.2. How do patients use medicine dispensers?

3. Benefits of using medicine dispensers

3.1. How do patients with dementia perceive the use of medicine dispensers?

3.2. In your opinion, how is the use of medicine dispensers beneficial for the patients with dementia?

3.3. How effective do you think medicine dispensers are in the administration of medicine?

4. Challenges of using medicine dispensers

4.1. How long have you helped patients with the use of medicine dispensers?

4.2. What do you think are the challenges in using medicine dispensers?

4.3. Could you talk more about these challenges?

5. Strategies for improving the use of medicine dispensers in the care for people with dementia

5.1. What areas do you think can be improved on?

6. Do you have any other thing to talk about in regard to the use of medicine dispensers in the provision of care to the elderly with dementia?

Appendix 2

NSD INFORMATION SHEET

NSD REFERENCE NUMBER: 170534

Welfare technology in the provision of healthcare services to people with dementia: the use of medicine dispensers

The purpose of this study is to understand the contribution of medicine dispensers and challenges encountered while using them in home healthcare services for people with dementia. The following are the research questions: 1. What are the benefits of using medicine dispensers? 2. What are the challenges faced in the process of using medicine dispensers? 3. What are the strategies for improving on the use of medicine dispensers in the care for people with dementia?

This thesis will be based on a qualitative study design and thematic analysis will be used to analyse the data collected from interviews.

The importance of this thesis is to explore the role of welfare technology especially the use of medicine dispensers by people with dementia in home healthcare services.

Who is responsible for the research project? Oslo Metropolitan University is the institution responsible for the project.

Why are you being asked to participate?

Each interviewee will be requested to participate voluntarily and the purpose of the study explained to them. They will be informed about what will occur during the research study and how the findings will be utilised.

Appendix 3

INFORMED CONSENT

The data subject should receive written and/or oral information about the project and consent to participation. You must ensure that the information at least includes the following:

The purpose of the project and what the collected personal data will be used for

The purpose of this study is to understand the contribution of welfare technology, especially the use of medicine dispensers and challenges encountered while using them in healthcare services for people with dementia.

Your rights to participate in this study:

You are free to participate in this study.

You can leave at any time you want without having to give reasons.

You do not have to answer any questions you do not want to

Your decision to leave the study will not affect your relationship with me

All data and materials collected in relation to you will be destroyed immediately.

The information you give will be anonymised when the project ends and the thesis approved.

The expected time for the end of the project is 15.05.21. All recordings will be deleted.

As long as you can be identified in the data material, you have a right to:

You have the right to access which personal data is registered and to receive a copy of information,

To have personal information about you corrected,

To have personal information about you deleted, and

To send a complaint to the Norwegian Data Protection Authority about the processing of your personal data.

Appendix 4

Thesis progression plan 2019 - 2021

August 2019 - December 2019	<ul style="list-style-type: none">• Lectures• Theoretical framework• Library guidance• Topic development
January 2020 - June 2020	<ul style="list-style-type: none">• Lectures• Research methods• Library guidance• Topic development continued• Proposal development• Guidance from supervisor
August 2020 – December 2020	<ul style="list-style-type: none">• Lectures• NSD approval of the project• Thesis preparation seminar• Proposal writing• Data collection• Guidance from supervisor
January 2021 – May 2021	<ul style="list-style-type: none">• Guidance from supervisor• Thesis writing• Draft thesis• Remarks for correction from supervisor
May 2021	<ul style="list-style-type: none">• Submission of final thesis