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Healthcare workers' perceptions of the use of gloves and observed compliance with national guidelines in two Norwegian nursing homes

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Master's in Public Health Science

Acknowledgments

This marks the end of a long and instructive journey. I once had a dream of doing a master's degree, and now I am almost there. I am humbled by all the wonderful, knowledgeable professors I have learned from at the Norwegian University of Life Sciences (NMBU), and by everyone who has shown interest in my master's degree, especially the participants in this study. Thank you for sharing your perceptions and opinions and letting me observe you during your work. I could not have done this without you! And of course, thank you to my employer the Nursing Home Agency in Oslo municipality, for giving me the freedom to do this master's thesis.

My interest in infection prevention started growing as the Methicillin-resistant *Staphylococcus aureus* (MRSA) outbreak spread in a nursing home at an earlier workplace. To see the fear in the residents' eyes when they had to live in isolation is something I never will forget. During outbreaks, healthcare workers use disposable equipment that generates plenty of waste. Much of the equipment is made of or with plastic parts. The decomposition of plastic takes centuries, and in recent decades we have become more aware of the damage plastic poses to the environment. Through my work as an infection prevention nurse, I have a particular interest in investigating how gloves are used in nursing homes, both with regards to infection prevention, to secure the skin on healthcare worker's hands and to see if any overuse of gloves can be prevented considering the United Nations' Sustainable Development Goals. I hope this study can bring new insight into facilitators and barriers to correct glove use.

First, I want to send a huge thank you to my wise and patient supervisor Sheri Bastien, professor at NMBU. You are worth your weight in gold! Thank you for all the good insight, guidance, quick response, and cheering. Never change your Canadian way of lovely and precise feedback. To my co-supervisor, Mette Fagernes, senior adviser at the Norwegian Institute of Public Health, thank you for all your time, knowledge, insight, and positivity. Never stop sharing your beautiful smile and your wisdom. My fellow student, Ida Bjørnerud, thank you for participating in this master's thesis as a notetaker, for feedback, and for listening to my frustration. Maybe I will be lucky and work with one of you again someday.

Lastly, I want to send love and happiness to my whole family, and especially my patient and caring husband Torgeir Wiik for letting me have all the time I needed to fulfil my wish to do this master's degree. I love you all!

Pia Cathrin Kristiansen, May 14th, 2023

Sammendrag

Bakgrunn: Feil bruk av hansker kan føre til smitteoverføring og helsetjenesteassosierte infeksjoner (HAI). Hansker er nødvendig når helsepersonell (HP) kan risikere å komme i kontakt med blod, andre kroppsvæsker eller ikke-intakt hud, og når de håndterer mulig smittsomme personer eller kontaminerte gjenstander og flater. Tidligere forskning har påvist feil bruk av hansker i form av bruk uten at det er indikasjon, hansker blir ikke skiftet, eller tatt av i tide, eller manglende håndhygiene etter at hanskene er tatt av. Feil bruk og overbruk av hansker kan, i tillegg til HAI, føre til irritert hud eller eksem på hendene til HP, til forurensning av miljøet, og er en økonomisk og økologisk belastning for samfunnet.

Problemstilling: Denne studien ønsker å få en dybdeforståelse av helsepersonell sine holdninger til bruk av hansker og etterlevelse av de nasjonale retningslinjene for bruk av hansker i sykehjem. Funn fra studien bør være av interesse for fagmyndighetene, smittevernpersonell, utdanningsinstitusjonene og ledere ut fra et pasientsikkerhets- og kvalitetsforbedringsperspektiv. Funnene kan også være av interesse for fagfolk som jobber mot et mer bærekraftig miljø.

Metode: Studien har en utforskende konvergent-parallell blandet metode-design som sammenligner observasjoner med fokusgruppeintervjuer. Studien ble gjennomført ved to kommunale sykehjem i Oslo i løpet av to uker i januar og februar 2023.

Resultater: Observasjoner av 19 HP ble gjort i til sammen 73 episoder der hansker ble brukt (n=67) eller burde vært brukt (n=6). Hansker ble tatt på til riktig tid og i samsvar med indikasjonen 51 ganger. Overbruk ble identifisert i 16 situasjoner (21,9 %). Håndhygiene manglet etter bruk av hansker i 53,7 % eller 36 av 67 observasjoner. Det ble gjennomført to fokusgruppeintervjuer med totalt 13 deltakere. HP har et høyt ønske om å gjøre det beste for beboerne på en verdig måte. Avgjørelsen om å bruke hansker blir formet av sosiale normer og kunnskap, erfaring og følelser ut fra beboerens behov, oppgaven de skal utføre og retningslinjer for bruk av hansker.

Konklusjon: Til tross for kunnskap om retningslinjene, fører ikke HPs holdninger og oppfatninger om hanskebruk til etterlevelse. Det er avgjørende å identifisere drivere og barrierer og målrette nye intervensjoner og forbedringsprogrammer som kan øke etterlevelsen av retningslinjer for hanskebruk i sykehjem. Denne studien indikerer et spesielt behov for målrettede intervensjoner for å bedre etterlevelse av håndhygiene etter hanske bruk.

Abstract

Background: Incorrect glove use can result in cross-contamination and healthcare-associated infections. Gloves are required when healthcare workers (HCWs) are at risk of contact with blood, body fluids, or nonintact skin and when handling potentially infectious materials or contaminated items and surfaces. Previous research has found evidence of incorrect glove use in form of no indication for use, not changed, not doffed timely, or due to lack of hand hygiene after removal. Misuse and overuse of gloves can, in addition to HAI, lead to irritated skin or eczema on the hands of HCWs, contamination of the environment, and are an economic and ecological burden on society.

Aim: To develop an in-depth understanding of HCWs' attitudes and perceptions of gloves and explore barriers and facilitators as well as compliance with national guidelines. Findings from the study should be of interest to the professional authorities, infection control personnel, health education institutions, and managers from a patient safety and quality improvement perspective. The findings may also be of interest to professionals working towards a more sustainable environment.

Methods: A convergent-parallel mixed methods study design comparing observations with focus group interviews. The study was conducted at two municipal nursing homes in Oslo for two weeks in January-February 2023.

Finding: Observations of 19 HCWs resulted in 73 episodes where gloves were used (n=67) or should have been used (n=6). Overuse was identified 16 times (21.9%). Lack of hand hygiene after glove removal was observed in 36 out of 67 instances (53.7%). The two FGIs of 13 HCWs revealed that the decisions to use gloves are influenced by social norms, knowledge, experience, and emotions related to resident needs, tasks, and gloves. Availability of gloves was a facilitator, while glove quality posed a barrier.

Conclusion: Although HCWs possess knowledge of glove use guidelines, their attitudes, and perceptions do not necessarily translate into compliance. It is crucial to identify drivers and barriers and target new interventions and improvement programs that can increase compliance with guidelines for glove use in nursing homes. This study indicates a particular need for targeted interventions that focus on improving compliance with hand hygiene after glove removal.

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List of abbreviations

AMR -	Antimicrobial resistance
CO ₂ -	Carbon monoxide
FGI -	Focus group interview
HAI -	Healthcare-associated infections
HCW –	Healthcare-worker
MMAT-	Mixed methods appraisal tool
NEM -	National Committee for Medical and Health Research Ethics
NIPH -	Norwegian Institute of Public Health
NMBU -	Norwegian University of Life Sciences
NOST –	National tool for observing infection prevention measures in healthcare
PEG -	Percutaneous endoscopic gastrostomy feeding tube
PPE –	Personal protective equipment
REK-	Regional Committee for Medical and healthcare research ethics
SEIPS -	Systems Engineering Initiative for Patient Safety
SDG-	Sustainable Development Goals
SIKT -	Norwegian Agency for Shared Services in Education and Research
TPB -	The Theory of Planned Behavior
UN-	United Nations
US-	United States
WHO -	World Health Organization

1. Introduction

Healthcare workers' (HCW) perceptions of glove use and compliance with national guidelines is an under-researched issue in Norway. Glove use in healthcare settings is of substantial public health importance. About 32,000 people live in nursing homes in Norway (Statistics Norway, 2022). Nursing home residents are a vulnerable group who require a high degree of assistance with daily activities and medical care. This master's thesis aims to develop an in-depth understanding of HCW attitudes and perceptions of glove use and explore barriers and facilitators as well as compliance with national guidelines in two nursing homes in Oslo municipality and to contribute with new knowledge to fill this gap.

1.1 Glove use and healthcare-associated infections

According to World Health Organization (WHO) (2009a), HCWs are required to wear non-sterile disposable gloves (hereafter referred to as gloves) during all patient-care activities that may involve exposure to blood and other body fluid, mucous membrane, and non-intact skin, during contact precautions and outbreak situations. Correct glove use reduces the spread of bacteria and viruses to the environment.

Previous research has found that hand hygiene is not carried out according to the 5 moments of hand hygiene when gloves are used (World Health Organization, 2010). A systematic review of glove use found that inappropriate glove use can increase HAI (Picheansanthian & Chotibang, 2015). Overuse and misuse of gloves will in turn lead to increased stress on the skin of HCW hands resulting in incidences of dry skin and eczema (Folkehelseinstituttet, 2017b). In the WHO glove use leaflet (2009a) inappropriate glove use is stated to be a waste of resources.

Findings from the Norwegian Point Prevalence Survey (Berg et al., 2019) show that 3.6% of all nursing home residents have a healthcare-associated infection (HAI) at any given time. HAI are infections acquired during the process of receiving care in health institutions. Infections lead to reduced quality of life and premature death (Strand et al., 2023), and is an unnecessary burden to the resident, their next of kin, employees in healthcare settings, and the wider society (Berg et al., 2019). Most HAIs are caused by bacteria and treated with antibiotics. Unnecessary use of antibiotics can lead to antimicrobial resistance (AMR). The occurrence of AMR in Norway is low but increasing (NORM/NORM-VET, 2021). AMR is one of the top ten global public health threats (World Health Organization, 2021).

1.2 Laws and regulations that situate correct glove use from a public health perspective

The purpose of the Public Health Act (Helse- og omsorgsdepartementet, 2012) is to contribute to social development that promotes public health and to help prevent mental and somatic illness, injury, or suffering. Regulations concerning infection control in the health service aim to prevent and limit the occurrence of infections (Helse- og omsorgsdepartementet, 2005).

The United Nations (UN) Sustainable Development Goals (SDGs) (2023) are the world's joint work plan to eradicate poverty, fight inequality and stop climate change by 2030. When gloves are produced, carbon dioxide (CO₂) is released into the air and acidifies the environment. According to Jędruchiewicz et al. (2021), Malaysian global glove production alone was 480 billion pieces in 2021. Decomposition of plastic, including gloves, releases different toxic gases, and can cause respiratory problems and allergies, and micro- and nano-plastics contaminate both soil and water (Jędruchiewicz et al., 2021; Vadera & Khan, 2021; Verma et al., 2016). Correct glove use may reduce the production of gloves and waste, which in turn may lead to a more sustainable environment.

1.3 Structure of the master's thesis

A parallel convergent mixed-method study design was chosen by including both focus group interviews (FGI) to get an insight into HCWs' attitudes and perceptions of glove use and observations to find glove use compliance. From here on, observation, both in terms of method and result, will be discussed first before FGI. The study report is written as an article with mantel. The article will be submitted to a relevant international journal for publication and is attached in Appendix 10. The mantel contains reflections on background, method, and the study's quality in a more thorough way than the article. The public health relevance and theoretical aspects will be elaborated on in the mantel.

The next chapter sets the stage by providing background information and previous research findings before the aim of the study and the research questions are presented in chapter three. In chapter four, the theoretical framework and its relevance to the thesis are explained. Chapter five details the methodology, including data collection and analysis. A summary of the results given in the article is presented by themes and sub-themes in chapter six. Relevant quotes from the FGIs will be highlighted to illustrate the findings. Last, in the mantle, a discussion of the findings will be made, followed by a conclusion with implications for practice and recommendations for further research in chapter eight.

2 Background

2.1 Guidelines for glove use

Gloves are to be worn for two reasons; 1) to reduce the risk of contamination of HCW's hands with blood and other body fluids, and 2) to reduce the risk of spreading bacteria and viruses to the environment and of transmission from the HCW to the patient and vice versa, as well as from one patient to another (World Health Organization, 2009b). The glove use section in the Norwegian Hand Hygiene Manual (Folkehelseinstituttet, 2017a) states that nitrile or latex gloves are to be worn when 1) risk of contact with body fluids, including contact with blood, mucous membrane, and non-intact skin may occur 2) during contact precautions or outbreak situations 3) when handling or touching visible or possibly contaminated equipment or surfaces 4) when HCWs have eczema or wounds on their hands 5) when a risk of contact with harmful drugs or chemicals may occur and 6) during surgical, invasive, or aseptic procedures (sterile gloves and not a part of this study).

Gloves do not provide complete protection against contamination of the hands and are not a substitute for hand hygiene. Both WHO (2009b) and the Norwegian Institute of Public Health (NIPH) (Folkehelseinstituttet, 2017c) recommend that HCWs should disinfect or wash their hands before donning and doffing gloves to prevent cross-contamination.

According to Norwegian tender processes, 300 million gloves were used in healthcare in 2019, and the number is growing (OneMed, 2022). Over half of all HCWs experience skin problems during their work life (Folkehelseinstituttet, 2017b). Unnecessary hand washing, prolonged glove use, and inadequate skin cream contribute to skin issues (Kvam et al., 2019), which leave the skin with reduced barrier function and a risk of colonization with potentially pathogenic microbes that may lead to residents suffering from HAI (Folkehelseinstituttet, 2017b). Skin problems are an unnecessary suffering for the HCW and may lead to sick-leave days, a financial burden for the health service and society.

2.2 Search strategy

A search in PubMed and Google Scholar found hence 6700 articles and 18 000 hits published between 2010-2022 with the keyword "glove use". Most of the articles were investigating hand hygiene compliance.

A structured search was conducted in PubMed, Scopus, and Web of Science by using a PICO form. Searches were narrowed to English or Scandinavian language published in the last decade. Some of the keywords used were "glove" "PPE" "attitude" "nursing home"

“healthcare worker” (see Appendix 5 for more details). A new search in Ovid Medline and CINAHL was conducted in March and April 2023 (Appendix 6) guided by a librarian at the Norwegian University of Life Science (NMBU) to see if some new articles or reviews were missed or recently published.

An article about the misuse and overuse of gloves in hospitals in London (Wilson et al., 2015) became the starting point for a snowball sampling of articles from the reference lists, and again from these articles’ references.

2.3 Previous research on glove use

Wilson and colleagues (2015) found 57% inappropriate glove use and risk of cross-contamination in almost 50 % of all episodes of care where gloves were used. Unfortunately, they are not alone in finding glove use to be a pattern of concern. A study conducted in three US hospitals revealed that HCWs reported higher compliance rates than what was observed (Baloh et al., 2019). HCWs mentioned using gloves more frequently than required, primarily for their own safety. Interviews of 20 hospital-working nurses in Britain found that feelings of dirt and disgust are key drivers for their use of gloves (Jackson & Griffiths, 2014). Two observation studies on glove use in hospitals in England and Wales (Fuller et al., 2011; Loveday et al., 2014) and a cluster randomized controlled trial of hand hygiene interventions in Dutch nursing homes (Teasing et al., 2021), found that glove use is associated with lower hand hygiene compliance.

Gloves that are used too long are a cause of concern due to the risk of cross-contamination of the patients, the environment (Lindberg et al., 2020), and HCWs’ hands and wrists (Alhmidi et al., 2019). A French observational study of care given to known colonized or infected patients in a university hospital found pathogenic bacteria in 86% (n=19) of the used gloves that were microbiologically cultured (Girou et al., 2004). The same strain was also found in environmental surfaces, but only in four percent of the samples.

2.4 Glove use in Norwegian nursing homes

No Norwegian studies on glove use were found through literature searches nor by asking the co-supervisor if she knew of published studies. In a hand hygiene study at nursing homes in Oslo during the Covid-19 pandemic, hand hygiene compliance was found to be 58.3% (Sandbekken et al., 2022). The study indicated a strong correlation between hand hygiene and glove usage, with a 30.8% decrease in compliance when gloves were used.

3 Aim of the study and research questions

This study aims to develop an in-depth understanding of HCW perceptions of glove use in nursing homes and compliance with national guidelines. To do so, an exploratory convergent-parallel mix method was carried out by using observation of glove use compliance and focus group interviews (FGIs) of HCWs' perception of glove use. By understanding the HCW's considerations regarding glove use and actual behaviour, deviations from the recommendations can be mapped. This knowledge can be used to design and implement improvement measures for better infection prevention. Facilitators can be optimized, and barriers addressed to increase compliance with glove guidelines. The result may reduce the prevalence of HAI and the incidence of HCWs with irritated skin or eczema. Finally, reduced consumption of gloves will contribute to a sustainable environment and reduce costs in the health service and for society.

The research questions guiding this study are:

- To what extent is there consistency between HCW perceptions of when they should use gloves and observed compliance with national guidelines?
- How do HCWs experience and describe their own glove use?
- What are the main barriers and facilitators to correct and consistent compliance regarding glove use, according to the HCW and the observations?

To the best of my knowledge, this is the first study conducted in Norwegian nursing homes where the aim is to develop an understanding of HCW perceptions of glove use and subsequently compare these findings with the observation of compliance with national guidelines. Findings from this study should be of interest to the professional authorities, infection prevention personnel, and quality managers in the healthcare system from a patient safety and quality improvement perspective. It may also be of interest to professionals working towards a more sustainable environment.

4 Theoretical frameworks

In this chapter, the theoretical framework guiding this study is presented. First, the significance of the Theory of Planned Behavior (TPB) for understanding HCWs as individuals and what influences their choices will be presented. Subsequently, the Systems Engineering Initiative for Patient Safety (SEIPS) - model will be elaborated. Healthcare settings are complex, and the SEIPS-model was developed as a theory to understand how various factors affect outcomes.

This study adopts a pragmatic phenomenological hermeneutic approach (Lindseth & Norberg, 2004). Pragmatic relates to both quantitative and qualitative methods have strengths and weaknesses, but they can complete each other (Creswell, 2010). Phenomenology can be understood as human experiences and hermeneutics as an interpretive science (Harstad, 2022; Kvale & Brinkmann, 2015) meaning the study of human experiences and actions (MacLeod et al., 2023).

4.1 The Theory of Planned Behavior

The TPB is a social psychological model developed from the Theory of Reasoned Action by Fishbein and Ajzen (Ajzen, 1991). Human behaviours are influenced by intentions, and primarily by three determinant factors: attitudes, subjective norms, and perceived behavioural control. Attitudes towards a specific behaviour are an evaluation of a person's different beliefs about the behaviour and the strength in which each belief is held. Subjective norms are the evaluation of normative beliefs that the person adds to important others and the person's motivation to comply with those others. A person's perceived behavioural control towards a particular behaviour involves evaluating the probability or frequency at which a specific control factor will arise, and determining whether that factor would be a facilitator or a barrier to the behaviour (Ajzen, 1991). These factors may be external factors and the perceived power of these factors strengthens their facilitating or inhibiting abilities (DiClemente et al., 2019). Facilitators are structural supports that enable the behaviour such as training, availability, and personal factors. Barriers act the opposite way, i.e., they are perceived as an obstacle to the behaviour (DiClemente et al., 2019). External factors may directly force or prevent a behaviour. When a behaviour is considered significant, subjective norms align with it, and individuals believe they have control over the behaviour, they are more likely to engage in that behaviour.

To explain the aim of this study considering TBP, the factors will then be as follows: Attitudes toward glove use are relevant in this context. Subjective norms can be considered social pressures and include both the perceived expectations of others and how much the HCW values those expectations. Colleagues, leaders, students, and residents all have expectations about glove use, and these are relevant subjective norms to consider for all these groups. Perceived behavioural control is how easy the HCW feels it is to use gloves, in a specific context. Thus, it includes both self-efficacy with the use of gloves, and external factors such as availability, the quality of the gloves, and which task the HCW is about to conduct. It is of interest to this study to find facilitators and barriers that will lead to glove use compliance.

The determinant factors do not always contribute equally to predicting intentions (Ryan & Worthington, 2021), and intentions do not always guarantee behaviour. People anticipate the emotions they experience after performing a particular behaviour. Having positive feelings about a deed or pride after performing a specific behaviour increases the likelihood that the behaviour will be repeated (Ryan & Worthington, 2021). This way previous behaviour can significantly influence future behaviour, specifically when behaviour is habitual or routine. As the behaviour becomes more habitual, the relationship between past behaviour and future behaviour increases.

Previous studies have shown that the majority of variability in observed behaviour is not accounted for by measures of the TPB (Sniehotta et al., 2014). Attitude and subjective norms still have a role to play in predicting, understanding, and changing behaviour, but in healthcare settings, other variables must be accounted for. This study will therefore connect TPB with the SEIPS-model.

4.2 The SEIPS 2.0-model

The SEIPS model, a framework developed by Carayon et al. (2006), provides a comprehensive understanding of the structures, interactions, processes, and outcomes within healthcare systems involving HCWs and patients or residents. Healthcare settings are characterized as complex, variable, uncertain, and dynamic sociotechnical systems, involving interactions between human and technological factors (National Health Service, 2022a). In healthcare, human factors play a crucial role, and systems are designed to be person-centred, systems-oriented, and driven by design principles (Holden et al., 2013).

The SEIPS model was developed as a theoretical framework to analyse how different factors influence patient safety outcomes in healthcare, aiming to reduce the risk of unnecessary harm and errors associated with healthcare delivery. SEIPS 2.0, is the next-generation model for human factors in healthcare settings and emphasizes the influence of the work system on work processes, which in turn shape the outcomes. The work system consists of six key factors: person(s), task, tools and technology, organization, internal environment, and external environment. Notably, SEIPS 2.0 includes all relevant individuals, including HCWs, residents, and others, within the person(s) component (Holden et al., 2013).

The **person(s)** factors describe individual characteristics such as age, skills, expertise, attitude, and beliefs and values that shape the performance of a task. The component also includes collective-level characteristics such as team cohesiveness or the similarity of knowledge among group members. The resident's preferences, goals, and needs are characteristic of this component. The **task** component describes how difficult, complex, varied, time-assuming and so on the task is to perform. **Tools and technology** are objects who is a help to do the work. The **internal environment** is described as the physical environment such as lighting and noise. The **external environment** includes factors outside the workplace, such as economic, ecological, and political decisions. Any number of work system components can interact simultaneously, at "a moment in time" (Holden et al., 2013), and can act both as a facilitator and a barrier.

Work processes can be decomposed into physical, cognitive, and social or behavioural performance processes. Work systems and processes undergo planned and unplanned adaptations (Health Quality Ontario, 2017). Outcomes are important indicators of performance and can, in turn, shape patient, professional, and organizational outcomes. Outcomes can be both desired and undesired. The SEIPS 2.0-model is attached for further understanding (Appendix 8)¹.

This study employs the SEIPS 2.0 model to identify the factors that impact the work system and influence the process of adhering to glove use guidelines. The desired outcomes include: 1) low rates of HAI 2) lower prevalence of HCW with irritated skin or eczema, and 3) a more sustainable local and global environment.

¹ Richard Holden was contacted by email and has permitted the SEIPS 2.0 model to be reproduced in this thesis (Appendix 7). NHS England has created national system-based learning response tools and guides and encourages organizations and others to use their tools in their work.

5. Methodology

In this chapter the choice of study design will be revealed, followed by the recruitment of participants. Then a presentation of the research and analysis methods will be given before the ethical considerations will be presented.

5.1 Choice of study design and data collection

The research question sets the framework for choosing the study design. The theoretical drive is to explore and describe glove use in two nursing homes. A convergent-parallel mixed method study design was chosen (Creswell, 2010; Edmonds & Kennedy, 2017) with quantitative observations and qualitative FGIs. Quantitative methods are useful for finding the quantity of a phenomenon with an explanatory purpose (Hellevik, 2011), while qualitative methods are suitable for answering questions related to subjective experiences of a phenomenon (Bjørndal et al., 2008).

To describe glove use compliance with national guidelines, observations can be useful (Baldi & Moore, 2018; Bjørndal et al., 2008). The Norwegian action plan (Helse- og omsorgsdepartementet, 2019) states that monitoring hand hygiene compliance is crucial for better compliance, and NIPH was given the assignment to prepare an observation tool. All hospitals and nursing homes should start using the tool. Due to the Covid-19 pandemic, the preparation of the tool was postponed, but it was launched in 2022 as an observation tool to measure infection prevention compliance (see 5.3.1 for more information). This study was therefore an important and timely opportunity to start using the tool and conduct observations of glove use.

To understand HCWs' perceptions of a phenomenon and understand their lives, qualitative interviews can be a useful method (Kvale & Brinkmann, 2015). Knowledge is gained in the interactions between the participant and the interviewer. Interviews are time-consuming in terms of performing, transcribing, and analysing (Kvale & Brinkmann, 2015). FGI is useful when the goal is to find the participants' experiences but also their interactions (Halkier, 2010; Malterud, 2002). FGI is characterized by an open narrative approach, and the aim is not to agree, but to keep the conversation going until no new opinions emerge (Kvale & Brinkmann, 2015). It is important that the person who prepares the interview guide and moderates the FGI has good background knowledge of the topic to be discussed (Kvale & Brinkmann, 2015). FGI can also be timesaving compared to individual interviews and may answer some of the factors in the work system factors described in the SEIPS 2.0-model. Since qualitative

interviews as a method must be learned by doing them, this was an opportunity to learn how to conduct FGI.

Data from observation and FGIs were collected simultaneously but analysed separately. Field notes were taken during both methods to help identify facilitators and barriers that can explain the findings. The point of integration took place after analyses of both data sets by using the theoretical framework described in chapter four to draw an overall conclusion. Both methods are described more thoroughly in paragraphs 5.3 and 5.4.

5.2 Selection and recruitment of participants

Before recruiting participants, a meeting with the research officer in the Nursing Home Agency, Oslo Municipal was carried out. The aim was to identify three municipal nursing homes of average size from different parts of the city. All nursing homes in Oslo have single rooms, but not all have private bathrooms. The average size of nursing homes in Oslo has 95 beds divided into different units, some of which are special departments of various forms. None of the special units other than departments for residents with reduced cognitive capacity was included. The selection was based on a desire to observe glove use during care given to the general group of nursing home residents.

Five nursing homes were suggested to be contacted, but after a phone call to all the head of institutions, one was excluded due to another ongoing study, and one could not participate at the time of the data collection in this study. An email with information about the master's thesis was sent to the head of the institution at the three nursing homes. They discussed the participation with their quality manager and head nurses. All institutions were positive, but one struggled with recruiting enough participants for the FGI. As the other two recruited enough participants for both methods, this institution was therefore excluded.

Inclusion criteria were having a healthcare education or being a student undertaking relevant studies (e.g., nursing, social worker, or health apprentice) and that they voluntarily agreed to participate. The inclusion criteria were based on other international studies to compare the findings. A convenient selection of HCW and time for observations were taken. HCWs at any units at the institutions who had a dayshift on a scheduled day for data collection were asked to participate. Not every unit had HCWs who wanted to participate on the scheduled days.

Participants who expressed interest in the study received written information (Appendix 1) one week before data collection. A text message was sent to the participants by the master student the day before data collection, providing details about the time and location of the

study. Participants were allowed to ask any questions by replying to the message. Basic demographic information, such as sex, age group, years since graduation, and length of employment in the unit, was collected from all participants (see Table 1).

Table 1 Sample composition of the twenty-four participants who took part in observation and/or FGI based on educational level, sex, and age.

Education levels	Total Observation	Total FGI	Only observation	Only FGI	Both	Total participants (%)
Nurse	5	5	2	2	3	7 (29.2%)
Assistant nurse	9	7	5	3	4	12 (50%)
Student	5	1	4	0	1	5 (20.8%)
<i>Total HCW</i>	<i>19</i>	<i>13</i>	<i>11</i>	<i>5</i>	<i>8</i>	<i>24 (100%)</i>
Sex						
Male	6	6	2	2	4	8 (33.3%)
Female	13	7	9	3	4	16 (66.6%)
Age group	<20	20-30	30-40	40-50	50-60	>60
	1	5	5	7	6	0

5.3 Observation to assess compliance with glove use guidelines

Structured non-participant observations of glove use according to national guidelines were collected by using the first edition of the National tool for observing infection prevention measures in the health service (NOST) (Folkehelseinstituttet, 2022a). More information about NOST is given in the next subsection. The observation was conducted during the HCW's normal work throughout morning care between 8-12 o'clock on weekdays.

5.3.1 NOST- observation tool

NOST is a quantitative observation tool with standardized controlled observational opportunities. It was developed as a quality improvement web solution and is based on international guidelines and the WHO hand hygiene monitoring tools (Folkehelseinstituttet, 2022a, 2022b; World Health Organization, 2009b). The tool has four modules: 1) hand hygiene, 2) jewellery, watches, and fingernails, 3) gloves, and 4) personal protective equipment (PPE). It is only possible to use one module at a time.

There are three roles in the tool, observer, coordinator, and NPIH administrator. The observer must be well acquainted with national guidelines and all functions of the technical solution. Before gaining access to NOST a standardized training and certification course arranged by NIPH was undertaken. In this study, the observer was also the coordinator, and no data was sent to the NIPH administrator.

The aim was to observe glove use compliance, so just the glove module was used. There are two main choices in the glove module, one to register whether gloves are used when indicated or not, and one to register when gloves are used without indication (Folkehelseinstituttet, 2022b). The indications for glove use are contact with body fluids, infection, or others (e.g., HCW with non-intact skin or chemicals). Whereas no indications for glove use are divided into delivering care without contact with body fluids, contact with food, and others. The result will be presented according to this division in the article (see Table II, p.6 in the article). The predefined possibility to register if hand hygiene was carried out after doffing gloves were included in this study.

It is possible to add comments to each observation. Prolonged use of gloves was one of the comments done in the tool. Additionally, field notes were taken of where the observation was done (bathroom, in bed, disinfection room, and so on) along with hand hygiene facilities and placement of gloveboxes.

5. 4 Focus group interviews to explore the attitudes and perceptions regarding glove use

The FGIs aimed to get the participants to exchange attitudes and perceptions on glove use, observations they have done, and their own experiences, and comment on each other's statements and points of view. A thematic guide was designed by using prior knowledge and previous research findings on the theme. The themes were discussed with both supervisor and co-supervisor and ended up as follows: 1) Knowledge of when it is recommended to use gloves; 2) Attitudes towards the use of gloves; 3) Facilitators and barriers to correct use of gloves. Each theme had sub-questions to help the moderator guide the conversation in the right direction or if the discussion stalled (Appendix 3). After each theme, a summary was given by the moderator with the question of whether anything was misunderstood or left out.

To learn the method properly, the first FGI was carried out using the co-supervisor and senior adviser at NIPH as a moderator. She was familiar with both the methodology and the glove use guidelines. This way it was possible to observe and learn the method and try out both roles, moderator and note taker. In the second FGI, a fellow student was the note-taker.

Around 90% of all opinions are expressed via non-verbal communication (Kvale & Brinkmann, 2015) and the note-takers job was to take notes of how the participants reacted to different themes and statements (e.g., nodding, looking away, shaking their heads, and so on).

Both FGI's were carried out in Norwegian at a meeting room in the administration of the nursing home and recorded by using the Dictaphone app (Universitetet i Oslo, n.d.) according to NMBU's guidelines (2021). Soda, coffee, and chocolate were served.

A short presentation of the study was given, and the moderator explained what FGI is and that there are no right or wrong answers. According to the phenomenological hermeneutical approach, to guarantee that the interviewee's voice is heard in the interview text it is essential that the interviewee feels free to relate her/his experience (Lindseth & Norberg, 2004). The moderator, therefore, pointed out twice, at the beginning of the presentation round and the start of the recording, that all opinions, perceptions, and observations on the themes were of interest and importance. The moderator and the note-taker sat at each end of the table, gathering the participants in the middle.

The first FGI was with six HCWs, where two were nurses with professional responsibilities at different units. One HCW who had not read the information letter before FGI chose to leave because this person did not want to consent to be recorded. Seven HCWs participated in the second interview and no nurses with professional responsibility participated. The two FGIs resulted in 73 minutes of recording.

5.5 Transcription of the focus group interviews

The audio files were stored in the Dictaphone app, where the recordings are encrypted in a web form that requires two-step authentication (Universitetet i Oslo, n.d.). Only the master student had access. Before the audio files were transcribed, each recording was listened to, and key points emerging from the discussion were written down. The entire audio files were then transcribed word by word, including laughter, pauses, coughing, etc (Kvale & Brinkmann, 2015). The sound was of high quality in both audio files except for two short times in each FGI where the sound was too weak to write down what participants said.

After transcription, a second and third listening was done to quality assurance and double-check the notes taken of how the participants acted. The non-verbal communication was noted in the margin of the transcript. The quotes used to illustrate the findings were translated into English and may have lost some of their meaning in translation.

5.6 Analysis of the data

Descriptive analytics is the process of using data to identify trends (Hellevik, 2011). Observation data recorded in NOST were exported to Microsoft Office 365 Excel where basic statistics were obtained.

Thematic analysis is a method for identifying and sorting patterns into different themes or codes (Braun & Clarke, 2006). The six-phase framework by Braun & Clarke was followed to analyse data from the FGIs (see Table 2). The hermeneutic circle refers to the idea that our understanding of a text is based on our understanding of each part, as well as our understanding of how each part refers to the whole text (Kvale & Brinkmann, 2015).

Table 2 The process of thematic analysis adopted by Braun & Clarkes Six's Step of Thematic Analysis (2006).

Phase	Process
Familiarization	Listening and transcribing the audio files. Then re-listening and read the data until the data is familiar
Coding of the transcription	Data minimizing by applying codes of interesting data sets and describing the codes
Themes identification	Finding coherent and meaningful patterns, and putting codes relevant to the theme together
Reviewing themes	Reviewing the themes to find if they are consistent with the TPB or SEIPS factors
Defining and naming themes	Further analysis and distribution of each theme. Finding the truth as it is conveyed through the analysis.
Reporting	Find quotes and extracts that illustrate the conditions that clarify the analysis and respond to the research questions.

The transcript with the non-verbal communication was read to uncover additional details about the HCW's attitudes and the subjective norms in TPB or organization factors in SEIPS-model (see Table 3). "SEIPS quick reference guide and work system explorer" (National Health Service, 2022a, 2022b) has been a useful guide in analysing and thematising the data.

Table 3 Examples from the thematic analysis of meaningful statements given during FGIs, coded and thematized.

A meaningful statement or representative quote	Code	Theme from TBP & SEIPS
The resident should feel that there is some distance, that it is not so intimate for any of us	Empathic	Attitude. Person(s), Task
In the event of an accident, I use double gloves because it often happens that the gloves crack	Fear	Attitude, Task, Tools & Technology
We use gloves when we wash and groom nails because faeces and other strange things get stuck	Disgust	Subjective norm, Task
I disinfect after I take off gloves but not before because it gets so sticky and hard to don gloves	Discomfort	Attitude. Task, Tools & Technology, Person(s)
You must look at the situation and the resident because we know them well and know what to expect	Knowledge	Perceived behavioural control, Person(s)
I like to wear gloves when....	Protection	Attitude, Task, Person(s)
They say that gloves are only used when	Leadership	Subjective norm, Organization
We have different types of gloves for infection and general care. After covid-19, we got a new supplier	Economy	Subjective norm, Perceived behavioural control, External environment

5.7 Ethical considerations

Completing a master's study involves following strict ethical guidelines, by the Declaration of Helsinki's ethical principles for research on humans (World Medical Association, 2022).

Before data collection, approval from the Norwegian Agency for Shared Services in Education and Research (SIKT) was granted with reference number 992699 (Appendix 4).

The purpose of the study did not involve investigating medical health status or developing new insight into illness and health. It was therefore not necessary to apply for approval from the Regional Committee for Medical and Health Research Ethics (REK). The first SIKT approval was for data collection in somatic units. Since HCWs working in units with residents with reduced cognitive capacity also wanted to participate, SIKT was contacted to ensure that this did not affect the approval and implementation of the study. They responded it was of no consequence for the approval since the data collection was related to HCW's actions and not the residents.

The research ethics guidelines from the National Committee for Medical and Health Research Ethics (NEM) (2019) point out that research on adults who are not competent to consent can only be carried out if the risk and inconvenience to the research participant are negligible. Participating in this study may be experienced as unpleasant for some, but the findings will benefit the residents. Out of respect, all residents at the included units were informed in advance (Appendix 2), and those residents who received care while HCW was observed provided verbal consent before the observation started.

A non-disclosure agreement was signed before the data collection, and all participants signed a written consent form. All data, including consent forms from observation and FGI, are stored following NMBU's guidelines (2021) and will, by the SIKT approval, be deleted when the master's thesis is approved, and the article is published.

To obtain the participant's confidentiality, each person was transcribed into a number instead of their name, and no names of units, the nursing home, other colleagues, moderators, or note-takers were written down. Quotations included to support the findings in the result chapter will be referred to as HCW followed by a number.

6. Results

A summary of the findings in the article will be presented below under the same thematic subheadings as in the article. In addition, some findings and quotes that did not make it into the article will be presented in this chapter. These do not change the essence of the main findings; the mantle just has more space to elaborate.

Firstly, a short presentation of the results from the observations is given. For ease of reading, then the results of the thematic analysis together with findings from observations and field notes are revealed and mapped in SEIPS 2.0. Lastly, the human factors with relevant quotes from the FGI to support the findings will be given.

6.1 Observed compliance with guidelines for glove use

A total of 73 episodes where gloves were used ($n=67$) or should have been used ($n=6$) were recorded during help with the morning care of 17 residents from seven different units. The observation was of 19 HCWs (see Table 1 p.11) while helping two residents with a shower, three residents with morning care in a shared bathroom, five residents with morning care in bed, and seven in their private bathroom or at the sink in their room. Observations also included diaper change, emptying urine bags, making up or changing the linen of beds, waste management, textile handling, breakfast preparation, disinfection of used aids, medicine dosage, and distribution.

Gloves were donned 51 times in compliance with the indication and 16 times (21.9%) without indication. These were seven observations of care without contact with body fluids, five observations of preparing for morning care, and four observations of cleaning up and making the bed.

Six episodes of no-glove even if indicated were recorded: one observation of contact with intimate areas, two episodes of dental care, one episode of disinfecting an aid, one episode where the HCW had eczema on the hands, and one episode where the resident had non-intact skin.

Hand hygiene after removing gloves was done in 46.3% or 31 out of 67 observations (for more details, see Table II, p. 6 in the article).

It is neither possible to sort by sex or seniority in NOST, but by the field notes, both nurses, nurses' assistants, and students did use gloves too long and unnecessarily (see Figure 1, p. 6 in the article).

Gloveboxes were observed at the sink, on a chair with clothes from yesterday covering the box, and other times in a cabinet. Some gloveboxes appeared to be visually contaminated as the box was damp, spotted, and discoloured.

6.2 The results mapped by using the SEIPS 2.0-model

As previously described, for ease of reading, the interpreted findings of this study are revealed before the findings from the thematic analysis of the FGI. The findings are sorted into the six components of the work system described in SEIPS 2.0 (see Figure 1). In chapter seven, the components of the work system will be discussed.

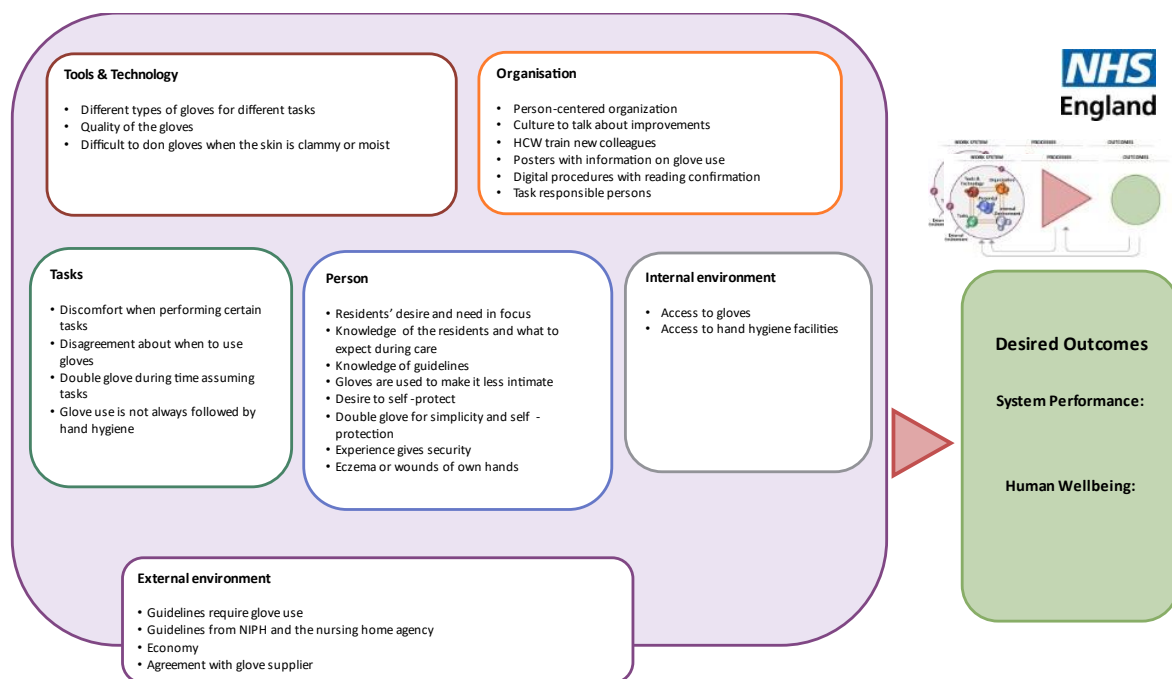


Figure 1 Overview of analysed data plotted in Holden et al.'s SEIPS 2.0-model (2013) adopted by NHS England (2022b).

6.3 Healthcare workers' perceptions of the use of gloves

In the article, it is emphasized that glove use is influenced by three primary factors: 1) knowledge and experience, 2) emotions, and 3) the impact of social norms. These factors are directly associated with the resident's desires and needs, the task being performed, and the guidelines regulating glove use. The result is presented under these subheadings.

6.3.1 Knowledge and experiences that affect the use of gloves

There was a full agreement on the point that familiarity with the residents and their needs was crucial to their choice of wearing gloves in both FGI. It was known to all participants that no

gloves were to be used during help with the face and upper body unless the HCW or the resident have non-intact skin.

All HCWs had a clear understanding of when to wear gloves. Situations mentioned were during contact with blood and body fluids, care of wounds, urinary catheter, care of percutaneous endoscopic gastrostomy tube (PEG), dripping of eyes, handling antibiotics, contaminated textiles, waste management, and chemicals. Although there were some disagreements regarding whether gloves should be worn when helping with tooth brushing.

“I rarely wear gloves when brushing residents’ teeth unless they have a dental prosthesis. I think the resident might feel uncomfortable that I wear gloves.” (HCW 4)

“I prefer to wear gloves because most residents bleed from the gums. Saliva and possibly blood can get on my hands, so I must protect myself.” (HCW 9)

Statements were given that no one used gloves in the corridor, and all personnel doff their gloves before leaving the resident’s room or the shared bathrooms. But when one HCW stated otherwise, other participants nodded, and some looked down.

“I speak up when I see someone wearing gloves in the corridor. There are germs on used gloves, so when they touch the door handle, they leave bacteria there.” (HCW 2)

6.3.2 Emotions affecting the use of gloves

The resident’s desires and wishes were in focus. It was stated that the resident's feelings must be included when it comes to choosing whether to use gloves or not. All participants nodded when statements arose.

“I try to instruct all new colleagues to think how they would feel if they were to be helped and gloves were used.” (HCW 4)

Feelings such as fear, or disgust were described as emotions that increased the likelihood of using gloves. The participants expressed fear of gloves cracking, contaminating their own hands, or getting infected. Additionally, disgust of accidents with faecal or vomit gained on hands due to pinholes in the gloves was mentioned. The participants also talked about a desire to protect themselves against burns or damage from chemicals.

“If the resident uses soap that worsens my eczema, then I choose to wear gloves.” (HCW 4)

As the article describes, double gloving was an engaging topic, and it seems to be a social norm on some occasions. Even so, it also was a point of discussion because the participants were uncertain if it had a purpose, or if it just was a psychological effect.

6.3.3 The influence of social norms on the decision to wear gloves

The participants talked about different kinds of gloves used for different tasks, and that the cost was the main reason for this practice.

“We have two different gloves. One for residents with infections and one for all other purposes. Sometimes assistants are not aware of it and use good gloves to normal care, and then we might be empty when we need them.” (*HCW 13*)

6.3.4 Facilitators and barriers to correct glove use

During the moderator’s summary of the FGI, everybody nodded when stated facilitating factors were the adequate availability of gloves and hand disinfectant. Furthermore, the training of students and new colleagues is set up in a system, and they had a culture for patient safety and quality improvement. Barriers mentioned were the quality of the gloves, which were stated to be of a lower quality than before the Covid-19 pandemic. Most participants did not think they overuse or misuse gloves, and that no one disinfects gloves during care.

7. Discussion

The discussion will try to answer the research questions by connecting the quantitative and qualitative findings to the theoretical framework and comparing them with previous research in the field. The main research question guiding this study was to what extent is there consistency between HCWs' perceptions of when they should use gloves and observed compliance with the national guidelines? With the sub-questions, how do HCWs experience and describe their glove use, and what do the participants think are the main barriers and facilitators to correct and consistent compliance regarding glove use?

A summary of the article's discussion and a broader discussion of several of the findings will be presented in this chapter. As in the previous chapter, these do not change the essence of the main findings; the mantle just has more room to elaborate. At the end of this chapter, a thorough discussion of method choices and limitations of the thesis will be given, before a conclusion, and implications for further practice and research are given in chapter eight.

7.1 Observed glove use compliance

As the article discusses, glove use compliance was only 47.1 % (n=24). The compliance of gloves donned according to indications was higher, and gloves used without any indication for use were lower than expected compared with previous findings. Hand hygiene after removing gloves was done in approximately half of the observations of glove use (n=31/67) and is similar to findings from an observational study in Chinese residential care (Au et al., 2021) and a Dutch hospital (Haenen et al., 2022). Both found that wearing gloves appeared to be a substitute for hand hygiene.

In a previously mentioned observational study on hand hygiene conducted by nursing students in Norwegian nursing homes, it was found that two factors, namely glove use and being an assistant nurse, negatively impacted compliance with hand hygiene. Consequently, lower compliance rates were observed when gloves were worn, as compared to situations where gloves were not used (Sandbekken et al., 2022). Based on findings from this study, factors other than education determined whether hand hygiene was performed after wearing gloves. Task and emotions were more decisive by whether gloves were used and followed by hand hygiene.

7.2 Human factors affecting glove use

To use TPB as an explanation of behaviour and grounds for changing behaviour must contain factors related to at least one of the determinants of the intentions. To maintain behaviour

change, a repetition of correct glove use, and a range of social, financial, and legal support are needed to prevent relapse (Crosby et al., 2019). In the following subsection, each of the SEIPS work system components will be discussed.

Person(s): Person-centredness and well-being are key principles of all nursing homes, and it is, therefore, crucial to recognize if the desired outcome shall be accomplished. The desire to fulfil the resident's needs and wishes is consistent with both the attitude and social norm in the TPB and are determinants that affect the behaviour. According to statements given during the FGI, HCWs primarily see the nursing home as the residents' homes before they see it as their workplace. For example, even if they need to wear gloves, since it is the resident's home, they cannot lock gloves in storage in the residents' rooms.

The desire for self-protection against faeces, vomit, and wound secretions was high amongst the participants, and maybe not so much transmission from residents without known carriership or infections. Other studies have also found that the desire to self-protect is primarily against dirt and body fluids (Jackson & Griffiths, 2014; Porzig-Drummond et al., 2009; Smiddy et al., 2015).

An interview study of nurses working in an acute care hospital in England (Jackson & Griffiths, 2014) found that glove use was primarily a form of self-protection, not an infection-prevention strategy. When comparing observation with statements given during FGI in this study, familiarity with the residents may have resulted in a reduction of the protective behaviour required, for example, when an HCW chose to apply moisturizer on the body of a resident with scratch marks and scabs without gloves. Nurses in hospitals generally do not know the patients the same way as HCWs in nursing homes know the residents. They care for and interact with the resident through a longer period and social happenings which may explain why Jackson and Griffiths (2014) concluded this way.

Tasks: Helping the resident with oral care was an assignment where the participants did not agree on whether gloves were recommended, required, or not necessary. Observations did support this disagreement where both glove use and no gloves were observed during teeth brushing.

Proper doffing is important to prevent hands and wrists from being contaminated. During a simulated doffing process, where gloves contaminated with fluorescent solution were used, it was discovered that 37% of participants ended up with contaminated skin (Alhmidi et al., 2019). This is of great importance since compliance with hand hygiene after doffing gloves

was found to be so low in this study. The glove section in the national hand hygiene guidelines (Folkehelseinstituttet, 2017a) describes that gloves have pinholes and do not eliminate contamination of the hands. If you do not look at the poster on correct doffing, nor read the whole hand hygiene manual (Folkehelseinstituttet, 2017c), you will not find that hand hygiene should be done immediately after unclean gloves have been removed. If you on the other hand read the NIPHS Guide for basic infection prevention routines, in the section on gloves, it is specified that hand hygiene must be carried out immediately after unclean gloves have been removed (Folkehelseinstitutt, 2022). Findings in this study imply that it is unclear what the term “unclean” gloves mean (visually or microbiologically unclean), and it might be more precise to write that hand hygiene should be performed immediately after removing possible contaminated gloves or simply after glove use.

Tools and technology: Field notes state that nitrile, latex, and vinyl gloves as well as sterile gloves were available. No sign was put up to describe which gloves should be used for different tasks at the local storage room in every unit, leaving the choice of which to use to the HCW.

The practice of double gloving was not uncovered during the observations. On the other hand, the observation of the episode where a resident almost fell, double gloving would maybe be a reasonable choice. Double gloving is not necessary during routine non-surgical clinical care according to a Scottish review of glove use (ARHAI Scotland, 2022). An American study of the effect of single- versus double gloving on virus transfer to HCWs’ skin and clothing during the removal of PPE did find a reduction of viruses on the double gloved HCW hands (Casanova et al., 2012). These findings are consistent with what the participants stated they feared during contact precautions in this study. Casanova et al. (2012) concluded that if double gloves are to be promoted as part of standard precautions the importance of hand hygiene must be specified. Double -or single gloving will never be a substitute for hand hygiene (Folkehelseinstituttet, 2017c). Further research and knowledge on double gloving are needed, both regarding the actual effect and whether this is sustainable, or timesaving compared with better gloves and hand hygiene.

Organizational factors: In a Dutch study on compliance with hand hygiene in fourteen nursing homes, the researchers recommended a dedicated glove-use training program (Haenen et al., 2022). These improvement programs should include strategies aimed at improving leadership and risk perception. The findings in this study support this recommendation.

It was stated during both FGI that the Covid-19 pandemic measures and the absence of them did raise questions on when and where to use gloves. Jain et al. (2019) did a study on modified glove use for contact precautions in a hospital in Australia. They found that mandatory glove use contributed to the overuse and misuse of gloves and recommended a more selective approach, which is of interest regarding the findings in this study.

Internal environment: According to guidelines, hand hygiene facilities including gloves at the point of care is crucial for compliance (Folkehelseinstituttet, 2017c; World Health Organization, 2009a). During observations, the HCW did use time to look around to find gloves, which can have affected their perceived behaviour control of glove use. Some gloveboxes appeared to be visually contaminated, which is consistent with the microbiological findings from a glovebox design study in Germany (Assadian et al., 2016).

External environment: It seems that a new agreement was made on behalf of the municipal nursing homes in Oslo with a new glove supplier and that the new gloves are not as durable as the previous ones. A scoping review from Canada aimed to find barriers and facilitators to the use of PPE by HCWs in long-term care facilities (Tsang et al., 2023). They found barriers primarily related to the environmental context and resources, such as economics and staffing.

7.3 The study findings' relevance to public health

This study has shown overuse of gloves, which may be prevented by improving components that make it easier to use gloves according to guidelines. Glove use will still be an important standard precaution measure, but by preventing overuse and misuse a more sustainable future is possible. If gloves do not rupture so easily, the HCWs may feel more protected, and double gloving will be unnecessary on many occasions. By using the observation tool NOST, local measures to improve glove use compliance may prevent both infections from spreading and eczema in the hands of HCWs to occur.

None of the participants talked about glove use as an environmental issue. To contribute to UN SGD, it is time to raise awareness of glove misuse and overuse in a wider environmental context. New gloves with a better carbon footprint, less use of raw material, or ensured that a certain percentage of the materials used are bio-based are available on the market and may be a contribution to a more sustainable environment. Findings in this study indicate that there is a need for more research into how the educational institution and the health service can increase students' and employees' compliance with glove use guidance, and how this can contribute to reaching the UN SDGs.

7.4 Methodological strengths and limitations

The main argument for choosing a mixed methodology to answer the research questions was to provide a better and deeper understanding of the subject even if the number of participants was small. The quantitative data answered to which extent the participants complied with national glove use guidelines, while the qualitative data provided insight into why HCWs use gloves or not. Mixed methods require knowledge of both methods. Since this was my first study, I lack this practical knowledge which is a weakness in the choice of method. Even so, Hong et al.'s Mixed methods appraisal tool, MMAT (2019) (Appendix 9), did guide me during the study to raise awareness of the quality of this study.

Mixed methods require a clear description of all the phases of both methods and the compilation of the data sets (Regnault et al., 2018). The size of the mantel makes this difficult. In my attempt to describe the phases thoroughly, important findings have been omitted from the report. Mixed methods are therefore not the optimal choice of method for an article-based 30-credit master's thesis. On the other hand, mixed methods studies are increasingly advocated for, and the approach has been receiving more attention in several fields internationally, so familiarity with the method is important. Additionally, a mixed methods approach allows for the triangulation of data and a more comprehensive overview of a topic or phenomenon such as glove use.

The data collection and analysis were done through a hermeneutic approach by 1) a non-judgmental attitude towards observed actions and given statements; 2) a critical examination of what took place in the form of what was observed and communicated, and lastly 3) the collected audio files was listened to, transcribed, and interpreted together with the observations data (Lindseth & Norberg, 2004). At the same time, it was important to be proactive and not let the preconceptions of glove use affect the findings. Since this study had a hermeneutic approach with an interpretation of the participant's stated experience, not all interpretations can be equally plausible, nor can the understanding be definitive (Debesay et al., 2008; Harstad, 2022).

7.4.1 Researcher reflexivity

What it is like to work in a nursing home, and how nursing homes are run, is known through decades of working at and supervising various nursing homes. The glove use guidelines are well known through my infection prevention education and previous knowledge of glove use compliance is based on international research, most of them from hospitals. The fact that this

study found both different compliance and statements explaining this adherence along with a not previously described and not recommended practice (double gloving) strengthens the likelihood that an open, unbiased approach has been followed.

Conducting a study at your workplace presents substantial challenges. In this case, the Nursing Home Agency consists of 41 municipal and non-municipal nursing homes. The agency has two infection prevention nurses who primarily give advice and guidance to the head of institutions and quality managers. Restriction regarding the Covid-19 pandemic has limited the infection prevention nurses to visit different nursing homes, which makes the master's student to a degree unfamiliar to the HCWs and this way limited the influence of the findings. In one nursing home, it was specified that the study was carried out by one of the infection prevention nurses in the agency, and in the other a master's student from NMBU.

The research process is reported as accurately as possible, based on knowledge of the methods used and own assumptions to increase the credibility of the study. (Bjørndal et al., 2008; Creswell, 2010; Kvale & Brinkmann, 2015). During the data collection, attention was drawn to the fact that both being observed or participating in FGI affects the collected data. This was to limit bias in the fieldwork and the impact on the research results. Due to the lack of previous experience with interpreting qualitative and quantitative data, the meta-inference is not as carefully specified as the literature suggests (Creswell, 2010; Regnault et al., 2018). The result and discussion indicate that the two datasets complement each other to a large degree, rather than being opposites.

Both the research question and the theoretical framework direct attention to structures and phenomena of interest and may have influenced the findings. Perhaps a more theoretical-driven FGI interview guide, another perspective, or framework could have gained different or more interesting insights. On the other hand, the fact that a theoretical framework was used may have increased the reliability and validity of the study and increased the ability for others to conduct a similar study using the same framework at a later point.

7.4.2 Methodological and validity threats

A strength of this study is that both observation and FGI were conducted to develop a comprehensive understanding of glove use in the two nursing homes (Bjørndal et al., 2008). The overall experience of the HCW who volunteered to participate was high (see Table 1, p. 11) and may decrease the content validity and be a selection bias since glove use is habitual. All participation was voluntary, and those who took part may have been both more reflective

and updated on correct glove use than the average HCW in nursing homes, and in this way be a selection bias. On the other hand, the fact that the participants did not agree with all the statements that were presented, controls the probability that the sincere perception of glove use amongst the participants was found.

The first FGI was led by an experienced moderator to in-practice learn the methodology. Her role at NIPH may have influenced what the HCW chose to share. On the other hand, at the next FGI, the participants were aware of the student's role as an infection prevention nurse, and the two FGIs did not differ in what the HCW shared and were consistent with the observations done.

The same thematic guide was used during both FGIs to ensure comparability. After each theme, the moderator gave a verbal summary of what was said and what was understood. The participants then gave nods and consent or corrected the summary. This way, a dialogic validation was obtained. The first FGI was carried out in the afternoon the same day as the first observations were done, and the second FGI was done on the third day, which meant that several participants recognized the moderator at the second interview. All participants knew each other in the second FGI, which they did not in the first FGI. The differences in the composition may have influenced the conversations and been a source of bias in the data collection. Nevertheless, as previously mentioned, the two FGIs presented the same results. It would have been interesting to have conducted more FGIs and included the head nurses and quality managers, but the time available and the size of the study did not allow this.

Lack of interview and text analysis experience, together with the preconceptions, may have misled the analysis in the wrong direction. On the other hand, the observations reinforced the belief that the interpretations were correct.

To enhance internal validity, a standardized and validated observation tool was selected for documenting the observations. HCW performs several tasks at the same time. Despite standardized training, this may have caused some of the observations to be logged incorrectly. The co-supervisor was consulted about two observations in which I was insecure of how to log correctly.

Observation as a method will by itself influence the result as the observation is of an HCW who knows they are observed (Bjørndal et al., 2008), also known as the Hawthorne effect (McCambridge et al., 2014). At the same time as the data collection was done, the units had nursing students in practice. The participants were therefore familiar with and used to being

observed and followed throughout the work. This, together with the observer wearing a uniform to look like the other HCWs to blend in may have reduced the Hawthorne effect. On the other hand, the observations may however have resulted in an underestimation of inappropriate practice.

7.4.3 The reliability and transferability of the study

The observation data were complemented with interpretations from the focus group interviews (FGIs) and aligned with the theoretical framework. The data collection process involved the presence of the student, minimizing collection biases, and enhancing the reliability of the study's findings.

A weakness of this study is the extensive use of the snowball method to find previous research. Guidance from a librarian should have been carried out earlier and to a greater extent. Due to available time and personal health concerns, this was not possible.

Another weakness of this study is the sample size. This is a 30-credit master's thesis with a time limit. In addition, for practical reasons, only daytime-workers were included, and no member checking was conducted after the thematic analysis was carried out to verify the interpretation of the findings. The participants represent cultures from two nursing homes and seven units and have different backgrounds and experiences. This increased the possibility of answering the research question from different angles and perspectives. On the other hand, more men participated than average are otherwise in nursing homes, which could be a selection bias. The convenience sample and effect size do not make this study generalizable. On the other hand, the study's research questions were concrete and precise, and the findings may have significance in other similar nursing homes. Also, the findings were discussed against the theoretical framework, which can be seen as a strength compared to the transferability of this study.

8. Conclusion and implications

The purpose of the master's thesis has been to compare HCWs' attitudes and perception of glove use with the observed compliance with national guidelines. The findings indicate that HCWs' intentions to use gloves are influenced by factors such as knowledge, experience, emotions related to resident preferences and needs, the nature of the task at hand, and adherence to glove use guidelines. Additionally, social norms also play a role in shaping HCWs' perceptions of glove use. Although most HCWs deny overuse or misuse, observations showed only 46.8% compliance and 21.9% overuse. On the positive side, timely donning of gloves in appropriate situations exceeded expectations at 69.9%. Among the various factors examined, the proper placement of gloves emerged as the most significant facilitator, whereas the quality of gloves posed the greatest barrier.

This study is the first to use NOST. The findings suggest updating the glove module in NOST to incorporate prolonged glove use registration. This update would effectively address the challenges we might have regarding glove use in nursing homes. The feedback regarding this need has been communicated to the developers of the tool.

It is crucial to raise awareness regarding two important aspects highlighted by this study: the lack of hand hygiene after glove removal and the use of double gloving as a substitute for hand hygiene. If the findings of this study are representative of glove use practices in all nursing homes, it is important to recognize the significance of immediately performing hand hygiene after removing gloves to prevent the spread of microorganism.

Further research is needed to explore the efficacy and sustainability of double gloving in nursing homes, in comparison to using higher-quality gloves and prioritizing hand hygiene. Conducting a more comprehensive study or Ph.D. research that includes HCWs, managers, and residents can be beneficial both from a public health perspective and an infection prevention perspective. It would also be valuable to conduct focus group interviews with students before, during, and after their practical training to understand their expectations, the practices they adopt, and to measure how their attitudes to glove use change throughout the internship period. These findings could inform targeted interventions to improve compliance. Moreover, this research could contribute to reducing residents with HAI and hand eczema among healthcare workers, and support nursing homes in achieving the UN SDGs by identifying measures for appropriate glove use, reducing overuse, and enhancing waste management.

References

- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/https://doi.org/10.1016/0749-5978(91)90020-T)
- Alhmidi, H., Gonzalez-Orta, M., Cadnum, J. L., Mana, T. S. C., Jencson, A. L., Wilson, B. M., & Donskey, C. J. (2019). Contamination of health care personnel during removal of contaminated gloves. *Am J Infect Control*, 47(7), 850-852. <https://doi.org/10.1016/j.ajic.2018.12.003>
- ARHAI Scotland. (2022). *Standard Infection Control and Transmission Based Precautions Literature Review, Personal Protective Equipment (PPE): Gloves*. nhs.scot: National Services Scotland, Antimicrobial Resistance and Healthcare associated Infection team Retrieved from <https://www.england.nhs.uk/wp-content/uploads/2022/04/C1636-national-ipc-manual-for-england-v2.pdf>
- Assadian, O., Leaper, D. J., Kramer, A., & Ousey, K. J. (2016). Can the design of glove dispensing boxes influence glove contamination? *J Hosp Infect*, 94(3), 259-262. <https://doi.org/10.1016/j.jhin.2016.09.005>
- Au, J. K. L., Suen, L. K. P., & Lam, S. C. (2021). Observational study of compliance with infection control practices among healthcare workers in subsidized and private residential care homes. *BMC Infect Dis*, 21(1), 75. <https://doi.org/10.1186/s12879-021-05767-8>
- Baldi, B., & Moore, D. S. (2018). Samples and observational studies. In K. Mangold (Ed.), *The Practice of Statistics in the Life Sciences* (4th ed., pp. 141-164). W.H. Freeman and Company.
- Baloh, J., Thom, K. A., Perencevich, E., Rock, C., Robinson, G., Ward, M., Herwaldt, L., & Reisinger, H. S. (2019). Hand hygiene before donning nonsterile gloves: Healthcare workers' beliefs and practices. *American Journal of Infection Control*, 47(5), 492-497. <https://doi.org/https://doi.org/10.1016/j.ajic.2018.11.015>
- Berg, T. C., Løwer, H. L., Alberg, T., & Eriksen, H. M. (2019). *Helsetjenesteassosierte infeksjoner, antibiotikabruk (NOIS), antibiotikaresistens (MSIS) og Verdens håndhygienedag [Årsrapport]*. Folkehelseinstituttet. https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2019/arsrapport-nois-mm_publisertpdf.pdf
- Bjørndal, A., Flottorp, S. A., & Klovning, A. (2008). Kvalitative studier. In *Kunnskapshåndtering i medisin og helsefag* (2 ed., Vol. 2, pp. 133-142). Gyldendal Akademisk.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Carayon, P., Schoofs Hundt, A., Karsh, B. T., Gurses, A. P., Alvarado, C. J., Smith, M., & Flatley Brennan, P. (2006). Work system design for patient safety: the SEIPS model. *Qual Saf Health Care*, 15 Suppl 1(Suppl 1), i50-58. <https://doi.org/10.1136/qshc.2005.015842>
- Casanova, L. M., Rutala, W. A., Weber, D. J., & Sobsey, M. D. (2012). Effect of single- versus double-gloving on virus transfer to health care workers' skin and clothing during removal of personal protective equipment. *American Journal of Infection Control*, 40(4), 369-374. <https://doi.org/https://doi.org/10.1016/j.ajic.2011.04.324>
- Creswell, J. W. (2010). SAGE Handbook of Mixed Methods in Social & Behavioral Research. In A. Tashakkori & C. Teddlie (Eds.), *SAGE Handbook of Mixed Methods in Social & Behavioral Research* (2 ed.). SAGE Publications, Inc. <https://doi.org/10.4135/9781506335193>
- Crosby, R. A., Salazar, L. F., & DiClemente, R. J. (2019). How Theory Informs Health Promotion and Public Health Practice. In J. S. Santelli (Ed.), *Health Behavior Theory for Public Health* (2nd ed., Vol. 1, pp. 25-40). Jones & Barnett Learning.
- Debesay, J., Näden, D., & Slettebø, A. (2008). How do we close the hermeneutic circle? A Gadamerian approach to justification in interpretation in qualitative studies. *Nurs Inq*, 15(1), 57-66. <https://doi.org/10.1111/j.1440-1800.2008.00390.x>
- DiClemente, R. J., Salazar, L. F., & Crosby, R. A. (2019). Conceptual and Theoretical Perspectives for Public Health Research and Practice. In J. S. Santelli (Ed.), *Health Behavior Theory for Public Health. Principles, Foundations, and Applications* (2nd ed., Vol. 1, pp. 59-72). Jones and Bartlett Learning.

- Edmonds, W. A., & Kennedy, T. D. (2017). *An Applied Guide to Research Designs: Quantitative, Qualitative, and Mixed Methods* (P. E. Spector, Ed. Second ed., Vol. 2). SAGE Publications, Inc. <https://doi.org/10.4135/9781071802779>
- Folkehelseinstitutt. (2022). Nasjonal veileder for basale smittevernrutiner. <https://www.fhi.no/nettpub/nasjonale-veileder-for-basale-smittevernrutiner/>
- Folkehelseinstituttet. (2017a). *Hansker*. Folkehelseinstituttet. Retrieved 2023.03.03 from <https://www.fhi.no/nettpub/handhygiene/i-praksis/hansker-hudreaksjoner-og-negler/>
- Folkehelseinstituttet. (2017b). *Hudreaksjoner og hudpleie*. Folkehelseinstituttet. Retrieved 03.03.23 from <https://www.fhi.no/nettpub/handhygiene/i-praksis/hudreaksjoner-og-hudpleie/?term=&h=1>
- Folkehelseinstituttet. (2017c, 2023). *Veileder for håndhygiene i helsetjenesten*. Folkehelseinstituttet. Retrieved 03.03.2023 from <https://www.fhi.no/nettpub/handhygiene/>
- Folkehelseinstituttet. (2022a). *NOST*. In (Version 1) [Data collection mobile application]. Folkehelseinstituttet.
- Folkehelseinstituttet. (2022b). *NOST – Nasjonalt verktøy for observasjon av smitteforebyggende tiltak i helsetjenesten*. <https://www.fhi.no/sv/forebygging-i-helsetjenesten/handhygiene/nost/>
- Fuller, C., Savage, J., Besser, S., Hayward, A., Cookson, B., Cooper, B., & Stone, S. (2011). "The dirty hand in the latex glove": a study of hand hygiene compliance when gloves are worn. *Infect Control Hosp Epidemiol*, 32(12), 1194-1199. <https://doi.org/10.1086/662619>
- Girou, E., Chai, S. H. T., Oppein, F., Legrand, P., Ducellier, D., Cizeau, F., & Brun-Buisson, C. (2004). Misuse of gloves: the foundation for poor compliance with hand hygiene and potential for microbial transmission? *Journal of Hospital Infection*, 57(2), 162-169. <https://doi.org/https://doi.org/10.1016/j.jhin.2004.03.010>
- Haenen, A., de Greeff, S., Voss, A., Liefers, J., Hulscher, M., & Huis, A. (2022). Hand hygiene compliance and its drivers in long-term care facilities; observations and a survey. *Antimicrob Resist Infect Control*, 11(1), 50. <https://doi.org/10.1186/s13756-022-01088-w>
- Halkier, B. (2010). *Fokusgrupper* (1 ed., Vol. 1). Gyldendal forlag.
- Harstad, O. (2022). Hermeneutikk. In *Å tenke om metode* (Vol. 1, pp. 74-100). Fagbokforlaget.
- Health Quality Ontario. (2017). Patient Safety Learning Systems: A Systematic Review and Qualitative Synthesis. *Ont Health Technol Assess Ser*, 17(3), 1-23.
- Hellevik, O. (2011). *Forskningsmetode i sosiologi og statsvitenskap* (6 ed.). Universitetsforlaget.
- Forskrift om smittevern i helse- og omsorgstjenesten, (2005). <https://lovdata.no/dokument/SF/forskrift/2005-06-17-610?q=Forskrift%20om%20smittevern%20i%20helsetjenesten>
- Helse- og omsorgsdepartementet. (2012). *Folkehelseloven*. Lovdata.no: Regjeringen
- Helse- og omsorgsdepartementet. (2019). *Handlingsplan for et bedre smittevern - med det mål å redusere helsetjenesteassosierte infeksjoner 2019–2023*. Regjeringen: Helse- og omsorgsdepartementet Retrieved from <https://www.regjeringen.no/contentassets/714aa1437e2545f7bb4914a3474cd691/handlingsplan-for-et-bedre-smittevern.pdf>
- Holden, R. J., Carayon, P., Gurses, A. P., Hoonakker, P., Hundt, A. S., Ozok, A. A., & Rivera-Rodriguez, A. J. (2013). SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics*, 56(11), 1669-1686. <https://doi.org/10.1080/00140139.2013.838643>
- Hong, Q. N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.-P., Griffiths, F., Nicolau, B., O’Cathain, A., Rousseau, M.-C., & Vedel, I. (2019). Improving the content validity of the mixed methods appraisal tool: a modified e-Delphi study. *Journal of Clinical Epidemiology*, 111, 49-59.e41. <https://doi.org/https://doi.org/10.1016/j.jclinepi.2019.03.008>
- Jackson, C., & Griffiths, P. (2014). Dirt and disgust as key drivers in nurses' infection control behaviours: an interpretative, qualitative study. *Journal of Hospital Infection*, 87(2), 71-76. <https://doi.org/https://doi.org/10.1016/j.jhin.2014.04.001>
- Jain, S., Clezy, K., & McLaws, M. L. (2019). Modified glove use for contact precautions: Health care workers' perceptions and acceptance. *Am J Infect Control*, 47(8), 938-944. <https://doi.org/10.1016/j.ajic.2019.01.009>

- Jędruchniewicz, K., Ok, Y. S., & Oleszczuk, P. (2021). COVID-19 discarded disposable gloves as a source and a vector of pollutants in the environment. *Journal of Hazardous Materials*, 417, 125938. <https://doi.org/https://doi.org/10.1016/j.jhazmat.2021.125938>
- Kvale, S., & Brinkmann, S. (2015). *Det kvalitative forskningsintervjuet* (7 ed., Vol. 3). Gyldendal Norsk Forlag AS. (Learning the Craft of Qualitative Research Interviewing)
- Kvam, M. S., Alfonso, J. H., Berents, T. L., Randem, B. G., & Stylianou, E. (2019). Work-related hand eczema. *Tidsskriftet den norske legeforening*. <https://doi.org/10.4045/tidsskr.18.0213>
- Lindberg, M., Skytt, B., & Lindberg, M. (2020). Continued wearing of gloves: a risk behaviour in patient care. *Infection Prevention in Practice*, 2(4), 100091. <https://doi.org/https://doi.org/10.1016/j.infpip.2020.100091>
- Lindseth, A., & Norberg, A. (2004). A phenomenological hermeneutical method for researching lived experience. *Scand J Caring Sci*, 18(2), 145-153. <https://doi.org/10.1111/j.1471-6712.2004.00258.x>
- Loveday, H. P., Lynam, S., Singleton, J., & Wilson, J. (2014). Clinical glove use: healthcare workers' actions and perceptions. *Journal of Hospital Infection*, 86(2), 110-116. <https://doi.org/https://doi.org/10.1016/j.jhin.2013.11.003>
- MacLeod, M. L. P., McCaffrey, G., Wilson, E., Zimmer, L. V., Snadden, D., Zimmer, P., Jónatansdóttir, S., Fyfe, T. M., Koopmans, E., Ulrich, C., & Graham, I. D. (2023). Exploring the intersection of hermeneutics and implementation: a scoping review. *Systematic Reviews*, 12(1), 30. <https://doi.org/10.1186/s13643-023-02176-7>
- Malterud, K. (2002). Kvalitative metoder i medisinsk forskning – forutsetninger, muligheter og begrensninger. *Tidsskriftet for den norske lægeforening*, 25(122), 2468-2472. <https://tidsskriftet.no/2002/10/tema-forskningsmetoder/kvalitative-metoder-i-medisinsk-forskning-forutsetninger-muligheter>
- McCambridge, J., Witton, J., & Elbourne, D. R. (2014). Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects. *Journal of Clinical Epidemiology*, 67(3), 267-277. <https://doi.org/10.1016/j.jclinepi.2013.08.015>
- National Health Service. (2022a, 10 November 2022). *Patient safety learning response toolkit*. 2022. Retrieved 6.5.2023 from <https://www.england.nhs.uk/publication/patient-safety-learning-response-toolkit/>
- National Health Service. (2022b). *SEIPS quick reference guide and work system explorer*. England: National Health Service Retrieved from <https://www.england.nhs.uk/wp-content/uploads/2022/08/B1465-SEIPS-quick-reference-and-work-system-explorer-v1-FINAL.pdf>
- Norges miljø- og biovitenskaplige universitet. (2021). Informasjon for studentar om behandling av forskingsdata og persondata. In. Ås: NMBU.
- NORM/NORM-VET. (2021). *Usage of Antimicrobial Agents and Occurrence of Antimicrobial Resistance in Norway*. NORM/NORM-VET. <https://www.fhi.no/en/publ/2022/norm-og-norm-vet-usage-of-antimicrobial-agents-and-occurrence-of-antimicrob/>
- OneMed. (2022). Norwegian tender processes. In *Need of gloves in Norwegian health care facilities*.
- Picheansanthian, W., & Chotibang, J. (2015). Glove utilization in the prevention of cross transmission: a systematic review. *JBI Database System Rev Implement Rep*, 13(4), 188-230. <https://doi.org/10.11124/jbisrir-2015-1817>
- Porzig-Drummond, R., Stevenson, R., Case, T., & Oaten, M. (2009). Can the emotion of disgust be harnessed to promote hand hygiene? Experimental and field-based tests. *Social Science & Medicine*, 68(6), 1006-1012. <https://doi.org/https://doi.org/10.1016/j.socscimed.2009.01.013>
- Regnault, A., Willgoss, T., Barbic, S., & On behalf of the International Society for Quality of Life Research Mixed Methods Special Interest, G. (2018). Towards the use of mixed methods inquiry as best practice in health outcomes research. *Journal of Patient-Reported Outcomes*, 2(1), 19. <https://doi.org/10.1186/s41687-018-0043-8>
- Ryan, M. J., & Worthington, A. K. (2021). Theory of Planned Behavior. In A. K. Worthington (Ed.), *Persuasion Theory in Action: An Open Educational Resource* (1 ed.). University of Alaska Anchorage. <https://doi.org/https://ua.pressbooks.pub/persuasiontheoryinaction/chapter/theory-of-planned-behavior/>

- Sandbekken, I. H., Hermansen, Å., Utne, I., Grov, E. K., & Løyland, B. (2022). Students' observations of hand hygiene adherence in 20 nursing home wards, during the COVID-19 pandemic. *BMC Infect Dis*, 22(1), 156. <https://doi.org/10.1186/s12879-022-07143-6>
- Smiddy, M. P., R, O. C., & Creedon, S. A. (2015). Systematic qualitative literature review of health care workers' compliance with hand hygiene guidelines. *Am J Infect Control*, 43(3), 269-274. <https://doi.org/10.1016/j.ajic.2014.11.007>
- Sniehotta, F. F., Presseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health Psychology Review*, 8(1), 1-7. <https://doi.org/10.1080/17437199.2013.869710>
- Statistics Norway. (2022, 15. June 2022). *Care services*. Statistisk sentralbyrå. <https://www.ssb.no/en/helse/helsetjenester/statistikk/sjueheimar-heimetenester-og-andre-omsorgstenester>
- Strand, B. H., Berg, C. L., Syse, A., Nielsen, C. S., Skirbekk, V. F., Totland, T. H., Hansen, T., Vollrath, M. E. M. T., Blix, H. S., Husabø, K. J., Gjertsen, F., Meyer, H. E., Kvaavik, E., Nes, R. B., Reneflot, A., Ranhoff, A. H., Bye, E. K., Holvik, K., Hjellvik, V., . . . Håberg, A. K. (2023). *Folkehelse rapporten Helse hos eldre i Norge*. <https://www.fhi.no/nettpub/hin/grupper/eldre/>
- Teasing, G. R., Richardus, J. H., Nieboer, D., Petrigiani, M., Erasmus, V., Verduijn-Leenman, A., Schols, J., Koopmans, M. P. G., Vos, M. C., & Voeten, H. (2021). The effect of a hand hygiene intervention on infections in residents of nursing homes: a cluster randomized controlled trial. *Antimicrob Resist Infect Control*, 10(1), 80. <https://doi.org/10.1186/s13756-021-00946-3>
- The Norwegian National Research Ethics Committees. (2019, 8/7/2019). *General guidelines*. The Norwegian National Research Ethics Committees. <https://www.forskningsetikk.no/en/guidelines/general-guidelines/>
- Tsang, C. C., Holroyd-Leduc, J. M., Ewa, V., Conly, J. M., Leslie, M. M., & Leal, J. R. (2023). Barriers and Facilitators to the Use of Personal Protective Equipment in Long-Term Care: A Scoping Review. *Journal of the American Medical Directors Association*, 24(1), 82-89.e82. <https://doi.org/10.1016/j.jamda.2022.11.012>
- United Nations. (2023). *UN sustainable development goals*. Department of Economic and Social Affairs. Retrieved 2023 from <https://sdgs.un.org/goals>
- Universitetet i Oslo. (n.d.). *Diktafon*. In (Version 3.8.1) [Recorder]. UiO. <https://www.uio.no/tjenester/it/adm-app/nettskjema/>
- Vadera, S., & Khan, S. (2021). A critical analysis of the rising global demand of plastics and its adverse impact on environmental sustainability. *J. Environ. Pollut. Manag*, 3, 105.
- Verma, R., Vinoda, K. S., Papireddy, M., & Gowda, A. N. S. (2016). Toxic Pollutants from Plastic Waste- A Review. *Procedia Environmental Sciences*, 35, 701-708. <https://doi.org/https://doi.org/10.1016/j.proenv.2016.07.069>
- Wilson, J., Prieto, J., Singleton, J., O'Connor, V., Lynam, S., & Loveday, H. (2015). The misuse and overuse of non-sterile gloves: application of an audit tool to define the problem. *Journal of Infection Prevention*, 16(1), 24-31. <https://doi.org/10.1177/1757177414558673>
- World Health Organization. (2009a). *Glove Use Information Leaflet*. WHO. [https://cdn.who.int/media/docs/default-source/integrated-health-services-\(ihs\)/infection-prevention-and-control/hand-hygiene/tools/glove-use-information-leaflet.pdf?sfvrsn=13670aa_10](https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/infection-prevention-and-control/hand-hygiene/tools/glove-use-information-leaflet.pdf?sfvrsn=13670aa_10)
- World Health Organization. (2009b). *WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care*. WHO. <https://www.ncbi.nlm.nih.gov/books/NBK144028/>
- World Health Organization. (2010). Your 5 moments of hand hygiene. In *Your-5-moments-for-hand-hygiene-poster* (Ed.). Geneva: World Health Organization.
- World Health Organization. (2021). *Global action plan on antimicrobial resistance*. <https://www.who.int/publications/i/item/9789241509763>
- World Medical Association. (2022, 64th WMA General Assembly, Fortaleza, Brazil, October 2013). *WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects*. World Medical Association. <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>

Attachments

Appendix 1 Information letter with a consent form (in Norwegian)

Ønsker du å delta i forskningsprosjektet

«Bruk av rene engangshansker på sykehjem»

Dette er en informasjon til deg om et forskningsprosjekt som gjennomføres i avdelingen der du jobber. I brevet gir vi deg informasjon om hensikten med forskningsprosjektet, gir deg et tilbud om å delta samt gir deg informasjon om hva deltagelsen vil innebære for deg.

Formål

Forskningsprosjektets formål er å finne ut om helsepersonell følger de nasjonale anbefalingene om bruk av rene engangshansker i sykehjem, samt hvilke holdninger helsepersonell har til bruk av hansker. Forskningsprosjektet har to deler. Den første delen er en observasjon av personalet sin bruk av hansker. Den andre delen er et intervju i en fokusgruppe der samtalen vil handle om holdninger til bruk av hansker.

Prosjektet er en del av en masteroppgave i folkehelsevitenskap ved Norges miljø- og biovitenskapelige universitet (NMBU). Forskningsresultatene planlegges publisert i en artikkel i et fagtidsskrift.

Hvem er ansvarlig for forskningsprosjektet?

Norges miljø- og biovitenskapelige universitet (NMBU) er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Du mottar informasjonsskrivet da vi gjerne vil at du deltar.

Vi søker etter helsepersonell som er villig til å bli observert når de utfører oppgavene de utfører på en dagvakt, eller som kan stille til ett intervju i en fokusgruppe. Det er i hovedsak sykepleiere, vernepleiere og helsefagarbeidere vi ønsker å rekruttere, men alle med helsefaglig utdanning kan delta.

Hva innebærer det for deg å delta?

Du kan velge å delta både i observasjonsdelen av forskningsprosjektet og til fokusgruppe intervjuet, eller bare en av delene.

Deltagelse for observasjon

Dersom du ønsker å delta i observasjoner av bruk av hansker, vil masterstudenten kontakte deg for å avtale en dagvakt (mandag-fredag) det kan passe at observasjonen utføres. Observasjonene vil gjøres under morgenstell og eventuelt andre oppgaver du utfører den dagen. Det vil bli flere observasjonsseanser samme dag, hvor hver seanse varer maksimum 30 minutter.

Du deltar kun en dag. Beboeren som mottar hjelp, skal også samtykke til deltagelse i forskningsprosjektet.

Observasjonene vil bli lagret i en elektronisk løsning utarbeidet av Folkehelseinstituttet. Ingen data vil bli innsendt til nasjonalt register. Det er kun masterstudenten og veileder som har tilgang til dataene.

Deltagelse i fokusgruppe intervju

Dersom du stiller til intervju i en fokusgruppe, vil masterstudenten kontakte deg og de andre deltagerne om tidspunkt for gjennomføring. De andre deltagerne er også helsepersonell fra samme institusjon som du jobber ved. Det vil være mellom 3-8 personer med i intervjuet, samt masterstudenten og eventuelt en medhjelper. Både intervjuer og medhjelper har skrevet under taushetsplikt.

Intervjuet vil bli gjennomført på en hverdag i tidsrommet mellom 11-15 på institusjonen du jobber ved. Selve intervjuet vil ta mellom en og to timer, og det vil bli servert mineralvann og sjokolade.

Det vil bli gjort lydopptak under intervjuene ved hjelp av Universitetet i Oslo sin diktafon app.

Det er frivillig å delta

Det er frivillig å delta i forskningsprosjektet. Dersom du ønsker å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg om du ønsker å delta eller ikke, eller om du senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke observasjonene og opplysningene du har gitt til formålene vi har fortalt om i dette skrevet. Opplysningene behandles konfidensielt og i samsvar med personvernregelverket.

Det vil kun være studenten og veilederen som har tilgang til opplysningene som samles inn.

Navn som kommer frem under intervju, vil bli slettet og omskrevet. Flere institusjoner deltar i forskningsprosjektet. Det betyr at selv om du er første som blir observert eller sier noe under intervjuet på din institusjon, betyr ikke det at du er nummer én i datamaterialet.

Det er Pia Cathrin Kristiansen som skal samle inn, transkribere (omskrive lyd til tekst), bearbeide og lagre alle dataene. Lydopptak fra intervjuene kobles via diktafon applikasjonen til ett godkjent nettskjema i henhold til godkjenning av Norsk senter for forskningsdata (NSD, eller Sikt).

Deltagerne i studien vil ikke kunne gjenkjennes i publikasjon, utover eventuelle anonymiserte sitater fra intervjuet.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?

Prosjektet vil etter planen avsluttes 1.7. 2024. Etter prosjektslutt vil datamaterialet med dine personopplysninger bli anonymisert og lydopptak slettet.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Norges miljø- og biovitenskapelige universitet har Personverntjenester vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- å få rettet opplysninger om deg som er feil eller misvisende
- å få slettet personopplysninger om deg
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål til forskningsprosjektet, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med:

- Prosjektansvarlig ved Norges miljø- og biovitenskapelige universitet (NMBU)
Sheri Bastien
Mobil: 902 65 363
E-post: sheri.lee.bastien@nmbu.no
- Vårt personvernombud:
Hanne Pernille Gulbrandsen
Mobil: 402 81 558
E-post: personvernombud@nmbu.no

Hvis du har spørsmål knyttet til Personverntjenester sin vurdering av prosjektet, kan du ta kontakt med: Personverntjenester på e-post personverntjenester@sikt.no eller på telefon: 53 21 15 00.

Med vennlig hilsen

Prosjektansvarlig

(Forsker/veileder)

Masterstudent

Samtykkeerklæring neste side

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Bruk av rene engangshansker på sykehjem», og har fått anledning til å stille spørsmål.

Jeg samtykker til:

å delta i observasjoner der et web-basert verktøy benyttes for å registrere håndhygiene og bruk av hansker

å delta i fokusgruppeintervju sammen med andre helsepersonell fra min avdeling

at mine opplysninger behandles frem til prosjektet er avsluttet

(Signert av prosjektdeltaker, dato)

Informasjon om forskningsprosjektet:

«Bruk av rene engangshansker i sykehjem»

Dette er en informasjon til deg om et forskningsprosjekt ved avdelingen der du bor. I dette brevet får du informasjon om hva forskningsprosjektet vil innebære for deg.

Målet med forskningsprosjektet

Forskningsprosjektets mål er å finne ut om helsepersonell følger de nasjonale anbefalingene om bruk av rene engangshansker i sykehjem, samt hvilke holdninger helsepersonell har til bruk av hansker. Forskningsprosjektet består av to deler. Den første delen er en observasjon av personalet sin bruk av hansker, og den andre delen er et intervju av personalet i en fokusgruppe. Prosjektet er en del av en masteroppgave i folkehelsevitenskap ved Norges miljø- og biovitenskapelige universitet (NMBU).

Hvem er ansvarlig for forskningsprosjektet?

Norges miljø- og biovitenskapelige universitet (NMBU) er ansvarlig for prosjektet.

Hva innebærer forskningsprosjektet for deg?

I tilknytning til observasjonsdelen ønsker vi å spørre deg om du ønsker å delta i forskningsprosjektet. Dersom du ønsker å delta, vil en observatør være til stedet under morgenstell. Ingen opplysninger om deg vil bli spurt om eller komme frem i forskningsresultatene.

Observatøren skal kun registrere hvordan personalet som hjelper deg utfører håndhygiene og bruker hansker. Registreringen gjøres i et elektronisk verktøy ved hjelp av mobiltelefon eller nettbrett.

Det er frivillig å delta

Det er frivillig å delta i forskningsprosjektet. Du vil på forhånd få beskjed om hvilke dager observatøren vil være i avdelingen, og når hun vil observere under ditt morgenstell.

Ditt personvern

Det er bare opplysningene om hvordan personalet utfører håndhygiene og bruker hansker som vil bli brukt i forskningsprosjektet. Ingen data om deg, din funksjon eller tilstand vil bli samlet inn.

Hvis du har spørsmål til studien, eller ønsker å vite mer så ta kontakt med prosjektansvarlig ved Norges miljø- og biovitenskapelige universitet:

Sheri Bastien

Mobil: 902 65 363

E-post: sheri.lee.bastien@nmbu.no

Hvis du har spørsmål knyttet til Personverntjenester sin vurdering av prosjektet, kan du ta kontakt med: Personverntjenester på epost (personverntjenester@sikt.no) eller på telefon: 53 21 15 00.

Med vennlig hilsen

Prosjektansvarlig

Master student

Appendix 3 Focus group interview guide (in Norwegian)

Intervjuguide- Fokus gruppe intervju

Takk for at dere stiller opp til dette fokusgruppeintervjuet, og velkommen!

Mitt navn er XXXXX og jeg XXXX og den som skriver masteroppgave om hanskebruk i sykehjem er XXX. Med meg har jeg XXXXX som skal fungere som sekretær.

Formålet med forskningsprosjektet er å finne ut hvilke meninger eller holdninger og opplevelser dere som utøvende helsepersonell har til bruk av hansker i sykehjem i Norge.

Selve intervjuet vil vare i 1-1,5 time.

Intervjuet i dag dreier seg altså om deres oppfattelse og holdning til bruk av hansker i deres avdeling. Det er ingen riktige eller gale svar. Målet er å få til en samtale eller diskusjon dere imellom om bruk av hansker i deres institusjon.

Intervjuet er med andre ord annerledes enn det man normalt forbinder med et intervju der intervjueren stiller flere spørsmål hele tiden. I dag er det i hovedsak dere som skal snakke og diskutere med hverandre. Vi håper dere diskuterer godt, men har tre temaer, ett av gangen, til å snakke om. Dere leder selv diskusjonen. Hvis den sporer av eller dere går tom for noe å si, eller ikke alle blir hørt, vil jeg veilede dere videre.

Intervjuet vil bli tatt opp. Opptaket starter etter at dere har presentert dere. Det er viktig at dere snakker høyt og tydelig slik at opptaket vil bli hørbart i ettertid. Intervjuet vil bli transkribert, altså skrevet ned fra tale til tekst av meg i etterkant. Ingen personer eller andre gjenkjennbare opplysninger vil bli lagret eller publisert. Det vil bli gjort ett fokusgruppeintervju til, som gjør at eventuelle sitater eller kommentarer ikke nødvendigvis kommer fra dere.

Før dere får presentere dere, vil jeg at dere snur arket foran dere og fyller ut punktene om dere som står der. Deretter snur dere arket på nytt bretter det i to og skriver navnet deres slik at arket fungerer som et navneskilt. Jeg ber også om at dere fyller du ut samtykkeerklæringen som ligger foran dere dersom det er ikke allerede har levert den inn.

Da tenker vi tar en introduksjonsrunde hvor dere forteller hva dere heter, hvilken yrkestittel dere har, og hvor lenge dere har jobbet ved avdelingen eller sykehjemmet. Og evt. spørsmål før vi starter opptaket. Har alle skrudd av lyden på mobil og levert fra seg vakttelefon?

Takk. Da starter vi opptaket.

Forestill dere at dere sitter på vaktrommet eller lignende og diskuterer på vanlig måte. Alle opplevelser og holdninger er like viktige. Og det finnes ingen riktig eller feil svar.

- **Tema: Kjennskap til når det er anbefalt å bruke hansker**

1. Hva er anbefalingene for hanskebruk ved deres avdelinger? F.eks. når er det anbefalt å bruke hansker, er anbefalingene skriftlige, og blir det gitt opplæring i riktig bruk av hansker.

Hjelpespørsmål:

- Har dere opplevd at hansker brukes i situasjoner der dere tenker det ikke er anbefalt å bruke hansker? Eller f.eks. at hanskene er på for lenge av gangen?
- Mener dere at det er vanlig å sprite seg på hender før og etter bruk av hansker?
- Har dere skriftlige retningslinjer.
- Hvilken tradisjon har dere her f.eks. når dere har en nyansatt og dere skal informere om når man skal bruke hansker og når man ikke skal

- **Tema: Holdninger til bruk av hansker**

1. Når og hvordan brukes hansker ved din avdeling? F.eks. situasjoner der hansker brukes når det ikke er anbefalt og motsatt; situasjoner der ikke hansker brukes selv om det er anbefalt.

Hjelpespørsmål:

- Har dere eksempler der dere mener at håndhygiene (håndsprit eller håndvask) kan erstatte noe av hanske bruken?
- Har dere opplevd bruk av doble hansker?
- Har dere opplevd at hansker blir spritet i deres avdeling?

- **Tema: Faktorer som fremmer og hemmer riktig bruk av hansker**

1. (slik jeg forstår dere tenker dere at bruken av hansker ikke er helt ideell ved deres avdeling) Hva mener dere skal til for å sikre bedre eller riktigere bruk av hansker?

Hjelpespørsmål:

- Er det faktorer hos personalet eller ledelsen som bør endres (kunnskap, erfaring ol)?
- Er det organisering eller systemer i avdelingen (for eksempel plassering av dispenser, organisering av arbeidet eller annet) som må endres?

- **Bonus Tema: Holdninger til hansker**

1. *Hvis du engang selv blir pasient; hvordan vil du at personalet som skal hjelpe deg skal bruke hansker?*
2. *Er det slik dere beskriver ønsket om bruk av hansker at bruk av hansker praktiseres i avdelingen deres i dag?*

Avslutningsvis

- Oppsummere hva som har oppfattet og høre om det stemmer
- Er det er noe mer dere ønsker å si om temaet?

Stoppe opptaket

Takk for deltagelsen. I utgangspunktet skal oppgaven levers inn 15. mai. Deretter sendes artikkelen inn til publisering i et internasjonalt tidsskrift. Når artikkelen er publisert vil den bli sendt til institusjonen og funnene vil komme i Smittevernytt. Dele ut sjokolade.

Appendix 4 SIKT approval (in Norwegian)

3/18/23, 3:06 PM

Meldeskjema for behandling av personopplysninger



[Meldeskjema](#) / [Disposable non-sterile glove use among healthcare-workers in nursin...](#) / Vurdering

Vurdering av behandling av personopplysninger

Referansenummer
992699

Vurderingstype
Standard

Dato
05.12.2022

Prosjekttittel

Disposable non-sterile glove use among healthcare-workers in nursing homes.

Behandlingsansvarlig institusjon

Norges miljø- og biovitenskapelige universitet – NMBU / Fakultet for landskap og samfunn / Institutt for folkehelsevitenskap

Prosjektansvarlig

Sheri Bastien

Student

Pia Cathrin Kristiansen

Prosjektperiode

12.12.2022 - 30.06.2024

Kategorier personopplysninger

Alminnelige

Lovlig grunnlag

Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 30.06.2024.

[Meldeskjema](#)

Kommentar

OM VURDERINGEN

Personverntjenester har en avtale med institusjonen du studerer ved. Denne avtalen innebærer at vi skal gi deg råd slik at behandlingen av personopplysninger i prosjektet ditt er lovlig etter personvernregelverket.

Personverntjenester har nå vurdert den planlagte behandlingen av personopplysninger. Vår vurdering er at behandlingen er lovlig, hvis den gjennomføres slik den er beskrevet i meldeskjemaet med dialog og vedlegg.

VIKTIG INFORMASJON TIL DEG

Du må lagre, sende og sikre dataene i tråd med retningslinjene til din institusjon. Dette betyr at du må bruke leverandører for spørreskjema, skylagring, videosamtale o.l. som institusjonen din har avtale med. Vi gir generelle råd rundt dette, men det er institusjonens egne retningslinjer for informasjonssikkerhet som gjelder.

TYPE OPPLYSNINGER OG VARIGHET

Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 30.06.2024.

LOVLIG GRUNNLAG

Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake.

Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER

Personverntjenester vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål

<https://meldeskjema.sikt.no/63581184-4933-4733-abd4-73667e84d911/vurdering>

1/2

- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER

Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), og dataportabilitet (art. 20).

Personverntjenester vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER

Personverntjenester legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

Ved bruk av databehandler (spørreskjemaleverandør, skylagring eller videosamtale) må behandlingen oppfylle kravene til bruk av databehandler, jf. art 28 og 29. Bruk leverandører som din institusjon har avtale med.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til oss ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: <https://www.nsd.no/personverntjenester/fylle-ut-meldeskjema-for-personopplysninger/melde-endringer-i-meldeskjema>

Du må vente på svar fra oss før endringen gjennomføres.

OPPFØLGING AV PROSJEKTET

Personverntjenester vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Appendix 5 PICO-form

CATEGORIES

S Y N O N Y M S	Health Personnel	Nursing Homes	Glove use		OR
	health care professional*	nursing home*	gloves, protective		
	health care provider*	homes, nursing	protective glove*		
	health care worker*	old folks home*	personal protective equipment*		
	personnel, health	retirement home*	ppe personal protective equipment*		
	professional, health care	old peoples home*	equipment, personal protective		
	provider, health care	Long-Term Care	protective equipment, personal		
	Attitude*	long term care	PPE		
	attitudes, staff	care, long term	Protective Devices		
	health personnel attitude*		protective device*		
	staff attitude*		device, protective		
			safety device*		
			devices, safety		
			Infection Control		
			control, infection		
		Infection prevention			

← **AND** →

Appendix 6 Search string Ovid Medline

Link:

[Click to run search](#)

The above Jumpstart will only work for users who have access to this specific database.

Database:

Ovid MEDLINE(R) ALL <1946 to April 20, 2023>

#	Query	Results from 21 Apr 2023
1	exp Health Personnel/	607,234
2	health personnel.mp.	205,787
3	health care professional*.mp.	30,632
4	health care provider*.mp.	43,548
5	health care worker*.mp.	18,419
6	personnel, health.mp.	117
7	professional, health care.mp.	418
8	provider, health care.mp.	37
9	exp "Attitude of Health Personnel"/	169,355
10	attitude, staff.mp.	2
11	attitudes, staff.mp.	16
12	health personnel attitude*.mp.	22
13	staff attitude*.mp.	1,378
14	attitude of health personnel.mp.	131,313
15	attitudes of health personnel.mp.	61
16	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	771,535
17	exp Nursing Homes/	44,144
18	nursing home*.mp.	52,570
19	homes, nursing.mp.	79
20	old folks home*.mp.	10
21	retirement home*.mp.	364
22	old peoples home*.mp.	282
23	exp Long-Term Care/	28,316
24	long term care.mp.	43,549
25	care, long term.mp.	352
26	17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25	90,701
27	exp Gloves, Protective/	5,148
28	gloves, protective.mp.	2,201
29	protective glove*.mp.	448
30	exp Personal Protective Equipment/	37,664
31	personal protective equipment*.mp.	11,049
32	ppe personal protective equipment*.mp.	141
33	equipment, personal protective.mp.	11
34	protective equipment, personal.mp.	7
35	PPE.mp.	7,339
36	exp Protective Devices/	50,013
37	protective device*.mp.	16,958
38	device, protective.mp.	2
39	devices, protective.mp.	10
40	safety device*.mp.	814
41	devices, safety.mp.	92
42	exp Infection Control/	70,321
43	infection control.mp.	49,346
44	control, infection.mp.	1,291
45	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44	146,441
46	16 and 26 and 45	381

exp Health Personnel/
health personnel.mp.

health care professional*.mp.
health care provider*.mp.
health care worker*.mp.
personnel, health.mp.
professional, health care.mp.
provider, health care.mp.
exp "Attitude of Health Personnel"/
attitude, staff.mp.
attitudes, staff.mp.
health personnel attitude*.mp.
staff attitude*.mp.
attitude of health personnel.mp.
attitudes of health personnel.mp.
1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15
exp Nursing Homes/
nursing home*.mp.
homes, nursing.mp.
old folks home*.mp.
retirement home*.mp.
old peoples home*.mp.
exp Long-Term Care/
long term care.mp.
care, long term.mp.
17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25
exp Gloves, Protective/
gloves, protective.mp.
protective glove*.mp.
exp Personal Protective Equipment/
personal protective equipment*.mp.
ppe personal protective equipment*.mp.
equipment, personal protective.mp.
protective equipment, personal.mp.
PPE.mp.
exp Protective Devices/
protective device*.mp.
device, protective.mp.
devices, protective.mp.
safety device*.mp.
devices, safety.mp.
exp Infection Control/
infection control.mp.
control, infection.mp.
27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44
16 and 26 and 45

[https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=XroJPJe2Zcl9pefdDgnm
mwL9TUAEbdTe0022AYC6I2rU5xRFXoonNXGQ1CoxpBbH](https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=XroJPJe2Zcl9pefdDgnm
mwL9TUAEbdTe0022AYC6I2rU5xRFXoonNXGQ1CoxpBbH)

Appendix 7 E-mail correspondence with Richard Holden regarding SEIPS 2.0

5/6/23, 10:31 AM

E-post – Pia Cathrin Kristiansen – Outlook

RE: Permission to reprint the SEIPS 2.0-model

Holden, Richard <rjholden@iu.edu>

ma. 17.04.2023 14:23

Til: Pia Cathrin Kristiansen <pia.cathrin.kristiansen@nmbu.no>

Hi,

Please go ahead and use it with citation!

Rich

--

Each person has a unique work-life schedule, preferences, email hygiene, and circumstances. A few words about mine:

- If you receive this at night or on a weekend/holiday, please understand I am not encouraging you to do the same. Thank you for understanding that my time to work on emails is often relegated to these not-universally-convenient times.
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Subject: Permission to reprint the SEIPS 2.0-model

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My name is Pia Cathrin Kristiansen, and I'm a student undertaking a master's degree in public health at Norwegian University of Life Sciences (NMBU). Through my masters thesis I am doing a small-scale study of glove use in two Norwegian nursing homes. As a framework for the study, I have used the SEIPS 2.0 -model together with the Theory of Planned Behaviour. My thesis is written in English as an article with mantel, and I will submit the article for publication.

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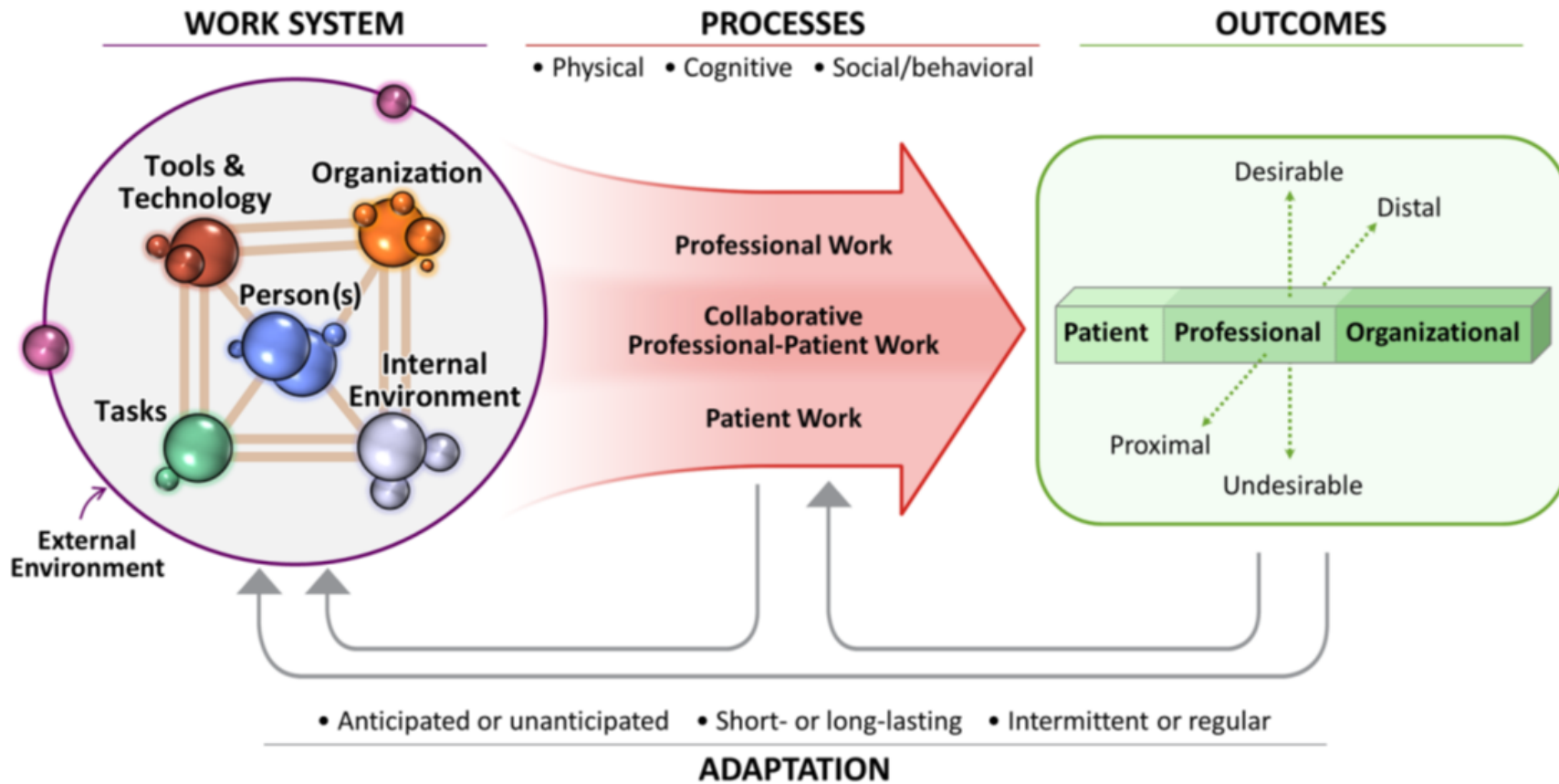
Thank you in advance for responding my email.

Regards

Pia Cathrin Kristiansen

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Appendix 8 SEIPS 2.0 model by Holden et al.



SEIPS 2.0 model reproduced with permission of Richard Holden with citation.

Holden, R. J., Carayon, P., Gurses, A. P., Hoonakker, P., Hundt, A. S., Ozok, A. A., & Rivera-Rodriguez, A. J. (2013). SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics*, 56(11), 1669-1686. <https://doi.org/10.1080/00140139.2013.838643>

Part 1: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study design	Methodological quality criteria	Response		
		Yes	No	Comments
Screening questions (for all types)	S1. Are there clear research questions?	X		
	S2. Do the collected data allow to address the research questions? <i>Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.</i>	X		
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	X		
	1.2. Are the qualitative data collection methods adequate to address the research question?	X		
	1.3. Are the findings adequately derived from the data?	X		
	1.4. Is the interpretation of results sufficiently substantiated by data?	X		
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	X		
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?			
	2.2. Are the groups comparable at baseline?			
	2.3. Are there complete outcome data?			
	2.4. Are outcome assessors blinded to the intervention provided?			
	2.5. Did the participants adhere to the assigned intervention?			
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?			
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?			
	3.3. Are those complete outcome data?			
	3.4. Are the confounders accounted for in the design and analysis?			
	3.5. During the study period, is the intervention administered (or exposure occurred), as intended?			
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?	X		TIME NOTED
	4.2. Is the sample representative of the target population?	X		
	4.3. Are the measurements appropriate?	X		
	4.4. Is the risk of non-response bias low?	X		
	4.5. Is the statistical analysis appropriate to answer the research question?	X		
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	X		X
	5.2. Are the different components of the study effectively integrated to answer the research question?	X		
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	X		
	5.4. Are divergences and inconsistencies between qualitative and quantitative results adequately addressed?		X	
	5.5. Do the different components of the study adhere to the quality criteria of each method of the methods involved?	X		

Appendix 10 The article; Healthcare workers' perceptions of the use of gloves and observed compliance with national guidelines in two Norwegian nursing homes

To be submitted to the Journal of Hospital Infection.

Pia Cathrin Kristiansen, master's student in Public Health, Norwegian University of Life Sciences, and infection prevention nurse, Nursing Home Agency, Oslo municipality

Summary

Background: Incorrect glove use can result in cross-contamination and healthcare-associated infections. Gloves are required when healthcare workers (HCWs) are at risk of contact with blood, body fluids, or nonintact skin and when handling potentially infectious materials or contaminated items and surfaces. Previous research has revealed incorrect glove use, including lack of indication, improper changing or timely removal, and inadequate hand hygiene after glove use.

Aim: To develop an in-depth understanding of HCWs' attitudes and perceptions of gloves and explore barriers and facilitators as well as compliance with national guidelines.

Methods: A convergent-parallel mixed methods study design comparing observations with focus group interviews (FGIs). The study was conducted at two municipal nursing homes in Oslo for two weeks in January-February 2023.

Finding: Observations of 19 HCWs resulted in 73 episodes where gloves were used (n=67) or should have been used (n=6). Overuse was identified 16 times (21.9%). Lack of hand hygiene after glove removal was observed in 36 out of 67 instances (53.7%). The two FGIs of 13 HCWs revealed that the decisions to use gloves are influenced by social norms, knowledge, experience, and emotions related to resident needs, tasks, and gloves. Availability of gloves was a facilitator, while glove quality posed a barrier.

Conclusion: Although HCWs possess knowledge of glove use guidelines, their attitudes, and perceptions do not necessarily translate into compliance. This study indicates the need for targeted interventions that focus on improving compliance with hand hygiene after glove removal.

Clinical trials identifier: N/A

Keywords: *glove use, attitude, nursing home*

Introduction

Healthcare-associated infections (HAI) are preventable infections acquired during the process of receiving healthcare, causing harm and burden to patients, healthcare workers (HCW), and society [1]. Still, almost four percent of all nursing home residents in Norway and Europe have an HAI at any given time [1, 2]. Approximately 32,000 people live in nursing homes in Norway [3], and they require a high degree of assistance with daily activities and medical care.

HCWs hands play an important role in the transmission of infections in healthcare settings, and gloves are an important standard precaution measure when used correctly [4]. Gloves are required when HCWs are at risk of contact with blood, body fluids, or nonintact skin and when handling potentially infectious materials or contaminated items and surfaces [5]. Gloves minimize but do not eliminate contamination of the hands, and gloves do not replace the need for hand hygiene.

During the last decade, infection prevention personnel around the world have stated that the overuse and misuse of gloves are a cause of concern [6-8]. Gloves are often donned too early, used without indications, not changed at critical points, not doffed promptly, and hand hygiene post removal is not performed adequately [6-9]. In addition to infection control-related issues, glove misuse, and overuse can also result in an increased incidence of dry skin and eczema for HCWs [5]. Moreover, as part of the United Nations' Sustainable Development Goals (SDGs), the importance of reducing single-use plastics has received increased attention, and reducing the overuse or misuse of gloves is of interest to achieve a more sustainable environment [10].

There is a knowledge gap regarding HCWs' attitudes and perceptions of glove use and compliance with guidelines in nursing homes. By understanding why and how HCWs use gloves, professional authorities, infection prevention personnel, health educational institutions, and quality managers can form new targeted interventions and improvement programs to increase compliance with glove use guidelines. This study aimed to compare observations of glove use compliance with findings from focus group interviews (FGIs) to increase understanding of the facilitators and barriers which influence glove use in the two nursing homes.

Methods

A convergent-parallel mixed methods study design comparing observations with focus group interviews (one in each nursing home) was chosen. In addition, field notes were taken to help identify physical facilitators and barriers that can provide additional contextual information to interpret the results. The study was performed during two weeks in January-February 2023, in seven units from two municipal nursing homes in Oslo of average size. All residents have private rooms with private or shared bathrooms.

Study participants

For practical reasons, HCWs who had dayshift on scheduled days were asked to participate by the head nurses in each nursing home. To be included, the HCWs had to be educated within healthcare (i.e., nurse, nurse assistant, or equivalent) or be a student undertaking relevant studies. Participation was voluntary and 19 HCWs were observed and 13 participated in FGIs, of which eight participated in both.

Observation of glove use compliance

Observations were conducted during morning care, breakfast, medicine distribution, and waste- and laundry management. The web solution “National Tool for observing infection prevention measures in the health service, NOST” (first edition) [11] was used to record the observations. NOST was developed for recording compliance with different infection prevention and control measures and is based on international guidelines. The tool has four modules: 1) hand hygiene, 2) jewellery, watches, and fingernails, 3) gloves, and 4) personal protective equipment (PPE). All observations of whether gloves are used according to indications or not, and if hand hygiene was performed after glove removal were done in the glove module. Data were exported to Microsoft Office 365 Excel to descriptively analyse the recorded compliance.

Focus group interviews and thematic analysis

A thematic guide was designed, using findings from previous research on glove use. The guide had three main themes: 1) knowledge of guidelines; 2) attitudes toward the use of gloves; 3) facilitators and barriers to glove use. A moderator led the discussion and a note-taker recorded observations of body language and other interactions. The FGIs were conducted in Norwegian and recorded and stored in a digital form by using a Dictaphone app version 3.8.1 from the University of Oslo [12]. The audio files were transcribed after each FGI. Quotes used to support the findings were translated into English and may have lost some of their meaning in translation.

The data were analysed by Braun & Clarke's six steps of thematic analysis [13]. A hermeneutic approach was applied to understand the transcript and find meaningful statements which were coded and thematized.

The point of integration took place after the analyses of both data sets by using the Systems Engineering Initiative for Patient Safety (SEIPS) 2.0-model [14] to help interpret the findings. SEIPS is a framework for understanding outcomes within healthcare.

Ethical considerations

The study was approved by the Norwegian Agency for Shared Services in Education and Research (SIKT), reference number 992699. Written consent was provided by the HCWs before participation. No information about the residents was collected, but out of respect, the residents were asked and gave their permission for the observer to be present during morning care. To secure the participants' confidentiality, all quotations are labelled with a randomized number.

Results

Participant characteristics

A total of 24 HCWs were included in the study (see Table 1). The participants' seniority varied from less than one month to thirty-two years, with an average job experience of slightly over ten years.

Table 1 Sample composition of the twenty-four participants who took part in observation and/or FGI based on educational level, sex, and age.

Education levels	Total Observation	Total FGI	Only observation	Only FGI	Both	Total participants (%)
Nurse	5	5	2	2	3	7 (29.2%)
Assistant nurse	9	7	5	3	4	12 (50%)
Student	5	1	4	0	1	5 (20.8%)
<i>Total HCW</i>	<i>19</i>	<i>13</i>	<i>11</i>	<i>5</i>	<i>8</i>	<i>24 (100%)</i>
Sex						
Male	6	6	2	2	4	8 (33.3%)
Female	13	7	9	3	4	16 (66.6%)
Age group	<20	20-30	30-40	40-50	50-60	>60
	1	5	5	7	6	0

Observations

The observations lasted for a duration of between 10-60 minutes, during the morning care of 17 residents. The number of recorded incidents of glove use varied from 1-13 observations per HCW. In total, 73 episodes where gloves were used (n=67) or should have been used (n=6) were recorded (see Table 2). Compliance with glove use guidelines, including donning and doffing promptly, followed by immediate hand hygiene, was recorded in only 24 episodes or 47.1%. Gloves were donned 51 times in compliance with the indication and 16 times without indication. The most common error was the lack of hand hygiene after doffing gloves in 53.7% (n=36).

The observations showed some difference in the compliance based on education (see Figure 1) but will not be further investigated here due to few participants and relevance.

NOST does not have the function to structurally document the prolonged use of gloves.

However, the field notes indicate that in 19.2% (n=14) gloves were not doffed promptly, e.g., after contact with body fluids or handling unclean textiles and before touching clean surfaces.

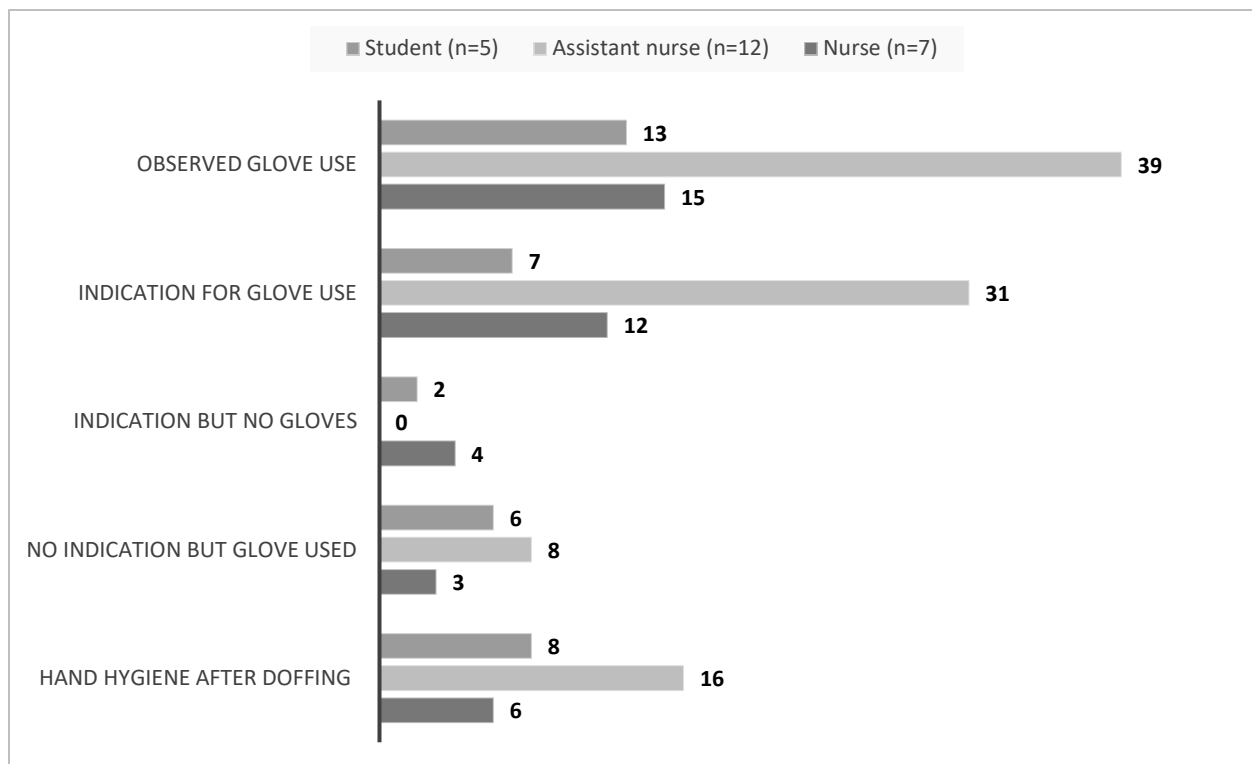


Figure 2 Overview of the observations divided by education.

Table II Observations registered in NOST according to indications in national guidelines

Indication for glove use	Observation of glove use	Number of observations (%)	Use of gloves (%)		Hand hygiene after doffing gloves (%)	
	Indication for glove use	Risk of contact with blood or body fluids	51 (69.9 %)	Gloves	47 (92.2%)	Yes
No gloves				4 (7.8%)	No	25 (53.2%)
0						
Other		6 (8.2 %)	Gloves	4 (66.7%)	Yes	2 (50%)
			No gloves	2 (33.3%)	No	2 (50%)
			Compliance according to the indication in guidelines	57 (78.1%)	Gloves	51 (89.5%)
		No gloves	6 (10.5%)	No	27 (52.9%)	
No indication of glove use	Care without contact with body fluids	9 (12.3%)	Gloves	9 (100%)	Yes	4 (44.4%)
	Food	0				
	Other	7 (9.6 %)	Gloves	7 (100%)	Yes	2 (28.6%)
					No	5 (71.4%)
Observed gloves without indication	16 (21.9 %)					
	Total observations	73 (100%)	Gloves	67 (91.8%)	Yes	31 (46.3%)
					No	36 (53.7%)

Healthcare worker's perceptions of the use of gloves

Analysis of the findings suggests three main determinants that affect the use of gloves, and the results will be elaborated on according to these subheadings.

Knowledge and experiences that affect the use of gloves

All participants were familiar with the glove use guidelines. Nevertheless, there were inconsistencies in the HCW's assessment of whether it was mandatory or necessary to use gloves or not, related to various tasks such as helping the residents with dental care.

The participants expressed that due to their familiarity with the residents, their health status, and their need for care, they do a quick risk assessment before starting the task.

“We know the residents well and know what to expect. Therefore, I can prepare and put on gloves, because I know that there is a high probability that the resident's hands or bed linen are contaminated with faeces.” (HCW 12)

Previous experience with the task and the resident as well as knowledge from education, courses, and guidance also affects how the HCWs feel about gloves.

“... before I got my approval, I saw my supervisor wash the resident's face and torso without gloves. Then I thought; “no, no, this is not for me. I must wear gloves to protect myself”. But now it's not a problem at all, because I know it's nothing dangerous. It shows respect to the resident.” (HCW 10)

The participants said that the Covid-19 pandemic increased knowledge about glove use and improved access to recommended gloves. However, many also stated that they believed that all the measures that were implemented during the pandemic led to misuse, overuse, and in the end, unlearning, fear, and trauma.

Emotions affecting the use of gloves

The participants emphasize that the resident's feelings must be taken into consideration when assessing whether they need to wear gloves. The desire to provide high-quality person-centred care also affects the extent to which HCWs perform hand hygiene immediately after using gloves.

“You want the resident to feel some distance when you help them wash genitals and sacral areas. Use of gloves creates some distance for both of us.” (HCW 4)

“I do not always rub my hands after glove use. It depends on why I use gloves. If I have assisted in the care of the intimate areas, I do not have time to wash or rub my hands, I simply finish my work and then clean my hands.” (HCW 7)

Stories about residents where the infection status was both known and unknown were told, and where fear of being infected entailed unnecessary strict use of gloves or other measures.

The interpretation of the data may indicate that using gloves gives a feeling of protection that removes the need for hand hygiene.

“During contact precautions, I firmly tape one glove to the gown and double glove. When I need to change, I simply doff one pair and put on new ones.” (HCW 7)

The use of double gloves was the most engaging topic that appeared in both FGIs. It was stated both that double gloving never happened and that it was completely normal.

“I use double gloves when, for example, there are a lot of faeces. Then I can take off one pair and not have to leave the resident. And I don't have to worry about the gloves cracking and leaving faeces on my skin.” (HCW 12)

“If the task takes a long time, your hands become clammy, and it is very difficult to put on new gloves. Therefore, many people choose to have two pairs of gloves instead.” (HCW 2)

The influence of subjective norms on the decision to wear gloves

In both FGIs, the participants stated that there was a culture of staying professionally updated and of asking for help or guidance and giving feedback. The participants reported that they previously had unwritten rules about when to wear gloves, such as during food preparation.

The desire to satisfy the residents, colleagues, and management along with the desire to self-protect sometimes decided to wear gloves difficult.

“...when we make breakfast, some residents want us to use gloves. Then you hear colleagues say it is not okay. Whom shall you listen to? The resident or the management?” (HCW 6)

“Sometimes I think we overuse gloves. For example, some use gloves throughout the whole morning care. And sometimes, if we use it when we prepare food, we simply forget to take them off and wash our hands, and then mix clean dishes with dirty ones.” (HCW 12)

Facilitators and barriers to correct glove use

Gloveboxes were stated and observed to be placed in almost every point of need and a facilitator to glove use. Posters on how and when to use gloves as a reminder and an aid to correct glove use were another facilitator.

The most frequently mentioned barrier was the quality of the gloves, followed by the refilling of gloveboxes, hand disinfection, and other items.

“During the covid-19 pandemic, we got new types of gloves. They crack faster. We have one pair that seems a little thicker and better, but we are only allowed to use them during contact precautions.” (HCW 10)

“One who is responsible for restocking each room is a way to solve the continuous absence of gloves and other items.” (HCW 1)

Another barrier stated to be the time it takes to doff gloves and perform hand hygiene correctly when the resident is waiting for the HCW to finish up.

“.... I don't want the resident to wait as long as 40-60 seconds while I wash my hands, so instead I rub when I follow them out of the room” (HCW 9)

The results were mapped by using the SEIPS 2.0-model

The analysed data were categorized according to the six components of the work system in SEIPS 2.0 [14] (Table 3). All components can act both as facilitators and barriers to glove use compliance.

Table III Thematic analysis of the findings considering glove use according to components in the SEIPS2.0 -model

SEIPS FACTOR	COMPONENTS THAT INFLUENCE THE USE OF GLOVES
Person(s)	Residents' desire and need in focus
	Knowledge of the residents and what to expect during care
	Knowledge of guidelines
	Gloves are used to make it less intimate
	Desire to self-protect
	Double glove for simplicity
	Experience gives security
	Eczema or wounds on own hands
Tasks	Discomfort when performing certain tasks
	Disagreement about when to use gloves
	Double glove during time assuming tasks
	Glove use is not always followed by hand hygiene
Tools & Technology	Different types of gloves for different tasks
	Quality of the gloves
	Difficult to don gloves when the skin is clammy or moist
Organizational factors	Person-centred organization
	Culture to talk about improvements
	HCW trains new colleagues
	Posters with information on glove use
	Digital procedures with reading confirmation
Internal environment	Task responsible persons
	Access to gloves
External environment	Access to hand hygiene facilities
	Guidelines require glove use
	Guidelines from NIPH and the nursing home agency
	Economy
	Agreement with glove supplier

To gain broader insights into glove use, a larger study could have incorporated FGIs with head nurses, quality managers, as well as HCWs. Additionally, exploring the residents' perspective on glove use would be valuable, considering the participants' expressed intention to protect and respect them.

Discussion

Glove use behaviour is influenced by previous experience and especially if the behaviour is habitual. The average seniority of the HCW who volunteered to participate was high (see Table 1) and may have brought a selection bias to the result. An English small-scale hospital study [8] found that 68.6% of gloves were used without indication. In comparison, 21.9 % (n=16) were uncovered in this study (See Table 2).

Reports of gloves being a substitute for hand hygiene have been previously documented [15, 16], leaving hand hygiene to drop on average by 30.8 % when gloves were used [17]. This study did not look at hand hygiene compliance, but only 46.3% (n=31) of all glove use was followed by hand hygiene.

Human factors affecting glove use

Factors affecting glove use are discussed in the context of the six components of the work system in the SEIPS 2.0 model.

Person(s)

The desire to provide high-quality person-centred care was important to the participants. As was the desire to self-protect. A mixed-method hospital study in England found that self-protection was strongly related to glove use [16] and that the English public prefers HCWs to use gloves when receiving care of “private parts” [18]. This is consistent with the participant’s desire to protect themselves and make some distance between the resident and themselves in this study.

Task

Using gloves is not a difficult task, but the assessment of whether to use gloves or not, and especially when to doff and perform hand hygiene, appears to be complex. Findings in this study may indicate a need to clarify the importance of immediately performing hand hygiene after the removal of possible contaminated gloves in the national glove use guidelines to increase compliance. A more precise description that hand hygiene before using gloves is a patient safety measure and that hand hygiene after using gloves is both a patient safety measure and a measure to self-protect could perhaps increase compliance.

Tools and technology

Different types of gloves perceived as of poor or high quality may cause unnecessary fear and lead to double gloving. Double gloving was used to reduce the risk of contaminating HCW hands if gloves crack and for time-saving purposes. It was reported to be a substitute for hand

hygiene for example during contact precautions. The national guidelines do not recommend nor describe the use of double gloving during care [5]. Further research and knowledge of double gloving in nursing homes are needed.

Organizational factors

This study found that HCWs have diverse attitudes toward glove use. The practice of training students and new colleagues can lead to glove overuse or misuse being taught by the expert to the novice. This will influence the impact of social norms which in turn influence when gloves are selected for subsequent use.

Internal environment

This factor is related to the physical environment. Field notes indicate that gloveboxes were stored in different places, but not in a system. Systematic placement of gloveboxes, for example in a glove rack may lead to cleaner gloves and perceived behaviour control.

External environment

The quality of the gloves affects the use of gloves. According to the HCWs gloves appears to be purchased based on economics. Gloves that crack lead to overuse and may be a financial burden at the expense of other needs. Even if one pair of gloves is inexpensive, the total cost of gloves, waste management, infections and so on may not be sustainable.

This study identified an overuse of gloves and a high lack of hand hygiene after doffing. Overuse may be prevented by choosing a higher-quality glove. If gloves do not crack so easily, double gloving may be unnecessary on many occasions.

Conclusions

The findings from this small-scale study are the first of its kind in Norway. The study has demonstrated that HCWs' attitudes and perceptions of glove use are shaped by various factors, including social norms, knowledge, experience, and emotions associated with fulfilling the resident's needs, the task they are to do, and glove use guidelines.

It is crucial to raise awareness regarding two important aspects highlighted by this study: the lack of hand hygiene after glove removal and the use of double gloving as a substitute for hand hygiene.

Conducting a more comprehensive study that includes HCWs, managers, and residents can be beneficial both from a public health perspective and an infection prevention perspective. The findings can be used to develop future interventions and improvement programs aimed at improving compliance with glove use guidelines. When overuse decreases, this will affect the environment in the direction of a more sustainable environment.

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Conflict of interest: The author declares that there is no conflict of interest. The views expressed here are those of the author and do not necessarily reflect the views of the university or the employer.

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References

1. Berg, T.C., et al., *Helsetjenesteassosierte infeksjoner, antibiotikabruk (NOIS), antibiotikaresistens (MSIS) og Verdens håndhygienedag*. 2019, Folkehelseinstituttet: Oslo. p. 138.
2. European Centre for Disease Prevention and Control, *Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities 2016–2017*, ECDC, Editor. 2023, ECDC: Stockholm.
3. Statistics Norway. *Care services*. 2022 15. June 2022 [cited 2022; Available from: <https://www.ssb.no/en/helse/helsetjenester/statistikk/sjukeheimar-heimetenester-og-andre-omsorgstenester>].
4. World Health Organization. *WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care*. Hand hygiene as a performance indicator. [guidelines] 2009 [cited 2023; Available from: <https://www.ncbi.nlm.nih.gov/books/NBK144028/>].
5. Folkehelseinstituttet. *Veileder for håndhygiene i helsetjenesten*. 2017 2023 03.03.2023]; Guidelines]. Available from: <https://www.fhi.no/nettpub/handhygiene/>.
6. Loveday, H.P., et al., *Clinical glove use: healthcare workers' actions and perceptions*. Journal of Hospital Infection, 2014. **86**(2): p. 110-116.
7. Picheansanthian, W. and J. Chotibang, *Glove utilization in the prevention of cross transmission: a systematic review*. JBI Database System Rev Implement Rep, 2015. **13**(4): p. 188-230.
8. Wilson, J., et al., *The misuse and overuse of non-sterile gloves: application of an audit tool to define the problem*. Journal of Infection Prevention, 2015. **16**(1): p. 24-31.
9. Lindberg, M., B. Skytt, and M. Lindberg, *Continued wearing of gloves: a risk behaviour in patient care*. Infection Prevention in Practice, 2020. **2**(4): p. 100091.
10. United Nations. *UN sustainable development goals*. 2023 [cited 2015 2023]; Available from: <https://sdgs.un.org/goals>.
11. Folkehelseinstituttet. *Håndbok for Nasjonalt verktøy for observasjon av smitteforebyggende tiltak i helsetjenesten (NOST)*. 2023 02.02.2023 02.02.2023]; Guidelines]. Available from: <https://www.fhi.no/nettpub/nost/>.
12. Universitetet i Oslo, *Diktafon*. n.d., UiO.
13. Braun, V. and V. Clarke, *Using thematic analysis in psychology*. Qualitative Research in Psychology, 2006. **3**(2): p. 77-101.
14. Holden, R.J., et al., *SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients*. Ergonomics, 2013. **56**(11): p. 1669-86.
15. Haenen, A., et al., *Hand hygiene compliance and its drivers in long-term care facilities; observations and a survey*. Antimicrob Resist Infect Control, 2022. **11**(1): p. 50.
16. Wilson, J., A. Bak, and H.P. Loveday, *Applying human factors and ergonomics to the misuse of nonsterile clinical gloves in acute care*. American Journal of Infection Control, 2017. **45**(7): p. 779-786.
17. Sandbekken, I.H., et al., *Students' observations of hand hygiene adherence in 20 nursing home wards, during the COVID-19 pandemic*. BMC Infect Dis, 2022. **22**(1): p. 156.
18. Wilson, J., et al., *Public perceptions of the use of gloves by healthcare workers and comparison with perceptions of student nurses*. J Infect Prev, 2017. **18**(3): p. 123-132.



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