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UNIVERSITY OF SKÖVDE

Doctoral Thesis

Knowing Me, Knowing You

- Bridging Perspectives through Age Suit Simulation Intervention in Nursing Education

Björn Bouwmeester Stjernetun

Jönköping University
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2. Abstract

Background: The ongoing shift in healthcare from hospital settings to care in the home reflected in the Good and Close Care reform indicates that newly graduated nurses will increasingly provide care for older persons in their own homes. Person-centred care, which underpins this integrated reform, depends on understanding the patient as a person by adopting their perspective. However, sustaining such care within a highly specialised health system remains challenging. Nursing students may feel unprepared for, and lack motivation to engage in, the care of older persons. In addition, age-related stereotypes within society and among care providers present further barriers.

These challenges highlight the need for didactic strategies that strengthen students' knowledge of person-centred care for older persons. Age-suit simulation, which promotes perspective-taking by allowing participants to 'walk in an older person's shoes', has been shown to enhance empathy and improve attitudes. However, previous research has made limited use of age suits and has rarely simulated the oldest age group (85+). Moreover, earlier studies have often overlooked realistic home environments and have lacked both longitudinal evaluation and a clear theoretical foundation.

Aim: The overall aim of this thesis was to study nursing students' experiences of an age-suit simulation intervention grounded in experiential learning within a home environment.

Method: The four studies employed different research designs. Studies I and IV were quantitative. Study I used a quasi-experimental pre-test–post-test design with a control group, while Study IV adopted a longitudinal design. Differences between groups were analysed using the Mann–Whitney U-test, and multiple regression analysis was applied to examine effects over time. Studies II and III adopted qualitative, inductive designs. Study II was based on group interviews conducted during reflection seminars and employed reflexive thematic analysis. Study III was an observational study in which the data were also analysed using reflexive thematic analysis.

Results: Participation in the age-suit simulation had a significant effect on increasing scores on the Perspectives on Caring for Older Patients-Short Form (PCOP-SF) both immediately after the simulation and throughout the remainder of the nursing programme. This indicates that the intervention enhanced students' favourable perspectives towards caring for older persons. Female sex and a greater number of years of prior work experience were also associated with reporting more favourable perspectives, as measured using the PCOP-SF. Students reported that the age-suit simulation increased their awareness of the vulnerability and loneliness that older persons may experience when living with various impairments. The embodied experience of the physical, psychological, and social impacts of ageing served as an important reference point in students' post-simulation reflections. As highlighted in the findings, students' new insights and understandings were often related to key concepts of person-centred care, such as preserving dignity and autonomy by being patient, allowing sufficient time in care situations, and getting to know and focusing on what matters to the person. The home environment, including the use of welfare technology, was described by students as presenting both potential risks—such as fall hazards or technology that is not suited to the individual—and opportunities, as an accessible home could alleviate some of the challenges associated with living with impairments. A prominent finding concerned the impact of impaired vision, which was explored further when students simulated the roles of a blind person and an attendant. During these simulations, two distinct approaches to collaboration were observed: students either adapted to one another's limitations or became distant from each other. In both approaches, a key influencing factor was students' ability and motivation to establish and maintain effective verbal and non-verbal communication.

Conclusions: This thesis revealed that students who participated in the age-suit simulation held more favourable attitudes towards caring for older persons compared to those who did not participate. The findings support the timing of the intervention in the second year of a three-year programme. In this study, the age suit was employed as a geriatric suit, which may account for the immersive and challenging nature of the experience. The results also provide support for using experiential learning theory as a framework for age-suit simulation, as the outcomes align with the concepts of the learning cycle. In particular, students perceived the simulation as an extraordinary experience that prompted reflection and critical thinking, leading to new insights and understanding. As demonstrated in the findings and discussed in this thesis, the age-suit simulation particularly drew students' attention to a heightened sense of vulnerability, including experiences of isolation and loneliness. Another perspective on vulnerability emerged from dependence on a healthcare system in which personhood is often overlooked. Students further reported that the simulation influenced their anticipated clinical practice. In particular, the importance of being patient, allowing sufficient time, and being fully present was highlighted as a key takeaway from the simulation, essential for preserving dignity and autonomy when caring for older persons.

Keywords: Age-suit simulation, experiential learning, home, home care, intervention, nursing, nursing students, person-centred care, reflection

3. Original papers

The following papers are enclosed as appendices.

Study I

Bouwmeester Stjernetun, B., Hallgren, J., & Gillsjö, C. (2024). Effects of an age suit simulation on nursing students' perspectives on providing care to older persons- an education intervention study. *Educational Gerontology*, *50*(3), 240–253.

Study II

Bouwmeester Stjernetun, B., Gillsjö, C., Odzakovic, E., & Hallgren, J. (2024). ”It' s like walking in a bubble”, nursing students' perspectives on age suit simulation in a home environment–group interviews from reflection seminars. *BMC Nursing*, *23*(1), 124.

Study III

Bouwmeester Stjernetun, B., Hallgren, J., Odzakovic, E., & Gillsjö, C. Pull through together or be detached? A qualitative study of experiential learning in nurse education during interaction in age suit simulation. *Submitted*

Study IV

Bouwmeester Stjernetun, B., Gillsjö, C., Odzakovic., E & Hallgren, J. The sustainability of age suit intervention among nursing students – a longitudinal cohort study. *In manuscript*

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4. Introduction

Research indicates that simulations allowing students to ‘walk in an older person’s shoes’ through age-suit experiences can enhance their empathy towards older persons. The significance of this didactic strategy is particularly evident in the context of the ongoing transition of healthcare from hospital settings to the home. This shift implies that future registered nurses (RNs) will increasingly provide care for older persons in home environments. Nevertheless, nursing students often exhibit unfavourable attitudes towards geriatric care, internalise age-related stereotypes, and perceive a gap between theoretical learning and clinical practice. In the integrated Good and Close Care reform (*God och nära vård*), there is transition in health care form institution as hospitals to home and also a shift in orientation from reactive to proactive health care. Person-centred care (PCC) is the value base in the reform and represents a paradigm shift from fragmented healthcare provision towards the development of sustainable relationships among care providers, patients, and families.

In this thesis, the term *care provider* refers to caregivers in health and social care, while *healthcare professionals* refer to registered professionals such as RNs and physicians. This integrative perspective is particularly beneficial when RNs care for individuals with long-term health conditions, as care is tailored in collaboration with the person and focused on what matters to them, rather than solely addressing symptoms. Similarly, caring and learning have been described as intertwined phenomena, with learning shaped by students’ experiences, values, and reflections that connect theoretical knowledge to both their own and the patient’s experiences. However, integrating PCC into practice remains challenging. Organisationally, there is a call for a person-centred healthcare culture sustained by PCC-oriented care providers who take the patient’s narrative seriously. By contrast, in highly specialised, resource-constrained healthcare systems, implementing PCC has proven difficult. RNs have further reported that the absence of person-centred training in their education contributes to their inability to respond adequately to individuals with long-term health conditions. There is, therefore, a clear need to prepare students and support their learning in relation to PCC, for example, through age-suit simulation. Most existing studies on age-suit simulation have employed the suit to primarily simulate the normal ageing process, with a predominant focus on fostering empathy and general attitudes towards older persons. Moreover, the contextual dimension of the home environment and PCC has often been overlooked, as has the potential for age-suit simulation to represent the experiences of persons with long-term health conditions. In this thesis, an intervention using age-suit simulation in nursing education was employed to enhance students' insights and understanding regarding ageing, the experiences of older persons living with long-term health problems, and the provision of care to older persons.

5. Background

In this chapter, the context of this thesis (Figure 1) is described. This context encompasses the RN's profession and responsibilities and highlights nursing education, including simulation as a didactic strategy to bridge the gap between theoretical learning and clinical practice for nursing students. PCC is presented both as a core competency of the RN and as a foundational pillar of the Good and Close Care reform. Similarly, health is discussed through the lens of personhood, positioning PCC as both a cornerstone of the context and a key element of the theoretical framework of this thesis. In this thesis, the term *long-term health problems* is used to refer to 'health problems that require ongoing management over a period of years or decades' (World Health Organization, 2002, p.3). The context of Good and Close Care and PCC aligns with the general syllabus of health and care sciences, which addresses the study of health and care across the lifespan from individual, group, and societal perspectives. The field examines how personal resources support physical, psychological, and social health, as well as how organisational structures, such as the healthcare system, influence care provision (Jönköping University, 2020)

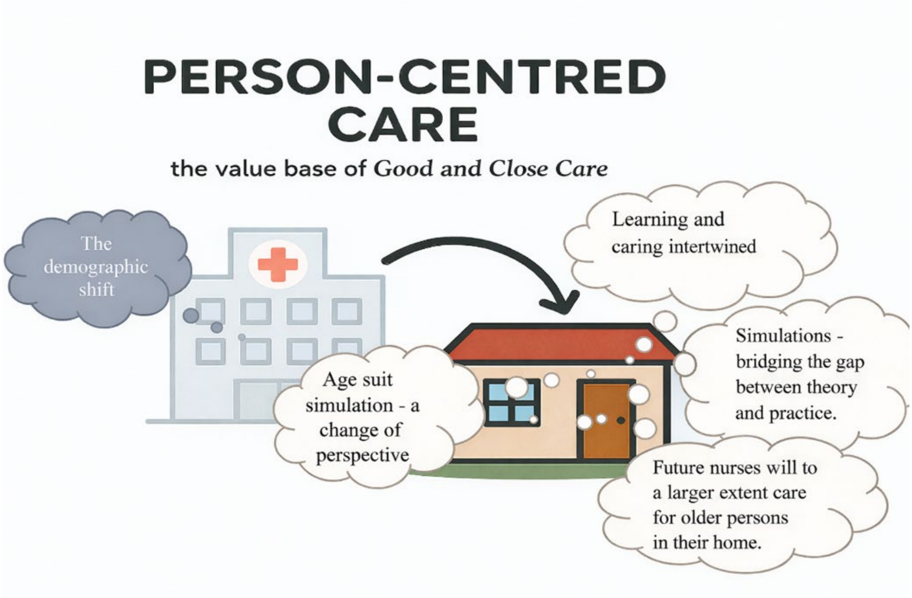

Figure 1. An illustration of the thesis's context, which highlights the Good and Close Care reform, with the transition from hospital-based care to caring for older persons in their homes. This transition implies that future nurses will increasingly need to practise person-centred care in home environments, which may also be equipped with welfare technology

5.1. The RN Profession and Its Responsibilities

In Sweden, healthcare provision at all levels, including regional and municipal services, is governed by the Health Care Act. Accordingly, RNs provide healthcare under this legislation, which states that care must be of high quality, equitable, and accessible, while respecting the patient's right to autonomy, continuity, and integrity (Swedish Code of Statues, 2017:30). Globally, RNs is the largest workforce in the health care system, and Sweden is among the countries with one of the highest number of nurses per inhabitant in the European Union. The RN often work autonomously and is responsible for patient care but also to work interprofessional as well as supervise other care providers (The European Union, 2025). Nursing represents a RN's specific, evidence-based competence, grounded in a humanistic worldview. Safe care is a cornerstone of nursing and is enabled through the RN's core competencies: PCC, teamwork and collaboration, evidence-based practice, improvement knowledge for quality development, and informatics. Consequently, RNs must provide healthcare from a person-centred perspective, recognising the patient as both a person and an active co-creator of their own care (Svensk sjuksköterskeförening, 2023). Similarly, the International Council of Nurses (ICN) code emphasises PCC, noting that incorporating a patient's personal preferences into nursing care is essential to promote health, prevent illness, restore health, alleviate suffering, and support a dignified death (International Council of Nurses, 2021). In nursing, caring is regarded as primary, as it determines what matters to the individual. Nursing is, therefore, described as an interpretative practice, taking into account both the disease process and the person's self-interpreted experience. Symptoms are not merely medical conditions but are imbued with meaning, which the nurse must understand to avoid creating further isolation or suffering (Benner & Wrubel, 1989). Accordingly, an RN's clinical judgement depends on moral agency, which is demonstrated through good practice and continuously develops through experiential learning (Benner, 2000).

5.2. Perspectives on Health

Within PCC, health is understood through the lens of personhood and within the context of social relationships, emphasising the individual's lived experience rather than focusing solely on clinical symptoms. PCC is, therefore, fundamentally concerned with human flourishing, fostering healthful and meaningful relationships among patients, care providers, and significant others (McCormack & McCance, 2017). It offers an alternative to reductionist approaches, recognising that patients are more than their diseases. Instead, they are viewed as active, responsible, and engaged participants in their own care. For healthcare professionals such as RNs, this perspective entails supporting patients in expressing themselves as persons through their illness narratives. These narratives articulate the experience of illness within the broader context of everyday life, enabling individuals to make sense of their situation. Such storytelling serves a therapeutic function, providing patients with a sense of control over their illness (Ekman et al., 2011). Similarly, health can be understood from the patient's perspective as the way it is experienced and shaped by what truly matters to the individual. In this sense, health is not solely about treating disease but about enabling individuals to live meaningfully despite illness (Benner & Wrubel, 1989)

5.2.1. *A Person-Centred Healthcare Culture*

Implementing PCC has proven challenging within a healthcare system dominated by a biomedical paradigm, which leaves little scope for considering the patient narrative and, consequently, for understanding the patient as a person (Ekman et al., 2021; Moore et al., 2017). Brendan McCormack further highlighted that the most significant barrier to PCC is the care environment itself, advocating for a comprehensive, person-centred healthcare culture that is sustained through person-centred approaches by both care providers and organisations. However, in order to develop person-centred practises educators must enhance nursing students' creative capacity which is crucial for being a reflexive practitioner (McCormack, 2022).

A recent review on PCC implementation highlighted that sustaining a person-centred work and care culture across multiple disciplines is a prerequisite for the successful integration of PCC. This requires a shared understanding of what constitutes PCC, including agreement on common goals, values, and the relative advantages of PCC compared to 'practice as usual' (Forsgren et al., 2025). Another overarching issue affecting older persons is ageism, which negatively impacts health and is associated with slower recovery, shorter life span, and impaired mental health (Nemiroff, 2022a). Similarly, previous research indicates that the home care needs of older persons and assisted living settings are often unmet, largely due to insufficient care provider competence and ageism (Kalánková et al., 2021). Other barriers arise when care providers solely focus on efficiency and care coordination, whereas those receiving care place greater value on relational aspects, such as trust and accessibility (Hatam et al., 2025). RNs have highlighted that a lack of training in communication, combined with little prior experience of caring for older persons, hinders their ability to integrate PCC into practice. They also emphasised reflection for improving their competence. Additionally, they reported that maintaining interpersonal relationships could sometimes be exhausting and challenging due to mismatchedexpectations from patients, families, and the healthcare organisation (Younas et al., 2023).

As shown by the research of University of Gothenburg Centre for Person-Centred Care (GPCC), PCC has not been satisfactorily implemented in healthcare practice, as evidenced by patients' dissatisfaction with their level of involvement in their own care. In response, the GPCC developed a three-step routine to support the implementation of PCC. The first step, *initiating the partnership*, involves capturing the patient's narrative, which reflects their suffering within the context of daily life, in contrast to medical narratives that focus on diagnosis and treatment. The second step, *implementing the partnership*, establishes an agreed upon personal health plan, enabling healthcare professionals, patients, and their families to work together towards common goals. The third step, *safeguarding the partnership*, involves documenting the health plan to ensure continuity and accountability in care (Ekman et al., 2021).

5.2.2. *Good and Close Care – A Transition from Organisation to Sustainable Relationships*

In recent decades, responsibility for the care of older persons has shifted from regional to municipal authorities, resulting in a transition of care from institutions, such as hospitals (Swedish Goverment Official Reports, 2020;19). The Swedish government initiated this reform to strengthen collaboration among regions, primary care, and municipalities, promoting coherent and seamless care across organisational boundaries for older persons with long-term health needs (Swedish Goverment Official Reports, 2020;19). This transition, described as the Good and Close Care reform (*God och nära vård*), represents an integrated approach that aligns health and social care more closely with the patient's experiences and everyday lives. PCC forms the value base of this reform and is expected to not only improve coordination of care between regions and primary care but also to contribute to equitable care. The reform is, therefore, particularly beneficial for older persons who may have complex care needs arising from various health conditions, including long-term health problems (the National Board of Social Affairs and Health, 2025b). Good and Close Care is described as a shift in focus from organisational structures to the building and maintenance of relationships among healthcare professionals, patients, and their families. Emphasising interpersonal relationships is especially important for older persons with long-term health problems, as strong and continuous relationships are essential for ensuring continuity, safety, and coordination of care, with the person's needs, preferences, and lived experiences placed at the centre (Barenfeldt & Ebrahimi, 2020).

5.2.3. *Living with Long-Term Health Problems*

Long-term health problems may aggravate a person's vulnerability because of the often increased need for healthcare, combined with a limited ability to participate in and make decisions about their own care (Gracey & McMillan, 2021; Perron et al., 2024). Consequently, ageing with long-term health problems can involve existential concerns about the future, a sense of being caught in limbo, and feeling a lack of influence over one's situation. However, older persons have described finding inner strength and adapting to a 'new normal' as a way to reinforce their autonomy and agency (Hajdarevic et al., 2025). Similarly, living with long-term health problems has been described as inhabiting a diminishing world, due to constant uncertainty regarding bodily capabilities—which, in turn, can restrict access to the wider world and increase the risk of a sedentary lifestyle (Åberg et al., 2020). In this context, life with long-term health problems is characterised by a constant concern for remaining autonomous. For example, the inability to perform tasks as before necessitates asking for help and relying on others for support (Ballmer & and Gantschnig, 2024).

5.2.4. *The Age Suit as a Geriatric Suit and Its Implications for Personhood*

An age suit is a wearable suit designed to simulate age-related health problems. For the studies in this thesis, the GERonTologic Simulator (GERT) was used. The GERT suit has been developed, tested, and utilised predominantly in Europe at universities, medical and nursing schools, and healthcare institutions (https://www.age-simulation-suit.com/). A detailed description of the age suit is provided later in the paper. The standard suit can simulate the effects of normal ageing and associated impairments. By adding accessories, multiple health conditions can be represented, transforming the suit into a geriatric age suit, which is the focus of this thesis.

The body forms the foundation of human perception and possesses the capacity to respond to situations without cognitive mediation (Benner & Wrubel, 1989). Similarly, PCC draws inspiration from the philosophy of Merleau-Ponty, particularly his view of the body. According to this philosophy, the body is fundamental to experiencing and engaging with the world, with mental and physical qualities being intertwined—embodied—thus rejecting a strict mind–body separation (McCormack & McCance, 2017; Thorburn & Stolz, 2023). For care providers, this perspective implies that respecting personhood is also expressed through respecting the patient's body (McCormack & McCance, 2017). Accordingly, a central argument of this thesis is that age-suit simulation provides a lens through which students can develop insights and understanding relevant to PCC in the context of caring for older persons. This aligns with the notion that safeguarding personhood is critical when caring for individuals with multiple health problems, as a reductionist view of the person threatens their personhood (McCormack & McCance, 2017).

5.2.5. *Providing PCC in the Home*

When a person receives healthcare in their own home, they are also regarded as a patient. Such patients may experience various health problems, some of which are long-term, alongside disabilities or other difficulties. They may, therefore, receive concurrent support from both social services and healthcare providers, including specialised care. To deliver PCC and recognise the patient as a person, effective coordination between the various health and social care providers is essential (National Board of Health and Welfare, 2023).

Persons living with long-term health problems who remain at home often require coordinated PCC involving multiple care providers over extended periods. However, a recent follow-up report on the Good and Close Care reform among individuals aged 65 and older, in both home and special housing, indicates that they now have less influence over their care and treatment. They also report a reduced sense of security compared to 10 years ago, suggesting that PCC has not been fully implemented. The report further notes that working as a care provider in the home is challenging, as an increasing number of patients with multiple long-term health problems are being discharged to municipal care, highlighting the need for improved competence and recruitment (National board of health and welfare, 2025). To provide context, in 2024, 352,000 persons over the age of 65 in Sweden received some form of social care, 154,000 received healthcare in their own homes, and 84,000 received healthcare in a nursing home (The National Board of Social Affairs and Health, 2025a).

RNs have also described that working in the home differs from a hospital environment because, in the home, the RN is a guest and must meet the patient on their own terms. This shift in power provides opportunities for the RN to view the patient as a person embedded within a particular context. Understanding the patient's everyday life is described by RNs as meaningful and enables inclusive and safe care (Hovlin et al., 2023). Working as an RN in the home may also involve encountering welfare technology (WT). Developed in Scandinavia, WT refers to the digitalisation of healthcare and social services to support safety, participation, activity, and independence among persons living with impairments, such as older individuals with long-term health problems (Frennert & Baudin, 2021; Zander et al., 2023). However, challenges in implementing WT—such as infrastructural limitations, inadequate evaluation of benefits, and poor user-friendliness—have raised concerns about adverse effects, including increased isolation of older persons and a negative impact on interpersonal relationships between care providers and patients (Zander et al., 2023). Another study indicated that WT was sometimes imposed on older persons, who felt excluded from decision-making processes (Svärdh et al., 2025). These issues arguably highlight barriers that conflict with the principles of PCC.

5.3. Nursing Education

This chapter describes learning in nursing education, emphasising reflection through experiential learning. Simulations and age-suit simulation, in particular, are presented as didactic strategies in nursing education that can help bridge the gap between theoretical knowledge and practical application thereby supporting and preparing students to care for older persons with a person-centred approach.

The nursing programme in Sweden is a three-year course of 180 credits, leading to a bachelor's degree and professional certification (Swedish Goverment Official Reports, 2022). According to the ICN, nurse educators should facilitate lifelong learning, encourage self-reflection, and explore innovative teaching methods. Another key aspect of nursing education is preparing students to meet global healthcare needs and developing an ethical perspective on the implementation of technology in healthcare. Valuing and respecting personal beliefs and preferences also aligns with PCC (International Council of Nurses, 2021), which is recognised as a core competency of the nurses (Svensk sjuksköterskeförening, 2023). The purpose of nursing education is to equip future RNs with the knowledge and skills—including PCC—necessary to address contemporary healthcare challenges, particularly those arising from demographic changes and prevailing health needs, foremost among them the ageing population and long-term health problems (World Health Organization, 2020).

5.3.1. *The Role of Reflection in Student Learning*

Learning is described as a process that leads to change as a result of experience, increasing the potential for performance and future learning, as well as influencing knowledge, beliefs, and behaviours (Noone, 2023). Similarly, experiential learning theory (ELT), which forms part of the theoretical framework of this thesis, conceptualises learning as a process in which knowledge is created through the transformation of experience (Kolb, 2013) within a cyclical process of experiencing, reflecting, thinking, and acting (Kolb & Kolb, 2018).

Experience alone, however, is not sufficient for learning, as consciousness is naturally oriented outward towards the world. A person's everyday attitude is largely unreflective, meaning that experiences are taken for granted rather than consciously analysed. Therefore, deliberate reflection, in which consciousness is turned inwards, provides the foundation for the learning process (Ekebergh, 2007). This deliberate reflection is also a central component of the ELT learning cycle (Kolb & Kolb, 2018). In nursing education, students engage with patients' lived experiences through interactions. Through openness and a shared desire to understand how health can be achieved, these interactions become a learning process for both students and patients, demonstrating the intertwined nature of caring and learning (Ekebergh et al., 2018). From an educational perspective, this approach entails integrating moments of learning activity into caring situations and recognising the learning potential inherent in every interaction. Doing so avoids a dualistic view in which caring is reduced to 'doing' and learning is treated solely as a concern for the student (Eskilsson et al., 2014). Ekebergh and Lindberg (2020) further emphasised that nursing students must engage in self-reflection to become aware of themselves in relation to the specific phenomenon under study. Without such reflection, preconceived ideas and 'taken for granted truths' remain unchallenged, resulting in only superficial incorporation of new understanding.

5.3.2. *Simulations in Nursing Education*

The literature offers various perspectives on how simulations are defined. For example, simulations have been described as a spectrum of teaching and learning methodologies within the nursing curriculum (Aul et al., 2021), aimed at promoting lifelong learning (Noone, 2023) and helping students bridge the gap between academic study and clinical practice (Hustad et al., 2019). Simulations have also been conceptualised as a technique rather than a technology, intended to replace or augment real, immersive experiences, enabling students to acquire new knowledge and improve their understanding of conceptual relationships and dynamics (Gaba, 2004). According to INACSL standards, simulations are defined as 'an educational strategy in which a particular set of conditions are created or replicated to resemble authentic situations that are possible in real life' ("INACSL

Standards of Best Practice: SimulationSM Simulation Glossary", 2016, p.44). While the standard provides a broad definition of learning, it recognises experiential learning as a key component of simulation-based education. In this thesis, Ekebergh et al.'s (2018) definition of didactic is adopted to refer to activities that support learning, with didactic strategies encompassing various learning approaches. Building on these arguments, age-suit simulation in this thesis—where students adopt the perspective of an older person through simulation—is considered a didactic strategy in nursing education, aimed at facilitating students' reflective processes. Deliberate reflection is a key element of learning, as it heightens students' awareness of their own values and beliefs, which is a prerequisite for the transformation of knowledge (Kolb, 2014) and is critical for reflective nursing practice (Ekebergh & Lindberg, 2020).

5.3.3. *Nursing Students' Perspectives on Older Persons*

Nursing students' views on older persons involve several perspectives and can be attributed to various factors. For example, a 2022 study indicated that Swedish students hold fairly neutral attitudes towards older persons compared to Austrian students. Only 70% of the Swedish students reported having cared for an older person and 42% were familiar with the term *ageism*. Furthermore, older students reported more favourable attitudes than younger students (Heckemann et al., 2022). Similarly, positive attitudes have been correlated with an increased willingness to work with older persons (Galzignato et al., 2021). Another study found that Swedish students viewed geriatric care as having a lower professional status (Kydd et al., 2014). Increased knowledge about older persons has been linked to improve students' attitudes towards older persons (Cidália Castro et al., 2023; Mohamed & DeCoito, 2022). A European study investigating nursing students' interest in geriatric care found that overall motivation was low, highlighting a potential challenge for the future of geriatric care (Koskinen et al., 2022). Another study reported ambiguous results, showing that while nursing students generally held positive views of old age, they also expressed ageist and stereotypical attitudes (L. Allué-Sierra et al., 2023).Students' concerns about their competence mirror broader challenges in nursing education, as they may feel unmotivated and inadequately prepared for the complexities of caring for older persons (Dahlke et al., 2024; Gerhardy et al., 2024). Those who perceive a gap between their education and clinical practice are also at greater risk of withdrawing from the nursing programme, and a lack of geriatric education can leave students feeling unable to act in their patients' best interests (Bakker et al., 2019). Nursing education, therefore, plays a vital role in fostering positive attitudes towards older persons, including addressing the issue of ageism (Mohamed & DeCoito, 2023).

5.3.4. *The Shift from a Nursing Student to a Practicing Nurse*

Newly graduated nurses must be able to provide safe and compassionate care across various healthcare settings. As novice RNs, they require a broad range of knowledge encompassing nursing practice, scientific understanding, and the ability to distinguish between normal and pathological conditions, as well as, importantly, an appreciation of the human experience of living with illness (Benner, 2015).

The transition from a nursing student to a practising nurse has been described by students as a challenging journey, often marked by inconsistencies between academic training and clinical practice. Novice nurses need to feel welcomed into the professional nursing culture and recognised as valuable members of the team (Hampton et al., 2021). In the beginning of their studies, students may hold a naïve understanding of the nursing profession, often driven by a desire to make a difference, which can contrast sharply with the realities of clinical practice. Insecurities about possessing the necessary competence or making mistakes are common concerns. Students have also highlighted the importance of lifelong learning and the progressive development of their professional understanding (Lundell Rudberg et al., 2022).

Benner (2022) explained that the ontology of knowing is accessed through embodied experience. This embodied experience forms the core of the skilled, purposeful, and contextually salient behaviours observed in experienced nurses. In Benner's framework, *know-that* is valuable for explaining and predicting, whereas *know-how* skills are derived from practice.

Experience, according to Benner, emerges when preconceived notions and expectations are challenged, leading to the formation of new understanding within a specific context. Therefore, experience is a prerequisite for expert knowledge (Benner, 1984). However, research suggests that nursing students today enter the profession at a novice level (Benner, 1984) rather than as advanced beginners, which may account for the insecurities observed among newly graduated nurses. In this regard, nurse educators should employ immersive simulations to prevent students from entering the field as novices and instead support their progression to the advanced beginner level (Benner, 1984) by enhancing skills such as communication, critical thinking, teamwork, and time management (Graf et al., 2020). Similar to the context specific knowledge learned through experience as described by Benner (1984) age-suit simulation in the context of home can raise students' insights and understanding of caring for older persons with long-term health problems from a person-centred perspective.

5.3.5. *Previous Research on Age-Suit Simulation – Limitations and Variations*

Age-suit simulators were first developed in the 1990s by the motor car industry. Since then, their application has expanded to a different context—namely healthcare—with most studies conducted in Europe, followed by Asia and the United States (Lavallière et al., 2017). The GERT suit has been studied among nursing students, RNs, care providers, and participants from the general public. Previous research on age-suit simulation has primarily focused on its effects on users' attitudes towards older persons (Mandegari Bamakan et al., 2021; Nelson et al., 2023; Sari et al., 2020).The majority of studies (Gerhardy et al., 2024; Gerhardy et al., 2025; Giner Perot et al., 2020; T. Laurentius et al., 2022; Moutoussamy et al., 2024; Rodriguez-Molinero et al., 2024; Rossler & Tucker, 2022; Schaefer et al., 2023; Schmidt et al., 2022; Silva et al., 2024; Söylemez et al., 2024; Vieweg et al., 2023) employed the standard version of the age suit, simulating normal ageing. Only a few studies have included additional accessories to simulate multiple health problems (Bowden et al., 2023; A. Bowden et al., 2020; Güney & Çiçek Doğan, 2024).

There are other age suits on the market besides GERT, one of which is the Aging Suit from Japan, SAKAMOTO (https://www.sakamoto-model.com/product/simulation/m176/). Compared to GERT, this suit does not offer the option of accessories and primarily simulates the impairments associated with normal ageing. For example, it lacks added weights to simulate muscle loss, the ability to replicate various eye conditions, or the tremor of the hands. It is also manufactured as a 'one-piece' suit, which may limit its suitability for students of different heights and body compositions. Studies using the Sakamoto suit have involved college students to assess changes in attitudes following age-suit simulation (youn Hong, 2017), exploring empathy and attitudes towards older persons among nursing students (Sari et al., 2020) and incorporating it into dental students' training in preparation for clinical practice (Ono et al., 2017).

Other studies have indicated promising results regarding the enhancement of understanding of older persons' perspectives and empathy and how these insights can influence RNs' clinical practice (e.g. their willingness to go the extra mile and manage frustration) (Alera Bowden et al., 2020). Another study highlighted the value of age-suit simulation as an experiential learning tool for fall assessment among older persons (Watkins et al., 2021). However, as noted by Gerhardy et al. (2022), there remains a gap in simulating the age period associated with the most severe functional decline—the fourth age (85+)—as well as a lack of longitudinal studies exploring its impact (Coelho et al., 2017). As highlighted in this section, previous research leaves gaps in understanding age-suit simulation beyond its effects on attitudes and empathy. Specifically, there is limited exploration of simulations involving long-term health problems and the fourth age, a focus on nursing students within realistic home environments and the long-term effects of such interventions. Furthermore, there is little attention given to situating the simulation within a broader theoretical framework relevant to nursing. These are the gaps that this thesis seeks to address.

6. Theoretical Framework

This section outlines the theoretical foundation of the thesis, which includes PCC as one of the RN´s core competencies and what quality care entails within the context of Good and Close Care. ELT explains how students learn and develop skills relevant for a PCC approach through age suit simulation.

6.1.1. *Person-Centred Care*

The PCC nursing framework is described as a middle-range theory that can be used to operationalise PCC in nursing practice. The framework is built upon four domains (Figure 2): *prerequisites*, which relate to the attributes of the nurse; *the care environment*, which considers the context in which care is delivered; *person-centred processes*, encompassing the activities through which care is provided; and *expected outcomes*, which refer to the intended outcomes of PCC for the patient, described as a positive care experience (McCormack & McCance, 2021).

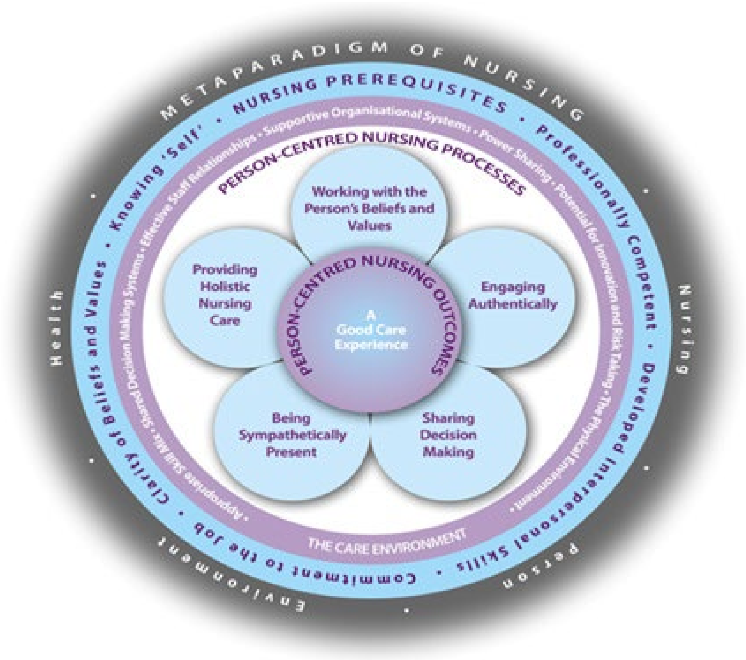

Figure 2. The Person-Centred Nursing Framework. Sourced from McCormack and McCance (2021) and permission to use by McCormack (2025).

Reflexiveness lies at the heart of *knowing self* within the first domain—the nursing prerequisites of the person-centred framework. Reflexivity entails the RN's awareness of their own beliefs and values and how these influence nursing practice and interactions with other persons. This layer may be understood as the entry point leading to the intended outcomes of PCC, namely a positive care experience (Brendan & Tanya, 2020). *Knowing self* involves confronting preconceived ideas, and this thesis supports the view that age-suit simulation can facilitate such learning experiences. Over two decades ago, McCormack (2003) highlighted that PCC is particularly important in geriatric nursing due to its emphasis on understanding the whole person, rather than reducing care to purely medical interventions.

PCC has also been described as a way to identify and respond to a person's individual needs within a healthcare context. The emphasis on care being *person-centred* rather than *patient-centred* reflects a fundamental assumption about personhood. A person is regarded as capable and responsible for their actions, underscoring the shift from viewing a patient as a passive recipient of care to recognising them as an active participant in their own care (Ekman et al., 2011). Defining personhood has important implications for nursing practice. When personhood is recognised and understood, it facilitates informed PCC practice. The PCC nursing framework conceptualises personhood as always being in relation to others, highlighting the importance of interpersonal processes that are crucial for forming meaningful relationships. A person must also be understood within their own context—past, present, and future. Core values, shaped by this context, form the reference point for a person's actions. *Knowing self* through one's core values provides the foundation for understanding another person's experiences. For nurses, knowing self is essential for being a reflexive practitioner. A key element of PCC is for the nurse to be authentic and creative in their practice.

It follows that, if nurse educators wish to promote PCC, they must create learning experiences that foster students' creative capacities, including the ability to solve problems and address challenges independently. To achieve this, students need to become reflexive practitioners by *knowing self*, a concept situated within the *Nursing prerequisites* domain of the PCC framework. Developing these nursing prerequisites requires educators to adopt innovative approaches (McCormack & McCance, 2021).

6.2. Experiential Learning Theory

The age-suit simulation intervention in this thesis is designed around ELT, which describes learning as a process whereby knowledge is created through the transformation of experience. The cycle consists of experiencing, reflecting, thinking, and acting (Kolb & Kolb, 2018), and the relationship of these steps to the simulation design is outlined in Figure 3. This perspective on learning contrasts with behaviourist theory, which views learning as a desired response to a specific stimulus. It also opposes the transmissive view of learning, which emphasises learning outcomes rather than the learning process itself (Kolb, 2013).

The cycle is initiated by an out-of-the-ordinary experience, engaging the five senses of vision, hearing, touch, taste, and smell, as well as the senses of direction, balance, and emotion. In this thesis, this corresponds to participation in the age-suit simulation. Following the experience, students engage in reflection on what occurred and how they felt, often prompted by the experience challenging their pre-understandings. This reflection was conducted after the simulation through guided group discussions. Closely linked to reflection is *thinking*, where learners draw conclusions from the experience by relating it to theories and other conceptual frameworks. This step was also undertaken during the guided reflections, in which students connected their feelings and insights to nursing concepts such as the RN's core competencies and PCC. Finally, in the *acting* phase, students apply what they have learned in real-life situations—which, in turn, provides feedback—such as encountering new challenges—and the cycle begins again (Kolb & Kolb, 2024; Stock & Kolb, 2021). In this thesis, this step was considered to occur during the students' subsequent clinical practice.

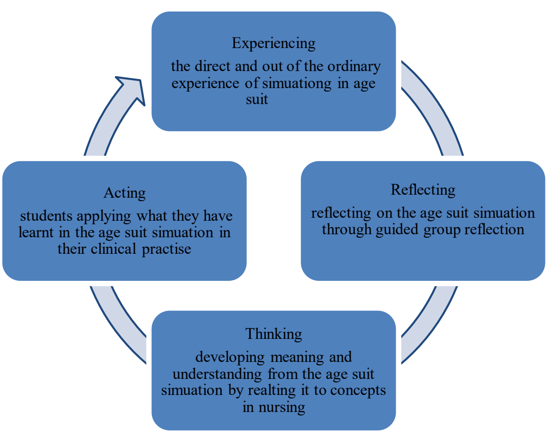

Figure 3. The experiential learning cycle, as applied to the age-suit simulation intervention. This image was created by Björn Bouwmeester using reference material sourced from (Kolb & Kolb, 2024).

7. Rationale

The PCC approach, emphasised as a value base in the *Good and Close Care* reform, supports the transition towards providing healthcare in the home, guided by individual needs and preferences and by recognising the person behind the patient. Older persons living at home with long-term health problems particularly benefit from this person-centred, integrated care approach, as they often rely on multiple care providers. In PCC, building and sustaining interpersonal relationships between the care provider and the person experiencing illness is foundational. Through such mutual relationships, care can be focused on what matters most to the individual. Nursing students, therefore, need to develop insights and understanding of how living with long-term health problems is experienced by older persons. Additionally, providing healthcare in the home requires that care providers understand how this important context of daily life shapes the person and their care experience. However, ageism—which is common both in society and among care providers—can hinder older persons' right to good health. Another barrier is that nursing students may feel unmotivated and unprepared for the complexity of caring for older persons. Simulation is a didactic strategy frequently used in nursing education to prepare students for clinical practice. Age-suit simulation, in particular, is a didactic strategy that aligns with experiential learning. Through this simulation, students experience aspects of ageing first-hand, allowing them to develop insights into the practice of PCC through heightened self-awareness, which is crucial for understanding the perspectives of others.

Previous research on age-suit simulation has primarily focused on changes in students' general attitudes towards older persons. Moreover, most studies have limited the full use of the age suit by excluding accessories, thereby overlooking the perspective of older persons in the fourth age. There is also a gap in understanding the effects of simulation within the context of the home, as well as a lack of longitudinal studies. This thesis, therefore, addresses these gaps and expands the knowledge and application of age-suit simulation as a didactic strategy, grounded in experiential learning, to support students’ insights and understanding of ageing, living with health problems, and providing healthcare.

8. Overall Aim

The overall aim of this thesis was to study nursing students’ experiences of an age-suit simulation intervention, grounded in experiential learning, within a home environment.

8.1.1. *Specific Aims for Each Study*

Study I: To explore the effects of an age-suit simulation education intervention in a home environment on nursing students’ perspectives regarding the provision of healthcare to older persons. Additionally, the study aimed to examine whether these effects differed between men and women and between students with little or no prior work experience and those with extensive experience of working with older persons.

Study II: To describe nursing students’ experiences of age-suit simulation in a home-like environment with welfare technology and to explore their perspectives on ageing and providing care to older adults.

Study III: To illuminate nursing students’ interactions during age-suit simulation from the perspective of being a blind older person and being an attendant guiding the blind person.

Study IV: To explore the long-term effects of age-suit simulation on nursing students’ perspectives towards caring for older patients.

9. Methods

9.1. Design

This thesis employed an intervention design comprising four studies that utilised both qualitative and quantitative methods (Table 1). Combining qualitative and quantitative approaches enriches the research, as each addresses different questions and employs distinct conceptual languages. Together, they provide complementary perspectives, offering both unique interpretations of the results and insights into the impact of context (Polit & Beck, 2021). The interrelations between the studies are outlined in Figure 4. Traditionally, interventions have been assessed primarily for their effectiveness through unbiased estimates; however, recent perspectives advocate for broader approaches that incorporate diverse methods and experiences (Skivington et al., 2024). Interventions can be viewed as events within dynamic, complex systems, where outcomes depend not only on the intervention itself but also on the surrounding context. An educational setting, such as the nursing programme examined in this thesis, can be considered a complex system (Hawe et al., 2009). Consequently, interventions may need to be evaluated beyond the simple question of whether they work or not (Skivington et al., 2024). Context is central to intervention development, making stakeholder involvement essential from the outset, as an intervention may be effective in a controlled environment but fail during real-world implementation (Skivington et al., 2024). In this thesis, stakeholder input was sought from representatives of pensioners' associations, as well as from one blind person and a certified attendant. The intervention design aligns with the Medical Research Council framework (Skivington et al., 2024), which consists of four iterative phases: development, feasibility testing, evaluation, and implementation.

The simulation intervention was developed by the researchers and deemed feasible following a pilot study (Study I). The four studies included in this thesis then evaluated the age-suit simulation intervention. Recognising that intervention effects may arise through dynamic, nonlinear processes—featuring periods of stability and rapid change—prospective, longitudinal monitoring and measurement are essential for meaningful evaluation (Hawe et al., 2009), which aligns with the prospective and longitudinal design adopted in this thesis.

Study I employed quantitative methods to determine whether the simulation intervention had an effect. Study II, using qualitative methods, built on these findings by exploring why the simulation intervention was effective. Since Study I demonstrated an effect, Study IV examined whether this effect was sustained over time. Study III further investigated a key finding from Study II. These lines of inquiry reflect a pragmatic orientation in this thesis, in which the researcher's evolving questions guide methodological choices, integrating both inductive and deductive reasoning (Polit & Beck, 2021).

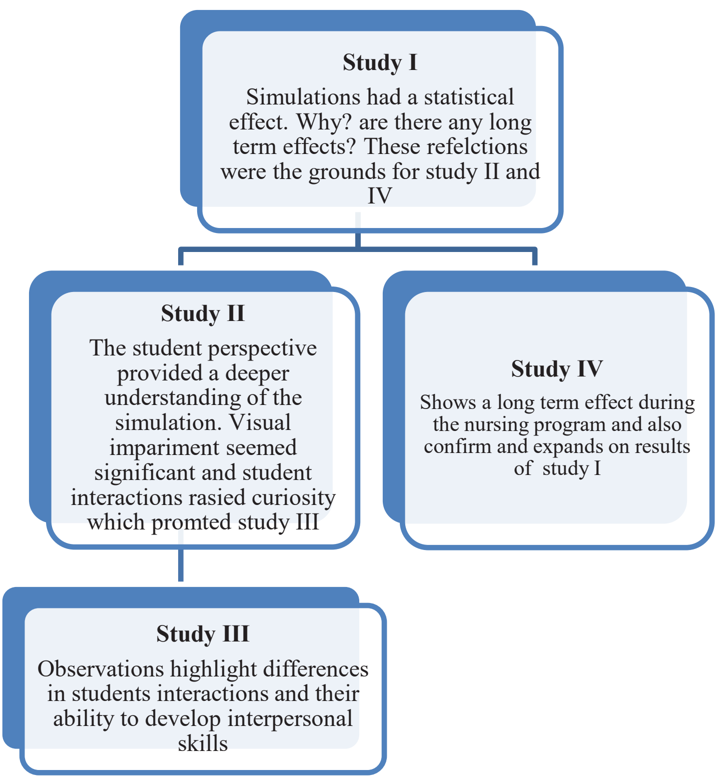

Figure 4. An overview of the studies and their interrelations.

Table 1. An overview of the four studies composing this thesis

Study	Design	Sample	Data collection	Data analyses
I	Quantitative design	Intervention (n = 471 pre- and 464 post-intervention). Control (n = 24)	Self-reported questionnaire	Pre-test–post-test design with a control group
II	Qualitative design	39 group interviews	Audio-recorded group interviews in reflection seminars	Reflexive thematic analysis
III	Qualitative design	34 video recordings (143 sequences) = 5 h 8 min	Video recordings of students in the persona of being 'blind and attendant' during age-suit simulation	Reflexive thematic analysis
IV	Quantitative design	Intervention (Questionnaires, n = 2077) Control (n = 24)	Self-reported questionnaire	Multiple linear regression analysis

9.1.1. *The Intervention*

Interventions have been described as purposeful actions intended to change the natural order of things, with the goal of contributing to evidence-based practice (Nilsen et al., 2022). In this intervention, each simulation session comprised 14–16 students, who were divided into two groups. Both groups were first informed about the study and provided consent to participate. Students who consented were then asked to complete a questionnaire. Following the introduction and completion of the questionnaire, all students were given a tour of the apartment, which was located at Skaraborg Health Technology Center (SHC) (https://www.his.se/mot-hogskolan/samarbeta-med-oss/skaraborgs-halsoteknikcentrum/). After the tour, one group returned to the innovation room while the other group donned the age suits and undertook the simulations. The group in the innovation room observed the simulations via live video footage projected on a screen, with cameras set up in every room of the apartment. Once the first group had completed the simulation, the groups switched roles so that the second group conducted the simulation while the first group observed. After both groups had completed the simulations, all students gathered for a guided group reflection with one of the teachers. Prior to the reflection session, students were asked to complete the questionnaire once again.

The simulation intervention in this thesis was based on ELT, in which the concrete experience within the learning cycle was represented by participation in the age-suit simulations. The reflecting and thinking stages of the ELT cycle were implemented through guided group reflections following the simulation, during which students related their reflections and thoughts to core concepts of nursing. The timing of the intervention—in the second year of a three-year programme—allowed students the opportunity to apply what

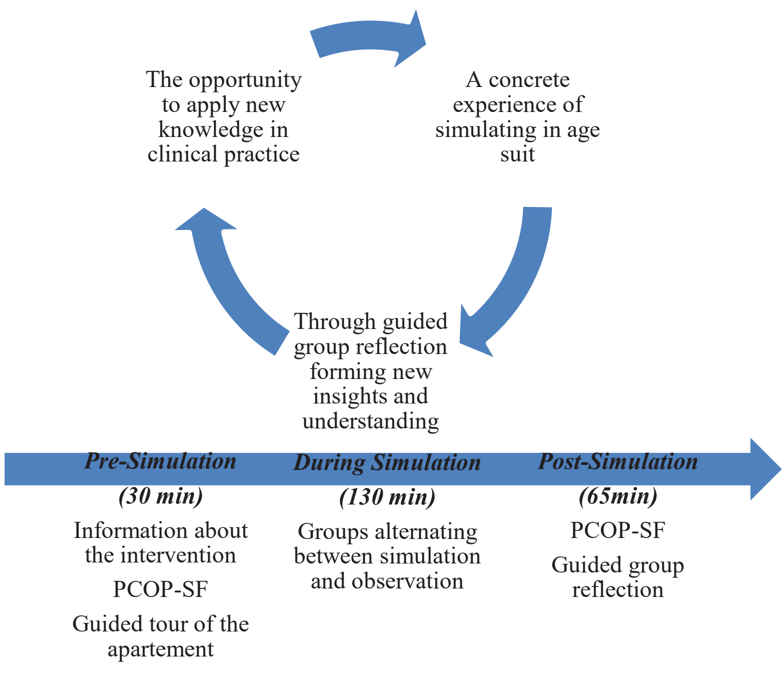

Figure 5. An illustration of the simulation intervention and the underlying theory of ELT.

they had learned during their subsequent clinical practice, both as students and as newly graduated nurses. The structure of the simulation intervention is illustrated in Figure 5.

9.1.2. *Setting SHC*

The simulation intervention was conducted at a university in southern Sweden within the framework of the three-Government-credit nursing programme (Swedish Goverment Official Reports, 2022). The activities described in this thesis took place at the collaboration arena, knowledge centre, and testbed of SHC, located on the third floor of the university campus. This arena provides a unique opportunity to simulate being an older person living with long-term health problems within a highly accessible home environment, allowing students to carry out daily tasks in a setting equipped with welfare technology and other assistive devices. The simulation intervention was implemented during the fourth semester, corresponding to the progression of gerontological and geriatric theoretical content within the nursing programme. The second year placed a stronger emphasis on multiple health problems and geriatrics compared to the first year, which primarily offered an introduction to health and gerontology. The gerontological and geriatric knowledge acquired in the first two years was assumed to serve as a valuable reference frame for the intervention. The SHC environment is particularly suitable for simulation, given the ongoing transition of care towards home-based provision and the increased use of welfare and assistive technology. The arena comprised an innovation room, a changing room, and a highly accessible 80 m² apartment, which included a living room, bathroom, bedroom, and kitchen. Each room was equipped with cameras that projected live footage to a screen in the innovation room. All rooms were fully furnished, and a radio and television were kept on throughout the simulation to create a realistic home environment. The apartment was highly accessible and featured adaptations to support persons with impairments, which students were instructed to explore and utilise. These features included electrically adjustable cupboards, an automated toilet seat (with self-cleaning, flush, and heating functions), and sensors connected to software that register activities such as sitting in a chair or lying in bed. One sensor-equipped chair enabled interaction with a tablet-based game, where motion was controlled by leaning to the right or left. Additionally, infrared cameras tracked movement as part of a system designed to monitor presence in bed and provide alerts if a person remained out of bed for too long or remained motionless. In both the bedroom and kitchen, a digital overview of the apartment was displayed on a TV screen. When a sensor was activated—for example, when a kitchen appliance was used, someone sat on the sofa, or lay in bed—the corresponding area was highlighted on the digital overview. The apartment layout, along with a display of all sensors (active or inactive), is illustrated below (figure 6).

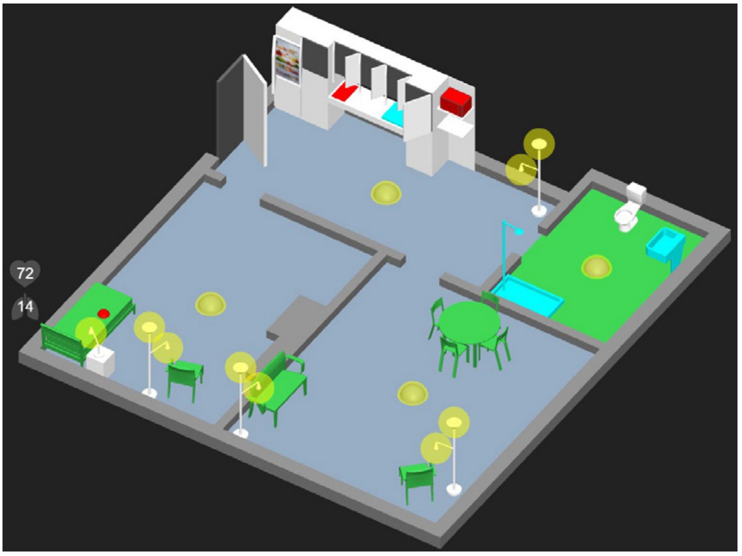

Figure 6. Layout of the apartment, with all sensors activated.

9.1.3. *The Age-Simulation Suit and Accessories*

The gerontological age suit GERT was used in this research project. The suit consists of various components, including straps, weights, gloves, and spectacles, and can be used with or without accessories. Without accessories, the suit simulates the effects of normal ageing. When accessories are added, it functions as a geriatric simulator, enabling the simulation of long-term health conditions (www.age-simulation-suit.com). Although several age suits are available on the market, there is a lack of validation studies to substantiate the manufacturers' claims regarding their performance.

Deciding which age suit provides the most authentic experience is challenging (Eost-Telling et al., 2020; Vieweg & Schaefer, 2020). The GERT suit has been shown to effectively reduce cognitive, gross, and fine motor skills in young individuals. For example, fine motor skills while wearing the suit were found to be comparable to those of a person in their late seventies or early eighties. The GERT suit also influences participants' perceived age and emotional state (Bowden et al., 2020; Vieweg & Schaefer, 2020). In one study, gait speed and step length were compared between a group of younger participants (aged 18–59) wearing the suit and older participants (aged 60–85) who did not wear the suit. The results indicated that the gait performance of the younger participants using the suit corresponded closely to that of the older adults (Lauenroth et al., 2017). These findings were approximately replicated in another study, where gait speed was similar between the two groups, although the younger participants' step length did not decrease to the level observed in the older adults (Thea Laurentius et al., 2022).

9.1.4. *The Personas Used in the Simulation*

In this thesis, the GERT suit and its accessories (https://www.age-simulation-suit.com/) were employed to create a variety of personas experiencing both normal ageing and various health conditions, including long-term health problems. This section provides a detailed description of each persona and specifies which components of the age suit were used to simulate their respective conditions.

Table 2. A comparison of the health problems when simulating with or without accessories

Age suit without accessories	**No.**	**Age suits with accessories**	**No.**
Head mobility restrictions	1	Back pain	9
High-frequency hearing loss	2	Chronic obstructive pulmonary disease	10
Joint stiffness	3	Enhanced restricted knee mobility	11
Loss of strength	4	Eye diseases (macular degeneration, cataract, diabetic retinopathy, glaucoma, retinitis pigmentosa, unilateral retinal detachment, blindness)	12
Narrowing of the visual field	5	Hemiparesis (including paralysis of one leg and one arm, unilateral vision impairment and hearing impairment, speech and swallow disorder)	13
Opacity of the eye lens	6	Knee pain and arthritis	14
Reduced coordination skills	7	Kyphosis (hunchback)	15
Reduced grip ability	8	Tinnitus	16
		Trembling hands	17
		Unsteady gait	18

Persona 1. An older person with chronic pulmonary disease and Parkinson's disease, experiencing numbness and tremors in the hands. The individual also has visual impairment (retinitis pigmentosa), impaired hearing, an unsteady gait, arthritis with pain in the right knee, general joint stiffness, and reduced mobility. Additionally, the person experiences loss of muscle mass.

Parts from the age suit: 1, 2, 3, 4, 5, 8, 10, 12, 14, 17, 18.

Persona 2. An older person with hemiparesis and neglect, experiencing pain in the left knee, general joint stiffness, and reduced mobility. The individual also has an unsteady gait, tinnitus, and visual impairment in the form of macular degeneration. Additionally, the person experiences loss of muscle mass and aphasia.

Part from the age suit: 1, 3, 4, 5, 7, 8, 12, 13, 14, 16, 18

Persona 3. An older person with visual impairment in the form of cataracts, kyphosis (hunchback), an unsteady gait, general joint stiffness, reduced mobility, and arthritis with pain in the right knee. The individual also experiences a loss of muscle mass.

Parts from the age suit: 1, 2, 3, 4, 5, 7, 8, 9, 14, 15, 18.

Persona 4. An older person with Parkinson's disease, experiencing back pain, visual impairment due to glaucoma, hearing loss, an unsteady gait, general joint stiffness, and reduced mobility. The individual also experiences a loss of muscle mass.

Parts from the age suit: 1, 2, 3, 4, 5, 7, 8, 11, 17, 18.

Persona 5. An older person who is blind and has unstable gait, overall stiffness in the joints, and reduced mobility. The person also has impaired hearing and arthritis with pain in the right knee. The person also experiences loss of muscle mass.

Parts from the age suit: 1, 2, 3, 4, 5, 7, 8, 11, 12, 14, 18.

Persona 6. An older person with tinnitus and vision impairment caused by type 1 diabetes (diabetic retinopathy), an unsteady gait, general joint stiffness, reduced mobility, and arthritis with pain in the right knee. The individual also experiences a loss of muscle mass.

Parts from the age suit: 1, 3, 4, 7, 8, 11, 12, 14, 16, 18**.**

Each student participated in the simulation assigned to one of the six personas. The intensity of the gloves was adjusted by one of the teachers present to create tremor and discomfort at a level the student could tolerate. Special shoes with thick soles impaired balance and gait. Weighted straps on the wrists (1.5 kg) and ankles (2.3 kg) affected movement and mobility, while a weighted vest (10 kg) added to the sensation of a heavier body, simulating loss of muscle mass. The total maximal weight of the age suit could reach up to 20 kg. For hemiparesis, a larger strap was attached to the affected leg, making it heavier (5 kg) and less mobile. Padded straps on the elbows and knees stiffened the joints, reducing their range of motion. Tremor was simulated through low-current electrical stimulation in the gloves, with adjustable intensity. Knee straps with special bolts simulated pain from arthritis. Earphones produced the sound of tinnitus and other hearing impairments. Specially designed glasses simulated various eye diseases, while an eye patch over the eye affected by hemiparesis enabled students to experience neglect. A large chest strap reduced breathing capacity, complemented by a clamp over the nose and a straw in the mouth to simulate the effects of obstructive chronic lung disease. Straps over the hips and neck created the sensation of a hunchback. Leather gloves restricted grip, and a neck ruff decreased neck mobility.

A special simulation scenario was designed for students to work in pairs, where one student assumed the role of a 'blind' person with health problems and the other acted as their guide, who also experienced health problems (Study III). Each pair was assigned a unique scenario: to take the elevator to the ground floor, go outside, return via the elevator to the third floor, enter the apartment, and carry out the remainder of the scenario within the apartment. At the start of the intervention, written descriptions of each student's assigned persona were placed on a table in the changing room. Students were instructed to read these descriptions, which detailed the persona's health problems, and then put on the age suit and accessories accordingly. Later, posters were developed displaying a photograph of the persona wearing the GERT suit alongside written information about the assigned health problems.

9.1.5. *Reflection in Age-Suit Simulation*

The age-suit simulation intervention provided nursing students with an opportunity to reflect on the needs, possibilities, and limitations associated with the technology available at SHC.

In this thesis, the simulation intervention was grounded in ELT, a learning theory in which reflection constitutes a central step in the learning cycle (Kolb, 2014). Following the simulation, students reflected on their experiences with the guidance of one of the teachers. The reflections were structured, with the teacher using pre-prepared topics (suppl. File 1) to ensure that key nursing concepts were incorporated. This approach aligns with that proposed by Johns (2009), who emphasised that the core of a reflective curriculum is grounded in the practitioner's everyday practice. Reflections began with each student describing their experiences, which were shaped by the specific persona they had been assigned. Guided reflection facilitates storytelling and situates the student's narrative within the tradition of nursing. Reflection also allows contradictions among beliefs, theory, and practice to be examined and resolved, which is the point at which learning occurs (Johns, 2009).

However, reflection should not be regarded as an isolated process within the intervention. Rather, ELT emphasises the concrete experience as a problem or an extraordinary situation that triggers reflection and subsequent learning (Kolb, 2014). When a person is fully immersed in an activity, they may sharpen their attention and question their attitudes, yet it is impossible to completely distance oneself from the experience 'in the moment'. Inward reflection—adopting a reflective attitude—requires stepping out of the situation; only then can reflection-on-action take place (Ekebergh, 2007). This reflective attitude is crucial to avoid superficial learning, where new information is merely added to existing knowledge. Students must be supported in directing reflection inwards, making them aware of their own understanding and perspectives regarding the phenomenon under study (Ekebergh & Lindberg, 2020). Similarly, the design of the age-suit simulation intervention encourages reflection-on-action to achieve a deeper understanding of the phenomenon—an older person living with various health problems, including long-term health problems.

9.1.6. *Study I*

This study adopted a quasi-experimental pre-test–post-test design with a control group. To examine nursing students' attitudes towards caring for older persons (distinct from their general attitudes towards older persons), the *Perspectives on Caring for Older Patients-Short Form* (PCOP-SF) scale was used. A pilot study was conducted to test both the concept and the outcome measure (PCOP-SF). The pilot was not included in the control group but formed part of the intervention group.

9.1.7. *Study II*

In this study, a qualitative exploratory design was adopted, using group interviews conducted during reflection seminars with nursing students. The data were analysed using reflexive thematic analysis.

9.1.8. *Study III*

In this observational study, a qualitative inductive design was employed using reflexive thematic analysis to examine video recordings of nursing students' interactions and behaviours during the age-suit simulation.

9.1.9. *Study IV*

This study employed a quantitative longitudinal design using multiple linear regression analysis to evaluate the sustainability of the age-suit intervention over a period of four years. The PCOP-SF scale was used as the outcome measure.

9.2. Participants

9.2.1. *Study I*

In the fourth semester of the three-year nursing programme, students participated in age simulations using the GERT suit at SHC as part of their mandatory education in the south of Sweden. Participants were recruited during 2019–2022 through consecutive sampling, a non-probability method in which all individuals meeting the inclusion criteria within a specified time period are included (Polit & Beck, 2021). In the autumn of 2019, a pilot study involving 76 students was conducted to test the GERT suit and the scenarios. Apart from the inclusion of demographic data, all aspects of the pilot study were identical to the main study; therefore, participants from the pilot study were included in the intervention group, which ultimately comprised 471 students. Due to the COVID-19 pandemic, restrictions in 2019 prevented age-suit simulation activities. Affected students were instead assigned an alternative task, which involved reading and reflecting on an article (Lee & Teh, 2020) about age-suit simulation. These students were sent the PCOP-SF questionnaire digitally, 24 of whom responded, forming the control group for the study.

9.2.2. *Study II*

Participant recruitment took place during 2019–2022, when nursing students in their second academic year in the south of Sweden participated in an age suit simulation at SHC. Participants were recruited through convenience sampling, a non-probability method in which the most readily available individuals are selected (Polit & Beck, 2021). The inclusion criterion was enrolment in the nursing programme during the second academic year. Sessions comprised 14–16 students, divided into two groups, and lasted four hours, either in the morning or afternoon. Each session involved the age-suit simulation followed by group interviews. The 39 group interviews included in this study were selected to ensure an equal representation of both morning and afternoon sessions.

9.2.3. *Study III*

The participants were nursing students in their second year (fourth semester) of a three-year nursing programme at a university in the south of Sweden during the period 2022–2024. All students who were actively enrolled in the programme at this time were eligible to participate. Four students (two pairs) were randomly assigned the roles of a blind person and an attendant guiding the blind person. Participants were recruited through convenience sampling (Polit & Beck, 2021). There were no exclusion criteria other than students who were not registered and active in the programme during the fourth semester or who did not wish to appear on video. In total, 68 students

(34 pairs) agreed to participate. Students who opted not to appear on video were assigned alternative personas.

9.2.4. *Study IV*

The participants were nursing students in their first, second, and third years at a university in the south of Sweden. The study also included students one year after graduation. Participants were recruited between 2019 and 2025 through consecutive sampling (Polit & Beck, 2021). All nursing students who were actively enrolled in the programme at the time were eligible to participate. There were no exclusion criteria. At the first time point, 479 questionnaires were collected; at the second (post simulation), 703 questionnaires; and at the third, 350 questionnaires. Students who provided consent were contacted one year after graduation, of whom 51 responded.

9.3. Data Collection

The researchers (CG, JH, and BBS) were responsible for data collection from the autumn of 2019 to the spring of 2025. Data for Study III were collected from spring 2022 onwards, primarily by the PhD student (BBS). Data were collected from nursing students in person at SHC, both before and after the simulation during the fourth semester (Studies I–IV) and on two occasions in campus classrooms during the first and sixth semesters (Study IV), using a paper version of the PCOP-SF questionnaire. Data were also collected digitally using the PCOP-SF for the control group in Study II during the fourth semester, as well as for participants (intervention and control groups) one year after graduation in Study IV. Group interviews during reflection seminars (Study II) and video recordings and reflective notes (Study III) were collected at SHC. An interview guide was used for the group interviews in reflection seminars (Appendix 1).

Table 3. Data collection from year one to one year after graduation.

Data collection method	Activity	Year one*	Year two*	Year three*	One year after Graduation*
Questionnaire: PCOP-SF and demographic data	The questionnaire was distributed as follows: in person during the first year; pre- and post-simulations in the second year; at the reception in the third year; and by e-mail one year after graduation	x	x	x	x
Audio-recorded group interviews in reflection seminars	At the end of age-suit simulation session		x		
Video recordings	During age-suit simulation		x		

*Year's row indicates point in time of the three-year nursing programme

Table 4. Overview of the response rate.

Data collection method	Year one	Year two pre-intervention	Year two post-intervention	Year three	One year after graduation
Audio-recorded group interviews in reflection seminars			59		
PCOP-SF questionnaire (*intervention group*)	388	684	679	285	40
Questionnaire PCOP -SF (*Control group*)*	91	24		65	11
Video recordings		34			

*The control group did not participate in group reflections or video recordings

9.3.1. *Demographic Data*

The questionnaire administered to the students collected the following background information: age, sex (male, female, or other), and work experience (none or less than two years, or more than two years).

9.3.2. *Instrument: PCOP-SF*

The PCOP scale was developed to address a gap in the literature concerning perspectives towards caring for older persons, as distinct from general attitudes. The original version comprises 24 items. Exploratory and confirmatory factor analyses in two studies resulted in a nine-item short form (PCOP-SF). Responses are rated on a five-point Likert-type scale, ranging from 0 = strongly disagree to 4 = strongly agree. Higher scores indicate more positive attitudes. Negatively phrased items are reverse-scored in the analysis when comparing scores (Burbank et al., 2018). The instrument was first translated into Swedish by the researchers and then back-translated into English to ensure that the translation accurately reflected the original questionnaire. Students received a version (Table 5) that included both English and Swedish text.

Table 5. The PCOP-SF questionnaire including the researchers' Swedish translation.

1. Caring for older patients is usually challenging and rewarding. (*Att vårda äldre patienter är ofta utmanande och givande*)
2. It's frustrating caring for older patients. (*Det är frustrerande att vårda äldre patienter*)*
3. Caring for older patients is often unpleasant work. (*Att vårda äldre patienter är ofta ett otrevligt arbete*)*
4. Caring for older patients is intellectually stimulating. (*Att vårda äldre patienter är intellektuellt stimulerande*)
5. I would not choose to attend continuing education in nursing care of older patients. (*Jag skulle inte välja att vidareutbilda min inom området vård av äldre patienter*)*
6. Older patients are interesting to care for. (*Det är intressant att vårda äldre patienter*)
7. Caring for older patients is less rewarding than caring for younger patients. (*Det är mindre givande att vårda äldre patienter än yngre patienter*)*
8. Although caring for older patients is labour intensive, it is worth investing time and energy. (*Även om det är arbetsintensivt att vårda äldre patienter, är det värt den tid och energi som investeras*)
9. Caring for older patients is an undesirable career choice. (*Att vårda äldre patienter är ett oönskat karriärval*)*

* Scores are reversed in analysis

9.3.3. *Study I*

This study was conducted during 2019–2022 in the fourth semester of the nursing programme and aimed to measure students' perspectives on caring for older persons. Data were collected using self-report measures (Polit & Beck, 2021), including demographic information and the PCOP-SF questionnaire, administered both pre- and post-simulation. Prior to Study I, a pilot study was conducted to test the planned intervention, which comprised a visit to SHC, participation in the age-suit simulation, a reflection seminar, and completion of the questionnaire before and after the simulation. The pilot study involved 78 students. No modifications were made to the simulation in its final form, except for the decision to collect demographic data. Data were collected via the PCOP-SF questionnaire, which was completed by students before and after the simulation (n = 471 pre-simulation; n = 464 post-simulation). Participants from the pilot study (n = 78) were included in the intervention group, although demographic data were not collected for this subgroup. The PCOP-SF was digitally distributed to these students (n = 72), of whom 24 responded; this subgroup (n = 24) served as the control group for the study.

9.3.4. *Study II*

Data were collected through group interviews (Polit & Beck, 2021) conducted during reflection seminars and comprised 39 group interviews, each lasting 30–60 min. These were performed as audio-recorded group reflections (*n* = 59) held at the end of each age-suit simulation session. The interviews included in the analysis were systematically selected, with one interview from the morning class and one from the afternoon class for each scheduled simulation. To ensure a rich and representative dataset, the selected group interviews also cover a timeframe spanning before, during, and after the COVID-19 pandemic.

9.3.5. *Study III*

Data for this study were collected between the autumn of 2022 and the spring of 2024 during the fourth semester of the nursing programme. Data were collected through observations (Polit & Beck, 2021) and comprised video recordings of students assuming the personas of ‘blind’ and ‘attendant’ during the age-suit simulation (34 videos, 143 sequences; total duration = 5 h and 8 min), as well as reflective notes.

9.3.6. *Study IV*

Data for this study were collected between 2019 and 2025 using the PCOP-SF questionnaire among two cohorts. The first cohort comprised the intervention group who had participated in the simulation intervention during their second year and included (n = 2076 questionnaires), and the second cohort comprised the control group (n = 24), who had not taken part in the intervention during the second year.

9.4. Data Analysis

9.4.1. *Study I*

Data conformity was assessed using the Shapiro-Wilk test, which indicated that the data were not normally distributed ($p < 0.05$). Therefore, non-parametric Mann-Whitney U-tests were employed (Polit & Beck, 2021) to compare differences in total mean scores between groups as well as for individual items on the PCOP-SF. The control group’s mean score was compared with that of the entire sample, which included the intervention group post-intervention and the pilot study group post-intervention. Sub analysis examining differences based on gender and work experience were also conducted. For gender comparisons, male students were coded as (1) and female students as (2). Work experience was dichotomised as (1) no experience or less than two years’ experience and (2) two or more years’ experience. The significance level was set at 0.05. Internal consistency reliability of the PCOP-SF (N = 471) was satisfactory, with a Cronbach’s alpha of 0.79 (Brace et al., 2018). Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25.

9.4.2. *Study II*

The group interviews in the reflection seminars were transcribed (564 pages) and analysed using reflexive thematic analysis, described as a six-step iterative process (Braun & Clarke, 2006, 2019). The first phase—familiarisation—served as the entry point for analysis, involving an immersive engagement with the dataset. This phase began during data collection and included transcribing, reading, and listening to all interviews. Rough notes and initial ideas were recorded in a separate Word document, which served as a reflective journal to aid the development and naming of codes and themes. In the second phase—coding—extracts of both semantic and latent content relevant to the study's aim were identified and labelled with codes. Codes sharing similarities were sorted into clusters and constituted the building blocks of the analysis and were revisited and refined through discussion and reflection with the co-authors. The third phase—generating themes—involved reflective engagement with the data, where codes with shared meaning were grouped to produce three candidate themes and eight subthemes. In the fourth phase—reviewing and developing themes—the data extracts and codes were examined in relation to the initial themes. The main and subthemes were further developed through a subjective, increasingly interpretative analysis of the data. The fifth phase involved refining, defining, and naming the themes to capture and communicate the story of the data. This required an immersive process of iterative discussion among the authors, during which a few themes were renamed to more accurately reflect the meaning expressed in the transcripts. In the sixth and final phase, the report was written, presenting the fully developed three main themes and eight subthemes.

9.4.3. *Study III*

For this study, reflexive thematic analysis (Braun & Clarke, 2006, 2019), a versatile method suitable for analysing complex qualitative data, was employed. This approach emphasises storytelling, shaped by the researcher's subjectivity and creativity. Meaning units in video analysis can be defined based on specific events such as time segments, gestures, speech, or broader ideas and patterns. In this study, the meaning units consisted of video sequences deemed relevant to the aim of exploring the two roles: being blind and being an attendant to a blind person. Reflective notes, which included observations and comments about the students' interactions during the simulations, were incorporated into the analysis. The analysis followed an iterative process comprising the following steps: Familiarisation involved viewing the video material and identifying interactions that aligned with the study aim. The characteristics of the attendant and the blind student were understood as patterns of being either close to or distant from each other and became the focus of deeper analysis. Generating initial codes involved identifying patterns of meaning. Codes sharing similarities were grouped into clusters, which served as the building blocks for the development of subthemes and main themes. Generating themes entailed reflecting on the refined codes and returning to the data to identify patterns of meaning. During this stage, notes and ideas regarding theme development were recorded on separate sheets of paper to provide a visual tool. Reviewing themes involved refining the themes to ensure they were relevant to both the data excerpts and the dataset as a whole, and that they resonated with the participants' quotes and interactions. The authors discussed how the themes could best represent a coherent narrative. Defining and naming themes was achieved through intersubjective discussion, with agreement reached on theme definitions and labels, as well as the selection of imagery to represent them and the production of the final report (Braun & Clarke, 2006, 2019).

9.4.4. *Study IV*

To compare differences in total mean values between groups, as well as for specific items, the non-parametric Mann–Whitney U-test was used, since the Shapiro–Wilk test indicated that the data were not normally distributed ($p < 0.05$). Descriptive statistics were used to present demographic characteristics. In this longitudinal study, nursing students' self-reports (PCOP-SF) were analysed at four time points. To evaluate differences among these four independent groups, the non-parametric Kruskal–Wallis test was performed, which is suitable for comparing two or more independent samples.

Post-hoc analyses were conducted using Bonferroni correction to establish a more conservative alpha level when performing multiple comparisons (Polit & Beck, 2021). All statistical analyses were carried out using SPSS version 28.

10. Pre-understanding

According to naturalistic ontology realities cannot be studied or understood in isolation as they are underpinned by contextual values and structures. Researchers' pre-understanding therefore influences the interpretation and presentation of findings (Lincoln & Guba, 1985). The author of this thesis has a background as a registered nurse with a master's degree in psychiatric nursing and clinical experience across a variety of care settings, including hospital care, primary health care, home health care, and in special housing. The author had a pre-understanding of the context of the Good and Close Care reform, which is a relevant concept in this thesis, particularly in relation to providing health care to older persons in their homes and understanding how living with age-related and long-term health problems may be experienced. In addition, prior to undertaking the research project for this thesis, the author had several years of experience as a lecturer in a nursing program and was familiar with simulation-based training; however, the author had no prior experience or knowledge of age-suit simulation.

In regard to quantitative research which represent a positivist paradigm stating that reality can be observed objectively, such data are often collected using instruments such as established questionnaires, as in this thesis. However, these instruments are also value-based. Importantly, they are interpreted by a researcher who is influenced by prior knowledge, values, and theoretical perspectives, which cannot be separated from or fully bracketed out of the analysis (Lincoln & Guba, 1985). Similarly, the researcher always bring their pre-understanding and consequently their involvement and engagement into qualitative research which emphasize the importance of researcher reflexivity in relation to prior knowledge, theory, and research data (Braun & Clarke, 2019, 2022, 2023). In line with reflexive thematic analysis, using a reflective journal and reflecting with supervisors was helpful when engaging with and interpreting the qualitative data. Consequently, research findings and interpretations are shaped by the researcher's and supervisors pre-understanding. The knowledge produced in this thesis is therefore regarded as contextual and constructed, mutually shaped through interactions between the researcher and the respondents.

11. Ethical Considerations

In this study, data were collected through questionnaires, group interviews during reflection seminars, reflective notes, and video recordings of nursing students. The Declaration of Helsinki outlines key ethical principles for research involving human subjects, emphasising that the well-being of individuals must take precedence over all other research interests (World Medical Association, 2013). Although the Declaration has no legal power in itself, it influences Swedish legislation relevant to research involving human participants (Swedish Code of Statutes, 2003) and serves to safeguard human dignity in empirical research. Therefore, it is an important reference for conducting high-quality empirical studies. The PCOP-SF questionnaire was translated into Swedish for this research. The Review Authority indicated that formal ethical approval was not required, but a positive dictum was requested and obtained (Dnr 2021-04056). The simulation intervention used in the studies in this thesis is grounded in both learning theory and PCC, aligning with Sustainable Development Goal 3 (Good Health and Well-Being) and Goal 4 (Quality Education) (The United Nations, 2023). The study also considered the ethical principles of Respect for Autonomy, Nonmaleficence, Beneficence, and Justice (Beauchamp & Childress, 2001). Beneficence and nonmaleficence refer to the Hippocratic principles of 'helping' and 'doing no harm'; autonomy is grounded in Kantian philosophy, recognising the intrinsic and unconditional value of persons; and justice entails the fair and equitable treatment of individuals (Beauchamp & Childress, 2001; Varkey, 2021). Students' autonomy was respected by providing both written and verbal information that participation was voluntary and that they could withdraw at any time without providing a reason. They received detailed information about the study's aim, data collection procedures, intended use of the data, and access rights. The names and contact information of the responsible researchers were also provided. One potential threat to autonomy was the inherent power imbalance between teachers and students. Therefore, it was paramount that students were informed that their performance in the simulation would not be graded, and that withdrawal from the study would have no negative consequences on their education. A central concept of nonmaleficence is to weigh the potential benefits against any discomfort or pain the intervention may cause the participants (Beauchamp & Childress, 2001; Varkey, 2021). Regarding data collection, researchers must be vigilant about protecting personal information, which includes any data that could potentially identify a participant. Ethical considerations of integrity were particularly important in Study III, where students were video-recorded. According to the Swedish Research Council (2024), participants must provide informed consent for appearing in audio and/or video recordings without any doubt. In all studies, participants gave consent both verbally and in writing. Providing informed consent is an essential aspect of autonomy (Beauchamp & Childress, 2001). In Study III, students were informed that participation would involve video recording. Students who did not wish to be recorded participated in the simulation, but their activities were not video- or audio-taped. Both quantitative and qualitative results are presented in ways that protect participants' identities. Interviews and questionnaires were coded, so quotes and responses cannot be traced to specific individuals. Recorded material, code keys, transcribed interviews, and questionnaires are stored securely at the University of Skövde in a locked storage compartment for a minimum of 10 years to ensure transparency and allow for scrutiny. Digital files are stored on secure, protected servers at the university. By definition, the age-suit simulation can cause some discomfort, as its purpose is to simulate health problems. The research team discussed strategies to manage this expected discomfort. During the initial briefing in the innovation room, students were encouraged not to push through any pre-existing pain and to report health conditions that might be aggravated by the simulation. In some cases, straps were loosened or modifications were made. For example, students with asthma were excluded from simulating chronic obstructive pulmonary disease, and students with knee pain had alternative knee wraps applied instead of the arthritis strap. However, it must be acknowledged that some students may have chosen not to disclose health conditions. Beneficence refers to the benefits participants may gain from an intervention. Potential benefits of the age-suit simulation include enhanced preparedness to care for older persons and respond to complex healthcare needs. This preparedness is relevant for both newly graduated nurses and nursing students during their clinical training. Consequently, the research findings can be directly implemented into nursing education programmes. The simulation intervention itself is non-invasive, and the anticipated benefits are considered to outweigh potential risks. The ethical principle of justice concerns who should benefit from the research (Beauchamp & Childress, 2001). In this thesis, the emphasis is on older persons. The benefits may also extend beyond nursing education, as other professionals involved in care for older adults could gain from the findings. From a broader perspective, this thesis may contribute to combating ageism, aligning with the concept of equitable distribution embedded in the principle of justice (Beauchamp & Childress, 2001).

12. Results

As Studies I and II address the same outcome measure—PCOP-SF—their results are reported together, whereas Studies II and III are presented separately.

12.1. Studies I and IV

Studies I and IV analysed nursing students' self-reported perspectives on caring for older persons using a questionnaire that included the PCOP-SF scale (Burbank et al., 2018) and demographic data. In Study I, the results reflect a pre-test–post-test intervention conducted during the students' second year, whereas Study IV focuses on changes in PCOP-SF scores over time, spanning the duration of the nursing programme and one year after graduation (four years). Both studies included a control group. The first section of the results presents comparisons between the intervention and control groups, while the second section highlights changes within the intervention group.

12.1.1. *Comparisons between the Intervention and Control Groups*

Differences in Demographic Data. The demographic data for both studies included the following variables: age, sex, and years of work experience. A comparison of these variables between the two studies is presented in Table 6. Because no demographic data was collected for the control group in the 1st year, characteristics comparison are based on the 2nd year.

Table 6. Demographics of Studies I and IV during the simulation intervention in year two.

Demographic data	**Study I**	**Study IV**
Response rate intervention group (pre/post intervention)	N-pre = 471 N-post = 464	N-pre = 684 N-post = 679
Number of participants control	N = 24	N = 24
Mean age intervention group	29.10 years	28.66 years
Mean age control group	33.13 years	33.13 years
No or less than two years of previous work experience intervention group	n = 193 (49.1%)	n = 66 (12.0%)
No or less than two years previous work experience control group	n = 12 (50.0%)	n = 12 (50%)

Two years or more of previous work experience intervention group	n = 200 (50.9%)	n = 486 (88.0%)
Two or more years of previous work experience control group	n = 12 (50.0%)	n = 12 (50.0%)
Number of females in the intervention group	n = 343 (87.5%)	n = 504 (86.5%)
Number of females in the control group	n = 20 (87.0%)	n = 20 (87.0%)
Number of males in the intervention group	n = 49 (12.5%)	n = 79 (13.5%)
Number of males in the control group	n = 3 (13.0%)	n = 3 (13.0%)

The mean age in the intervention group was comparable between both studies. A notable difference was observed in work experience. In Study I, 49.1% of the intervention group reported no or less than two years of experience. In contrast, in Study IV, 12.0% of students reported having no or less than two years of work experience, while 88% reported having more than two years of experience compared to 50.9% as reported in study I.

Difference in PCOP-SF Total Mean Score. In the PCOP-SF, higher scores indicate more favourable perspectives towards caring for older persons, whereas lower scores reflect less favourable perspectives. Put differently, a higher score corresponds to a less negative view of an item. For example, a high score on the statement *Caring for older patients is an undesirable career choice* indicates that participants disagree with this negative characterisation. Conversely, a high score on *Caring for older patients is intellectually stimulating* indicates that participants agree with this positive statement.

The pre-test–post-test comparison between the control and intervention groups in Study I (data from the second year) showed no statistically significant differences in total mean scores. In contrast, Study IV revealed that the intervention group reported significantly higher PCOP-SF total mean scores throughout the nursing programme compared to the control group. Notably, it took the control group approximately two years to reach a similar mean total score that the intervention group had achieved post-intervention. One year after graduation, the intervention group still reported a higher total mean score than the control group, although this difference was no longer statistically significant (Figure 7).

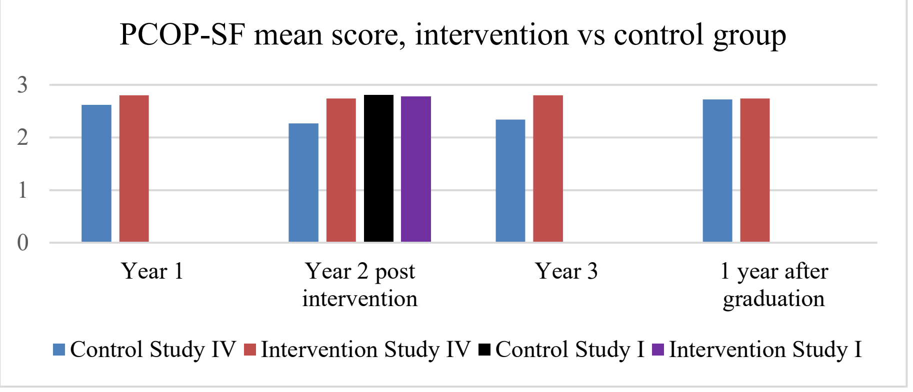

Figure 7. PCOP-SF mean score comparison between the intervention and control groups in Studies I and IV

Differences in PCOP-SF Specific Items. There were notable differences between specific items when comparing Studies I and IV, and interestingly, some results were reversed—for example, the statement *It's frustrating caring for older patients*. As shown in Table 7, the intervention group over time reported more favourable perspectives towards caring for older patients than the control group. However, there were a few exceptions. In Study I, the intervention group agreed more strongly than the control group *attend* *continuing education in nursing care of older patients* compared to the control group, suggesting that the control group showed greater interest in that

Table 7. Differences between study I and IV in PCOP-SF items*

Control or intervention	**Favorable perspectives in study I *post intervention***	**Favorable perspectives in study IV *post intervention***
Intervention	Item 9: Caring for older patients is an undesirable career choice	Item 2: It's frustrating caring for older patients Item 3: Caring for older patients is often unpleasant work Item 4: Caring for older patients is intellectually stimulating Item 7: Caring for older patients is less rewarding than caring for younger patients
Control	Item 2: It's frustrating caring for older patients	Item 5: I would not choose to attend continuing education in nursing care of older patients
Control or intervention	**Unfavorable perspectives in study I *post intervention***	**Unfavorable perspectives in study IV *post intervention***
Intervention	Item 2: It's frustrating caring for older patients	Item 5: I would not choose to attend continuing education in nursing care of older patients
Control	Item 9: Caring for older patients is an undesirable career choice	Item 2: It's frustrating caring for older patients Item 3: Caring for older patients is often unpleasant work Item 4: Caring for older patients is intellectually stimulating Item 7: Caring for older patients is less rewarding than caring for younger patients

* A higher score on a PCOP-SF item indicates a more favorable perspective - for example, agreeing with a positive statement about caring for older persons or disagreeing with negative statements about caring for older persons.

caring for older patients is frustrating. Additionally, in Study IV, the intervention group agreed more with the statement *I would not choose to* pursuing further education regarding the care of older persons.

Finally, a significant pre-intervention difference was observed in year one, with the intervention group reporting higher scores than the control group on item 8, *Although caring for older patients is labour-intensive, it is worth the investment of time and energy*, as well as item 9, *Caring for older patients is an undesirable career choice*.

12.1.2. *Changes within the Intervention Group*

The following comparisons focus on changes within the intervention group, examining mean scores, specific PCOP-SF items, and the influence of factors such as work experience, age, and sex (Figure 8).

Changes in Total Mean Score Pre/Post and Over Time. In Study I, there was a slight increase in the total mean score from pre- to post-intervention, rising from 2.74 to 2.78, although this change was not statistically significant. A similar trend was observed in Study IV, with scores increasing from 2.69 to 2.74 pre- to post-intervention. In Study IV, a significant difference was found in total mean scores between year one and year two pre-intervention, indicating that students initially rated their perspectives favourably in their first year, which then declined. However, post-intervention, the total mean score increased above the pre-intervention level and remained slightly lower than the score observed in year three, one year after graduation, suggesting that the effects of the age-suit intervention were sustained throughout the nursing programme.

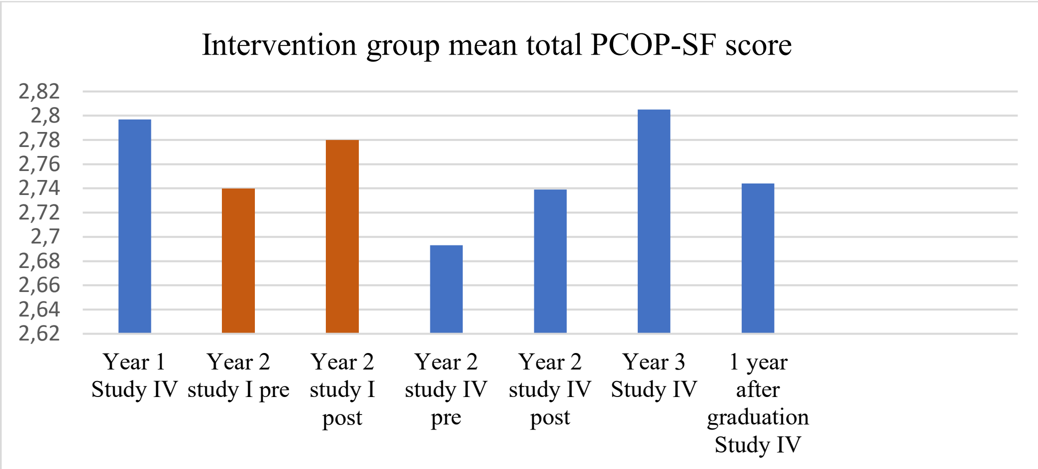

Figure 8. A comparison of the total PCOP-SF mean score between Studies I and IV.

Differences in PCOP-SF Specific Items. In Study I, there was a significant increase in item 1, *Caring for older patients is usually challenging and rewarding*, with a post-intervention score of 3.07, which was similar to the score observed in Study IV (3.05). Moreover, in Study IV, this score continued to increase over the course of the nursing programme and remained elevated one year after graduation.

Another significant increase in Study I was observed in item 8, *Although caring for older patients is labour-intensive, it is worth the investment of time and energy*, with a post-intervention score of 3.19, which was comparable to the results in Study IV (3.20). Furthermore, Study IV showed that the score for this item continued to increase up to one year after graduation.

In Study I, a significant decrease was observed in item 2, *It's frustrating to care for older patients*, with scores dropping from 2.71 to 2.52, indicating less favourable attitudes. In Study IV, this item was initially rated even lower at 2.32, increased to 2.74 in the third year, but then declined again to 2.48 one year after graduation.

Other differences between Studies I and IV were observed in item 4, *Caring for older patients is intellectually stimulating*, where it took students in Study IV approximately two years to reach a score comparable to that observed in Study I. Regarding item 5, *I would not choose to attend continuing education in nursing care of older patients*, students reported similar scores in both studies (2.31 in Study I and 2.39 in Study IV). However, in Study IV, this score decreased in year three (1.86) and further declined one year after graduation (1.67).

Finally, there were similar results at post-intervention between both studies in regard to item five: *I would not choose to attend continuing education in nursing care* (Study I = 2.31, Study IV = 2.39), six*: Older patients are interesting to care for* (Study I = 2.84, Study IV = 2.80), seven; *Caring for older patients is less rewarding than caring for younger patients* (Study I = 2.89, Study IV = 2.83), and nine: *Caring for older patients is an undesirable career choice* (Study I = 2.63, Study IV = 2.68).

Differences Between Women and Men in PCOP-SF Mean Scores. In Study I, there were no significant differences between women and men in total PCOP-SF scores pre- and post-intervention. While women showed an increase in their total mean scores post-intervention, male students did not. Interestingly, Study IV also revealed no significant differences between women and men pre-intervention. However, post-intervention, some gender differences emerged that aligned with the findings from Study I. Specifically, men exhibited a decline in their mean PCOP-SF scores from the beginning of the nursing programme to one year after graduation, whereas women's mean scores increased throughout the programme and remained higher one year after graduation (Figure 9).

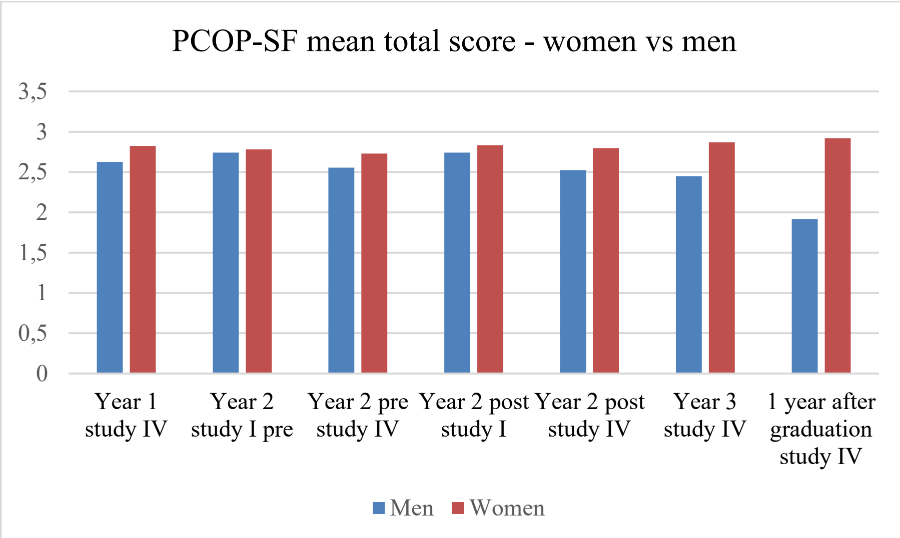

Figure 9. A comparison of differences in PCOP-SF total mean scores between women and men in Studies I and IV.

As shown in Study IV, women were over-represented compared to men in each year of the nursing programme (Table 8).

Table 8. An overview of the number of women and men in the intervention group spanning from year 1 in the nursing programme to 1 year after graduation.

	Year 1	Year 2 pre intervention	Year 2 post intervention	Year 3	1 year after graduation
Women	n=322	n=517	n=504	n=244	n=27
Men	n=61	n=79	n=79	n=40	n=5

Differences Between Women and Men in Regards to Specific PCOP-SF Items. In Study I, there were no significant differences between women and men regarding changes in specific PCOP-SF items. By contrast, Study IV revealed several differences over time. Women reported significantly higher scores than men in the following items during the indicated years:

Year One. Item 4 – *Caring for older patients is intellectually stimulating* (women = 2.47, men = 2.16, $p = 0.014$), indicating that women agreed significantly more with the statement than men.

Year Two Post-Simulation. Item 3 – *Caring for older patients is often unpleasant work* (women = 3.19, men = 2.63, $p \leq 0.001$), indicating that women disagreed with the statement significantly more than men. Item 7 – *Caring for older patients is less rewarding than caring for younger patients* (women = 2.92, men = 2.44, $p \leq 0.001$), indicating that women disagreed with the statement significantly more than men.

Year Three. Item 8 – *Although caring for older patients is labour-intensive, it is worth the investment of time and energy* (women = 3.21, men = 2.80, $p = 0.011$), indicating that women agreed to the statement significantly more than men.

Item 9 – *Caring for older patients is an undesirable career choice* (women = 3.03, men = 2.55, $p = 0.005$), indicating that women disagreed with the statement significantly more than men.

Item 3 – *Caring for older patients is often unpleasant work* (women = 3.48, men = 2.85, $p \leq 0.001$), indicating that women disagreed with the statement significantly more than men.

Item 7 – *Caring for older patients is less rewarding than caring for younger patients* (women = 2.94, men = 2.23, $p \leq 0.001$), indicating that women disagreed with the statement significantly more than men.

1 Year After Graduation. Item 6 – *Older patients are interesting to care for* (women = 2.89, men = 1.80, $p \leq 0.024$), indicating that women agreed to the statement significantly more than men.

Item 4 – *Caring for older patients is intellectually stimulating* (women = 2.78, men = 1.60, $p \leq 0.045$), indicating that women agreed to the statement significantly more than men.

Item 8 – *Although caring for older patients is labour-intensive, it is worth the investment of time and energy* (women = 3.37, men = 2.40, $p \leq$

0.007), indicating that women agreed to the statement significantly more than men.

Differences Regarding Years of Working Experience. Study I revealed no significant differences in total mean PCOP-SF scores between students with no or less than two years of work experience and those with more than two years of experience post-intervention. Both groups showed an increase in scores, with the less experienced group exhibiting a slightly higher increase (2.71 pre, 2.78 post) compared to the more experienced group (2.84 pre, 2.86 post). Similar results were observed in Study IV during year two, pre- and post-intervention, where the less experienced group again showed a greater increase than the experienced group. Notably, the most experienced students in Study I reported a mean PCOP-SF score (2.86) comparable to the most experienced students in Study IV (2.81). Study IV further indicates that, overall, the more experienced students consistently scored higher than the less experienced group, although data for the less experienced group were not available one year after graduation, creating some uncertainty at that time point.

Study I revealed that, in the most experienced group, no statistically significant changes were observed for any individual PCOP-SF item pre- and post-intervention. Conversely, in the group with less work experience, significant increases were noted for items 1 and 8. The less experienced group also reported statistically lower scores in item 2, *It's frustrating to care for older patients*, post-intervention.

Factors Influencing Total Mean PCOP-SF Score. In Study IV, the multiple regression analysis revealed that all predictor variables—sex, work experience of more than two years, age, and participation in the intervention group—significantly contributed to higher total mean PCOP-SF scores. Specifically, more favourable attitudes towards caring for older patients were associated with female students and those who had participated in the simulation intervention rather than the control group. Additionally, older students with greater work experience demonstrated more favourable attitudes compared to students with less experience. A similar trend regarding the relationship between work experience and higher PCOP-SF scores was observed in Study I; however, these differences reached statistical significance only in Study IV.

12.2. Study II

Figure 10. Illustration of the main themes of Study II. Artwork by Åsa Gamgam Leanderz, reproduced with permission

This study examined nursing students' reflections on participating in the age-suit simulation, an embodied experience that contrasted with their everyday practice. Three main themes emerged from the results (Figure 10). The first theme, *It's like walking in a bubble,* captures students' initial reactions to the shift from their 'normal self' to experiencing various impairments. The second theme, *An eye opener,* highlights how students, through the simulation, became more attentive to what matters in caring for older persons, as they could relate to the older person's experiences in a new way. The third theme, *Concerns regarding ageing and the present structure of geriatric care,* reflects the tension students perceived between safeguarding what matters to older persons and the realities and structures of the healthcare system, including concerns about their own ageing.

12.2.1. *It's Like Walking in a Bubble*

Simulating in the age suit was an exhausting and often frustrating experience for many students, as their movements became slow and sluggish, and ordinary tasks—such as walking, sitting, or picking up objects—became painful. These sensations contrasted sharply with their usual everyday experiences. Managing the impairments imposed by the age suit exposed students to a new sense of vulnerability that they were not accustomed to. This awareness of vulnerability was closely linked to feelings of loneliness. For instance, students often felt isolated, as much of their energy and attention was devoted to managing their altered bodies, finding ways through trial and error to perform everyday activities, and navigating the apartment. The struggle with their impairments—feeling limited to merely coping with basic tasks—was frequently described as a form of loneliness. Vision impairment was commonly reported as the most challenging, recognised as a major barrier in daily life that also complicated communication. Some students even reported withdrawing from social interactions with peers due to these difficulties. Many reflected on the profound dependence a person has on sight and hearing—not only for performing daily activities but also for engaging socially.

12.2.2. *An Eye Opener*

The main theme, *An eye opener*, captured how students used their experience of simulating in the age suit to better relate to older persons. A key insight was the importance of giving sufficient time and being fully present as future nurses when caring for older persons. Taking the time to listen to an older person's narrative about their daily life was considered crucial for providing PCC, as it created a space to understand the person behind the illness and identify what truly matters to them. The students emphasised that providing PCC at home also requires a shared understanding of the person and their preferences among all care providers. Many argued that 'everyone should try this' because of the perspective it offered. The simulation also made students more attentive to the home environment, including the use of welfare technology. As noted earlier, simulating impaired vision had been particularly frustrating and challenging. This experience gave students a completely new perspective on the home environment—for example, how misplacing items or installing technology that is not suited to the individual can become a hazard for older persons.

12.2.3. *Concerns Regarding Ageing and the Present Structure of Geriatric Care*

This main theme, *Concerns regarding ageing and the present structure of geriatric care*, captured students' perspectives on the vulnerability of a person with long-term health problems who is often dependent on a healthcare system over which they have little influence. The students reflected on this vulnerability both from the perspective of older persons and from their own potential future as older persons, which made them less optimistic about ageing. For example, they drew on their clinical experience to note how little time and resources are allocated to properly care for older persons, as well as the scarcity of competent care providers. The home was perceived as a private space, and inviting care providers in was seen as exposing oneself to vulnerability. Relatedly, the students were optimistic that welfare technology could alleviate some of the daily challenges of ageing, but they also raised concerns about its impact on personal integrity and questioned its user-friendliness.

12.3. Study III

Figure 11. Illustration of the main themes of Study II. Artwork by Åsa Gamgam Leanderz, reproduced with permission

This observational study focused on nursing students' interactions and behaviours during age-suit simulations, specifically in the roles of a blind older person and an attendant guiding them. The analysis generated three main themes: *Pulling through together*, *Detached from each other*, and *Dialogue is key when adapting to health problems*. These main themes were further supported by eight subthemes which provided deeper insights into how the students navigated collaboration, communication, and the challenges of supporting someone with visual impairment as the primary health problem and being guided by a person with health problems.

12.3.1. *Pulling Through Together*

This main theme illustrates how students successfully adapted to each other's health problems. For example, they adjusted how they held on to each other or modulated their voices to communicate more effectively. These adaptations enabled both students to participate more fully in the simulation activities and appeared to foster a positive and collaborative atmosphere. Typically, the pairs walked close together, side by side, with attendants demonstrating a caring attitude by carefully and purposefully guiding their peers through the simulation environment. Attendants were attentive to potential barriers that could pose hazards to the blind student and skilfully synchronised physical and verbal cues when providing guidance. This inclusive and supportive approach increased the blind students' confidence, allowing them to attempt tasks independently or collaboratively with their partner.

12.3.2. *Detached from Each Other*

This theme highlights situations where students drifted apart rather than working together. This distancing was partly due to attendants' difficulty in managing their own simulated health problems while supporting the blind student. Consequently, attendants often took over the activities with minimal or no involvement from the blind student. This exclusion was observed in behaviours such as withholding information, failing to provide cues or instructions, and reluctance to engage in physical guidance. Attendants were frequently hesitant to make physical contact, at times barely holding onto the blind student—or in some cases, avoiding contact entirely. This sometimes led to blind students being left alone while attendants proceeded with tasks in the apartment. Being left out in this way decreased the blind students' confidence and motivation to engage in conversation or participate in the activities.

12.3.3. *Dialogue is Key When Adapting to Health Problems*

This main theme illustrates two distinct approaches to how students communicated with each other. In the first approach, students who communicated effectively could overcome vision and hearing impairments by adjusting their tone of voice or body position—for example, looking at each other while speaking or moving closer. These students demonstrated a genuine interest in understanding how their peer's health problems affected them, asking questions such as how well they could hear or see and adapting their communication accordingly. In contrast, the second approach was characterised by poor communication. In these interactions, students were often reluctant to speak to each other, with periods of several minutes passing without any verbal exchange. They did not adjust their communication methods—for instance, speaking in a low voice or facing away from their peer—nor did they attempt to clarify miscommunications when they arose. Some students, however, could improve their communication over time, transitioning from being detached to working more in sync with their peer.

13. Discussion

The results of this thesis will be discussed in relation to previous research, the theoretical framework—including ELT and PCC—as well as the nursing philosophy of Patricia Benner (Benner, 1984).

13.1. Effect of Age-Suit Simulation on the Students' Perspectives of Caring for Older Persons

The simulations began in the students' second year of study. Study IV highlights a discrepancy between the students' higher total mean PCOP-SF score in year one compared to the beginning of year two, indicating that students' perspectives towards caring for older persons decline early in the nursing programme. Similarly, McCloskey et al. (2020) found that nursing students rated gerontology more positively in their first year compared to later years and suggested that clinical practice can negatively impact students' motivation to care for older persons. Other studies have also pointed out that the first years of nursing education are critical as students begin to form their professional identity. For some, managing theoretical studies while confronting the realities of clinical practice can influence whether they persist in or leave the programme (Canzan et al., 2022; ten Hoeve et al., 2017). In this thesis, students who participated in the age-suit simulation in their second year demonstrated an improvement in their total mean PCOP-SF score throughout the remainder of the programme and extending into one year after graduation (Study IV), indicating that the simulation intervention had both short- and long-term effects (Studies I and IV).

The timing of the simulation intervention is also relevant to the final stage of ELT—active experimentation. This stage involves students applying newly acquired knowledge in real-world situations. Through active experimentation, new challenges emerge as concrete experiences, initiating the learning cycle once again (Kolb & Kolb, 2018). In this thesis, students had further clinical placements ahead, positioning the simulation intervention as preparation for both their remaining training and their future roles as newly graduated nurses. Study IV shows that even one year after graduation, former students reported a higher total mean PCOP-SF score compared to their second-year pre-intervention scores. This suggests that both the simulation intervention timing and the didactic strategy were well-aligned with the nursing curriculum and students' clinical practice. Previous research has highlighted that simulations offer consistent learning conditions, whereas clinical placements cannot guarantee exposure to relevant situations or patients necessary to develop knowledge and skills (Bauchat et al., 2016; Weeks et al., 2024). Additionally, geriatric simulations have been shown to support first-year nursing students in integrating theory with clinical practice (Eide et al., 2020). In line with these findings, the age-suit simulation intervention in this thesis appears to complement both theoretical learning and clinical practice, producing both short- and long-term effects (Studies I and IV) and fostering new insights and understanding regarding the care of older persons (Studies II and III).

This thesis also shows that students with more than two years of previous work experience view caring for older persons more favourably than those with little or no experience (Studies I and IV). This aligns with previous research indicating that prior experience is often associated with more positive perspectives towards older persons (Galzignato et al., 2021; Magan et al., 2023; McCloskey et al., 2020). Although work experience in this thesis did not explicitly refer to experience in caring for older persons, students often highlighted such experiences in their reflections. However, favourable attitudes towards older persons do not always translate into a willingness to pursue geriatric nursing. Students may hold positive views towards older person while still perceiving geriatric nursing as an undesirable career choice (C. Castro et al., 2023; Magan et al., 2023). Furthermore, research on novice versus advanced students' attitudes towards older persons has produced ambiguous results (Venables et al., 2023), emphasising the need for better understanding of which educational interventions influence nursing students' career choices, particularly in geriatric nursing (Magan et al., 2023). Building on this point, the age-suit intervention in this thesis may positively influence students' career choices towards geriatric care.

This thesis revealed that, regarding gender, men consistently reported less favourable perspectives towards caring for older persons than women throughout their studies and into one year after graduation (Studies I and IV). This finding aligns with previous research indicating that women generally hold more positive attitudes towards older persons (Leticia Allué-Sierra et al., 2023; Fu et al., 2022; Toygar & Karadakovan, 2020), although some studies have reported inconclusive results (López-Hernández et al., 2021). This thesis does not provide a definitive explanation for these gender differences; however, statistics from Sweden show that women account for 93% of RNs in municipalities and 86% in regional care (Swedish Association of Local Authorities and Regions, 2024). Nonetheless, the less favourable attitudes among men are important to consider, as they may have implications for students' clinical practice when caring for older persons. In light of these demographics and previous research, future studies on age-suit simulation could benefit from a greater focus on gender differences.

13.2. Age-Suit Simulation Captures Aspects of Vulnerability and Loneliness

The age-suit simulation drew students' attention to a sense of vulnerability and loneliness, which they could relate to the experience of being an older person with health problems (Study II). This vulnerability was similarly observed in Study III, manifesting through students' inclusive or exclusive behaviours towards one another. These findings regarding vulnerability and loneliness can be interpreted in light of Benner's perspective, which emphasises that when a patient reveals themselves as a person and discloses what matters to them, they occupy a vulnerable position that simultaneously opens opportunities to foster growth and health despite living with illness (Benner & Wrubel, 1989).

As shown in this thesis, the physical, psychological, and social impacts of simulating in the age suit served as important reference points for the students' post-simulation reflections on vulnerability (Study II). Allowing the person time to reveal themselves resonates with Study II, where students highlighted the importance of being patient and giving the older person sufficient time to express themselves and their needs. Similarly, attentiveness and patience also influenced inclusive and non-inclusive behaviours observed in Study III. The students' insights and observed behaviours highlight that understanding the person depends on being attentive—which, in turn, enables the RN to relate to the other person in a responsive and supportive manner. Hence, everyday nursing practice involves protecting a person's vulnerability (Benner et al., 2009). The results of Studies II and III reveal multiple facets of loneliness: it was described as feeling isolated or 'walking in a bubble' due to an intense focus on managing the persona's health problems; it also manifested in difficulties recognising peers and communicating, influenced by environmental factors such as lighting and noise. Loneliness could occur even in the presence of others (Study II) or result from being excluded from participation (Study III). Encouraging nursing students' attentiveness to these aspects of vulnerability through age-suit simulation may provide valuable insights for their future encounters with older persons and aligns with Benner's view that a central part of caring is to alleviate vulnerability, which presupposes the RN's ability to recognise it (Benner & Wrubel, 1989).

As highlighted in previous research, ageing involves a range of transitions and losses that increase vulnerability and the risk of experiencing unmet needs for interpersonal relationships. Loneliness is a particularly complex phenomenon, as it is subjective and can become entrenched and difficult to alleviate if left unaddressed (da Silva, 2025; Edberg et al., 2023). Notably, the age-suit simulation captured various dimensions of loneliness by fostering heightened self-awareness among the students. This embodied awareness may enhance students' understanding of the importance of sustaining interpersonal relationships, which is integral to PCC (Brendan & Tanya, 2020; Ekman et al., 2011) and aligns with the value base of the Good and Close Care reform. An important finding from Studies II and III is that students not only became better able to relate to the experience of loneliness but also, through first-hand experience of impaired vision and hearing, became acutely aware of how such impairments can reduce a person's motivation to engage socially. The ability to recognise and respond to feelings of loneliness is crucial in the care of older persons because prolonged isolation may become increasingly entrenched and harder to alleviate (da Silva, 2025).While relationships can be restored and strengthened, existential loneliness is deeper and linked to a sense of meaninglessness in life (van Tilburg, 2020). Future studies could further explore how students' experiences of loneliness during age-suit simulation impact their interactions with older persons.

13.3. Reflecting and Thinking: Key Aspects of Learning in Age-Suit Simulation

This thesis underscores the role of guided reflection in the concrete experience as an integral component of the intervention. In particular, students were asked to relate their experiences from the age-suit simulation to concepts in caring science (Study II). Engaging in reflection after the simulation facilitated a change in the students' self-awareness (Study II). According to ELT, following a concrete experience—such as the age-suit simulation—students engage in reflective observation and abstract conceptualisation. During this process, they become aware of any tensions or inconsistencies between the new experience and their prior knowledge, which allows them to form new ideas and understanding about the situation (Kolb & Kolb, 2018; Kolb, 2013). Reflection is often emphasised as essential to learning, but it relies on breaking the flow of everyday life through a concrete experience that challenges pre-existing assumptions or habitual ways of thinking. It is this 'here and now' experience that initiates the learning process (Kolb & Kolb, 2018). The simulation intervention was deliberately designed to provide sufficient time post-simulation for reflection and thinking ensuring that students could internalize and integrate their experiences into their professional understanding.

The findings of this thesis (Studies II and III) suggest that students became more aware of the daily challenges, vulnerability, and loneliness that a person with long-term health problems may experience. This heightened awareness was intended to inform their clinical practice (Study II). Further support comes from the results of Studies I and IV, which indicate that the simulation prompted a change in students' perspectives, as they reported more favourable attitudes towards caring for older persons—an effect that was sustained over time (Study IV). Deliberate reflection and engagement with nursing-relevant concepts, as incorporated in this thesis, can be viewed as a strategy to address the common barrier novice nurses face in connecting theory with practice (Song & McCreary, 2020). The bridging of theory and practice observed in Study II has direct implications for patient care. As Ekebergh (2007) argued, integrating theoretical knowledge with practical experience enables nursing students to gain deeper understanding and insight into a patient's needs and situation, which is essential for becoming a reflective practitioner—a key characteristic of the expert nurse as described by Benner (1984).

13.4. Knowing Oneself Through Age-Suit Simulation: A Prerequisite for PCC

This thesis supports the idea that age-suit simulation can serve as a relevant didactic strategy for developing students' self-awareness. Enhancing self-awareness aligns with the nursing prerequisite of knowing self within the PCC framework (McCormack & McCance, 2021). According to Ekebergh (2007), students deepen their understanding of both themselves and their profession when inward reflection is linked to concepts relevant to nursing practice. Similarly, nursing students have reported that being self-reflective helps them envision themselves as future nurses and better relate to the needs of others (Contreras et al., 2020). Notably, a prominent result in Study II was the students' view that 'everyone should try this', highlighting the importance of a shared understanding of the older person's perspective among all care providers. This emphasis on shared understanding suggests that age-suit simulation can contribute to fostering a person-centred healthcare culture, which has previously been described as a major barrier to implementing PCC in clinical practice (Brendan & Tanya, 2020; Forsgren et al., 2025; Moore et al., 2017).

This thesis also highlighted behaviours and perspectives that can be considered unfavourable in relation to caring for older persons, as observed in Study III and reflected in the less positive attitudes reported by male students (Studies I and IV). Benner emphasised that the narratives of everyday practice within nursing provide an essential foundation for developing ethical judgement (Benner et al., 2009). Building on this perspective, the students in this thesis represent the nursing discipline with its core values. Consequently, these unfavourable perspectives and behaviours can be reframed as opportunities for students to become aware of values and attitudes that are not ideal when caring for older persons. The insights observed among the students (Studies II and III) align with the 'knowing self' aspect of the PCC framework—a key characteristic of being a reflexive person-centred practitioner—where one's beliefs and values are challenged and redefined to better understand others (McCormack & McCance, 2021). Studies I and IV further support that engaging in self-reflection contributed to the long-term effects of the intervention. Notably, two specific items—*Caring for older patients is usually challenging and rewarding* and *Although caring for older patients is labour-intensive, it is worth the investment of time and energy*—showed increased scores post-simulation (Study I) and continued to rise throughout the nursing programme, extending into one year after graduation. The stability of these post-simulation scores over time suggests that caring for older persons is perceived as both worthwhile and fulfilling. Future research on age-suit simulation should, therefore, explore students' motivational factors for pursuing a career in geriatric care.

13.5. Age-Suit Simulation as a Complement to Theory

Age-related care is not always prioritised in nursing education, and integrating it into an already packed curriculum can be challenging, potentially reinforcing ageism (Nemiroff, 2022b). In contrast, the simulation intervention in this thesis demonstrates that it is possible to introduce and integrate a new didactic strategy, such as age-suit simulation, into an established curriculum. This simulation serves as a complement to theoretical education on gerontology and geriatrics. However, some have raised concerns that simulating impairments could reinforce stereotypes. Kolb and Kolb (2018) argued that it is the 'small' everyday experiences that tend to reinforce a person's habits and convictions. This thesis shows that simulations involving the experience of health problems and impairments can be beneficial. As observed in Study II, students expressed a new level of respect for older persons and emphasised the need of preserving dignity and autonomy in their future practice. Even negative emotions, such as frustration about their own ageing process, helped students understand why older individuals might express similar feelings (Study II). The age-suit simulation in this thesis aligns with the concept of perspective-taking, rooted in Piaget's philosophy. Perspective-taking refers to the ability to view the world from another person's standpoint, which has been linked to increased concern for others' well-being. Extending this argument, perspective-taking helps foster empathy and enhances the perception of another's humanness (Miron et al., 2021). Although empathy was not directly assessed in this study, students demonstrated profound insights about preserving integrity and independence and expressed concerns about older persons' standing in the hierarchical healthcare system (Study II). These insights go beyond general attitudes, which are typically defined as 'the tendency to respond positively or negatively toward an idea, individual, or situation' ("INACSL Standards of Best Practice: SimulationSM Simulation Glossary", 2016, p.43). Nursing students' empathy has been associated with more favourable attitudes towards older persons. However, very high levels of empathy can lead to distress and compassion fatigue, especially among novice nurses who are more prone to such emotions when caring for older persons (Kolthoff & Hickman, 2017; Yao et al., 2021). Therefore, educators must not only address the issue of low empathy but also recognise when students become too emotionally involved (Yao et al., 2021). Future studies on age-suit simulation might consider incorporating empathy into the assessment, exploring its role in preventing compassion fatigue and its effects on attitudes towards geriatric care (Kolthoff & Hickman, 2017). Finally, in the context of ELT, the last step in the learning cycle is active experimentation, where students apply their learning in a new context (Kolb, 2014). In this thesis, this context is clinical practice, where students may apply the insights and knowledge gained from the simulation. Future research could investigate the impact of age-suit simulation on students' clinical practice and the care of older persons, particularly in terms of how it correlates with theoretical knowledge in gerontology and geriatrics.

14. Methodological Considerations

This thesis employed a combination of research designs to gain a comprehensive understanding of nursing students' experiences with the age-suit intervention. This chapter discusses the methodological considerations of the thesis, focusing on criteria relevant to both qualitative and quantitative approaches. For the quantitative Studies I and IV, validity and reliability are essential criteria for evaluating the quality of the research (Polit & Beck, 2021). In qualitative research, trustworthiness is a key standard for ensuring high-quality inquiry and rigor (Polit & Beck, 2021).

14.1. Quantitative Research – validity and reliability

This chapter describes the methodological approach used to examine the effects of the age-suit simulation. The quantitative method facilitated systematic data collection through the PCOP-SF questionnaire and enabled statistical analysis of key variables influencing the outcome measure in both a cross-sectional study (Study I) and a longitudinal study (Study IV). In both studies, a control group was included—which, in quantitative research, is recognised as a strategy to reduce potential bias (Polit & Beck, 2021).

14.1.1. *Internal Validity*

Internal validity refers to the extent to which a causal relationship between the independent and dependent variables can be established (Kazdin, 2023). In the context of this thesis, internal validity concerns the degree to which age-suit intervention, rather than other factors, can explain the results as measured by the dependent variable PCOP-SF. A strength in Studies I and IV was that all students attending the nursing programme were invited to complete the PCOP-SF questionnaire, which minimised the risk of selection bias. Another concern in quantitative research is the tendency to underreport 'negative results' (Kazdin, 2023). In this thesis, however, results highlighting potentially undesired effects of the simulation intervention were transparently reported, strengthening internal validity. For example, in Study I, the intervention group reported more frustration compared to the control group. Studying nursing students on campus also allowed for large sample sizes, which may have mitigated the threat of statistical regression (regression towards the mean), which occurs when samples are narrow or composed of individuals at distribution extremes (Kazdin, 2023).

Another strength regarding internal validity was the inclusion of a control group, ensuring that no other factors besides the intervention (Kazdin, 2023). Nevertheless, the control group was small, which may have reduced statistical power and increased the risk of type II errors (Shreffler & Huecker, 2020). Due to COVID-19 restrictions, participant selection for the control groups was constrained. Including a control group was not part of the original design of Studies I and IV because it would have been unethical to withdraw students from mandatory courses. However, collecting control group data concurrently with the intervention group (fourth semester) helped strengthen internal validity. Additionally, including all students as well as retaining the same participants over time (Study IV) further supported internal validity. A potential threat in both studies is that nursing students may participate in research more for altruistic reasons than for personal benefit (Bradbury-Jones & Alcock, 2010). While this raises questions about direct participant benefit, previous studies suggest that nursing students generally value involvement in clinical and pedagogical research, especially when it contributes to improving nurse education (Burrell et al., 2020; Ross et al., 2020). Thus, involving nursing students in this thesis can be seen as an effort to support evidence-based teaching, a research field often neglected in nursing education (Broome & Fairman, 2018). Both studies relied on self-reports, which may introduce bias.

One concern was the teacher–student relationship, which might have led some students to respond in ways that ‘please the teacher’. This imbalance relates to obtrusiveness, defined by Kazdin (2023) as the respondents’ awareness of being assessed/measured, which can influence responses. A strength of this thesis was the presence of researchers when students completed the questionnaires, allowing participants to clarify items if needed. However, the control group in Studies I and IV completed the instrument online during the pandemic and did not have the same opportunity for clarification, which may represent a limitation. Other threats to internal validity include participant maturation, especially in interventions conducted over longer periods (Kazdin, 2023). In the nursing programme, students encounter different clinical situations and supervisors, which can influence attitudes towards caring for older persons and their interest in geriatric nursing. Interestingly, many students forgot they had previously completed the PCOP-SF questionnaire, which may strengthen internal validity because their answers were less likely to be influenced by their prior responses.

Finally, manual data collection for Studies I and IV was time-consuming but appeared to motivate higher response rates, in contrast to digital surveys used for the control group and for students one year after graduation (Study IV). When using a measure such as the PCOP-SF, it is important to consider its construct validity, which concerns the extent to which the instrument accurately reflects the concept it is intended to measure (Kazdin, 2023). The PCOP-SF was developed based on the theoretical framework of symbolic interaction and informed by data from nursing students and RNs. Its construct reflects the nature and experience of caring for older patients (Burbank et al., 2018), which aligns with the outcomes intended to be measured in Studies I and IV. A potential threat to construct validity in Studies I and IV is test sensitization, whereby administering a pre-test before the intervention may influence how the participants perceive the intervention itself (Kazdin, 2023). This limitation may have been partially mitigated by the inclusion of a control group, which allowed for comparison between participants exposed to the simulation intervention and those who were not.

14.1.2. *External Validity*

External validity refers to the extent to which the results of a study can be generalised to a larger population and is an important goal in conducting research (Kazdin, 2023; Lincoln & Guba, 1985). Generalisability is a complex issue; for example, interventions that prove effective in practice may initially have limited generalisability. Such interventions can benefit from first being studied in a highly controlled environment, as this allows researchers to observe subtle phenomena, such as interpersonal interactions, which may be difficult to detect in real-world settings (Kazdin, 2023). Similarly, the apartment in SHC provided a well-controlled environment while still offering students the experience of a highly accessible living arrangement. One limitation in both the qualitative and quantitative studies is the under-representation of men. Statistics from 2022 indicate that 87% of clinically active RNs in Sweden were women and 13% were men (Otterdal, 2022). Comparatively, in 2023, 85% of nursing students in Sweden were women and 15% were men, showing a slight increase from 1997 (UKÄ, 2025).Therefore, the gender distribution among participants in this thesis reflects the general composition of nursing students and clinicians in Sweden and can be considered representative.

The nursing education programme in Sweden (180 credits) is regulated at the national level (Swenurse, 2021). Since the participants in this thesis were nursing students, the results may be generalisable to students at other Swedish universities. However, generalising the findings to other healthcare professionals may be more challenging. Since the completion of Study I, the age-suit simulation has been further implemented in both the generalist nursing programme and the specialist programme (district and geriatric nursing), which enhances the applicability and relevance of the simulation in broader educational contexts.

In Study IV, data were collected in person among students (except for the control group in the fourth semester) and digitally among RNs. One potential limitation is that students completed the questionnaire in the presence of the researchers, which may have induced a sense of being observed or supervised. The context in which the participants answer a questionnaire—whether in person on campus or remotely—can influence their responses and represents a potential threat to external validity, as participants may alter their answers if they are aware they are being assessed (Kazdin, 2023).

14.1.3. *Reliability*

The instrument used in this thesis, PCOP-SF, has previously been validated and applied in other studies, which strengthens its reliability—the extent to which a measure consistently assesses the characteristics of interest

(Polit & Beck, 2021). Internal consistency, an important aspect of reliability, is measured using Cronbach's alpha; for PCOP-SF, $\alpha = 0.88$, indicating strong internal consistency (Burbank et al., 2018). Kazdin (2023) indicated that a potential threat to reliability is that established measures may not undergo sufficient scrutiny. For the PCOP-SF, item 1, *Caring for older persons is challenging and rewarding*, could potentially be interpreted in multiple ways, representing a minor threat to reliability. One option could have been to remove this item; however, during data collection, it did not appear to raise any questions among the students. A strength of this thesis in terms of reliability is that the questionnaires were not altered, and administration was consistent throughout the project by the same group of researchers. Note also that the short-form version of the instrument was used in Studies I and IV. While the shorter version may omit some aspects of the construct, it reduces the time required for completion and helps mitigate survey fatigue among the participants. The short form has also been used in another Swedish nationwide study, where the instrument was translated into Swedish in a manner similar to the approach in this thesis (Holmberg et al., 2022).

14.2. Qualitative Research - trustworthiness

This section focuses on the results of Studies II and III, which represent the students' reflections on and interactions during the age-suit simulation. These results emerged from a reflexive engagement with the data, theory, and interpretation among the research team, a core feature of reflexive thematic analysis (Braun & Clarke, 2021). The discussion about the qualitative studies will be framed against trustworthiness which comprises four concepts: credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985).

14.2.1. *Credibility*

In this thesis, all researchers had prior experience providing care to older persons, including home care settings, and were responsible for collecting data for Studies II and III. This collaborative effort strengthens the credibility of the thesis, which refers to the trustworthiness of the interpretation of the findings. In particular, researchers need to both conduct the study rigorously and demonstrate its trustworthiness (Polit & Beck, 2021). Studies II and III also included relatively large sample sizes, suggesting that the sample is representative of a larger population and thereby enhancing credibility (Shenton, 2004). The participants in Study II were systematically selected, with one interview chosen from the morning class and one from the evening class for each scheduled simulation. This procedure aimed to mitigate selection bias, as unknown influences are more likely to be evenly distributed across the sample (Shenton, 2004).

In Study III, students were randomly assigned their persona. However, participant selection was also dependent on whether the students agreed to appear on video. Therefore, it is plausible that some important observations may not have been captured. In Study II, it was particularly important to capture nuanced perspectives from the participants regarding the simulations. Data collection for Study II involved group interviews conducted over a timeframe spanning before, during, and after the COVID-19 pandemic, ensuring a rich and representative dataset. This prolonged engagement with the participants also strengthens creditability (Shenton, 2004). A key feature of reflexive thematic analysis is the value of the researchers' pre-understanding and iterative engagement with the data, which allows the research team to distinguish and refine themes (Braun & Clarke, 2021). As the research team was actively involved in data collection, each member could provide valuable input during discussions of the findings, and this process of agreement-seeking further strengthens credibility (Shenton, 2004).

A potential limitation regarding credibility is the lack of member checking, as students were not invited to reflect on or provide feedback on the results of the studies. However, member checking presents methodological challenges, including the need for participants to engage critically and possess sufficient theoretical knowledge, as well as the time and effort required. Additionally, reading one's own interview transcripts may cause discomfort and could lead the participants to withdraw data. The teacher–student relationship also introduces a potential power imbalance, as participants may feel pressured to agree with the researcher, which can reinforce rather than mitigate this imbalance (Lloyd et al., 2024). Credibility is further strengthened through triangulation—the use of multiple methods, including group interviews in reflection seminars (Study II) and observations (Study III)—as these methods complement each other and provide a more comprehensive understanding (Shenton, 2004).

14.2.2. *Dependability*

Data for Studies II and III were collected over an extended period, which introduced a potential threat to dependability, as this concept refers to the stability and consistency of data collection (Polit & Beck, 2021). Researchers CG, JH, and BBS were responsible for collecting data from 2019 onward. A strength of this approach was that the team had established consensus and routine in data collection procedures, which likely reduced the risk of inconsistency. For Study II, the research team collectively collected the data, whereas Study III data were collected solely by the PhD student (BBS). Additionally, no alterations were made to the interview guide for Study II, further supporting the dependability of the data.

Alterations in data collection may pose a threat to dependability, particularly when data collection is extensive and occurs over longer periods (Ahmed, 2024), as was the case in Studies II and III. To maintain oversight, BBS kept a record of the different cohorts in an Excel file. Collecting data for Study III proved challenging. Using only one camera angle may have resulted in missed interactions between the students; however, a strength of this approach was the opportunity to be close to the participants. A limitation of using video recordings in Study III was poor sound quality, which became apparent during the analysis phase. For example, sounds from the radio and television sometimes made it difficult to hear what the students said to each other, potentially leading to the loss of important dialogue and posing a threat to dependability. In contrast, these background sounds were an intentional and important feature of the simulation design.

14.2.3. *Confirmability*

Confirmability pertains to the objectivity of the research findings and may involve the use of peer debriefings, such as input from colleagues or other experts, to review the data interpretation (Ahmed, 2024). Although pure objectivity is difficult to achieve, researchers can take steps to demonstrate that the results are grounded in participants' experiences rather than reflecting researcher bias (Shenton, 2004). Detailed methodological descriptions are essential to enhance confirmability. In both Studies II and III, reflexive thematic analysis was used, a method in which researcher subjectivity plays an important role. Nonetheless, discussions between the PhD student and supervisors, all with expertise in qualitative research, reflected the iterative nature of the analysis. The structured approach to data collection further strengthened confirmability. Random sampling is also considered to enhance confirmability, as it provides assurance of including a representative sample (Shenton, 2004). A particular strength of this thesis was that all nursing students in the programme were included, making the sample representative of the population studied.

14.2.4. *Transferability*

Transferability refers to the extent to which results from one context may be applicable to another context (Lincoln & Guba, 1985). Providing a comprehensive, thick description of the context, participants, and methods facilitates the potential for transferability (Ahmed, 2024). Studies II and III included nursing students with diverse backgrounds and experiences. As seen in the demographic data, many students were in their twenties; therefore, their life and work experience were limited. This limits the extent to which the results can be transferred to other contexts or to more experienced healthcare professionals. However, an interesting finding from Study II is that the students considered the age-suit simulation relevant for any person involved in the care of older persons. The context of the simulation intervention was carefully described in both Studies II and III, and detailed accounts of the research process, including rich and representative quotes and observations, were provided. Ultimately, however, how well the results can be transferred to other contexts is for the reader to decide (Lincoln & Guba, 1985).

14.3. Possibilities and Obstacles in Performing Age-Suit Simulation

The importance of contextual learning in the simulation has been emphasised in this thesis. Note that the simulation intervention was integrated into an established curriculum. Consequently, conducting the simulations required careful attention to both infrastructure (SHC) and alignment with the curriculum. Some obstacles encountered during the simulations were technical in nature. For example, ensuring that cameras, sensors, and the overall WT worked seamlessly was a challenge and required ongoing supervision and testing. Disruptions occurred when, for instance, a tablet failed to connect to a sensor, preventing the student from completing an activity. In other cases, students were unable to turn on the automatic water faucet, or the lights did not function as intended.

Other obstacles were related to the age suit itself. Although GERT comes with adjustable straps, glasses, and different sizes of shoes and gloves (https://www.age-simulation-suit.com/), some students found it difficult to achieve a satisfactory fit. For example, the shoes were sometimes too small or too large, the ankle weights did not fit snugly, or the knee straps could not be properly secured around the leg. While these situations were inconvenient, the presence of multiple personas allowed students to select an alternative persona or substitute one health problem for another, ensuring they could still participate in the simulation.

An interesting result of this thesis is that, even though students experienced different personas, vision and hearing impairments were often regarded as ‘the worst’. Another notable finding was that students reported experiencing impaired cognitive functioning while wearing the suit, which is not a health problem advertised by the manufacturer. By contrast, one study investigated the basic version of GERT and its effects on standard mobility, cognitive, and balance tests among young and middle-aged adults. The results were mixed: while the suit, on average, simulated ageing into the ‘third age’, where performance levels are still manageable, the participants did not experience the ‘fourth age’ (85+) (Gerhardy et al., 2024). These findings were partially replicated in another study using the GERT suit, which concluded that the cognitive impairment reported was most likely due to the combined effects of fine motor skill limitations and vision impairment. Additionally, this study found that the participants did not age 30–40 years as advertised but rather simulated the functional capacity of someone around 60 years old (Vieweg & Schaefer, 2020). In this thesis, it would have been valuable to include similar standardised assessments of ageing, such as grip strength, balance, and motor skills, as the simulation intervention suit adds health problems that have been overlooked in previous research.

15. Conclusion

- Future nurses need to be prepared to practice PCC in their encounters with older persons, as PCC is regarded both as the value base of Good and Close Care and as a core competency for nurses. The results of this thesis suggest that experiential learning is particularly well suited to complement the didactic strategy of age-suit simulation, through which students experience the perspective of an older person first-hand. The age-suit simulation challenged students' perspectives on ageing, allowing them to embody the experience of living with age-related health problems and gain insight into the everyday realities of older persons.

- Participation in the simulation intervention had a long-term effect that was sustained throughout the nursing programme, with some effects observed up to one year after graduation. This thesis highlights the importance of providing students with time to reflect on their simulation experiences in relation to nursing concepts, thereby facilitating the connection between theory and practice. Through the embodied experience of the age-suit simulation, students became aware of, and could relate to, the sense of vulnerability and loneliness that older persons may experience. Vision impairment emerged as one of the most prominent challenges and was a central factor influencing whether students felt included or excluded in situations requiring dependence on others. Impaired vision was perceived to affect multiple aspects of daily life, including communication, managing social relationships, navigating the environment, and using welfare technology in the home.

• Contextualising theory within the context of home care was beneficial for the students' reflections, allowing them to relate the simulation experience to previous encounters with older persons and to consider how they could integrate these insights into their clinical practice. The students' reflections align with the concept of *knowing self*, the first domain of PCC, which involves becoming aware of the tension between one's prior 'taken-for-granted' knowledge and the insights gained from new experiences. These insights fostered a deeper understanding of the importance of taking time and focusing on what matters to the individual to preserve dignity and autonomy. Such reflections resonate with Benner's view on everyday ethical comportment, which can only be learned and understood through experience rather than theoretical principles. The RNs' ethical comportment encompasses the skilled know-how of relating to others, involving self-awareness of one's beliefs, values, and intentions—which, in turn, enables responsiveness and responsibility to the vulnerability of others (Benner et al., 2009). Therefore, integrating experiential learning in nursing education that aligns with *knowing self* in PCC may strengthen the ethical competence of future nurses and contribute to a person-centred healthcare culture.

16. Implications

- Age-suit simulation can be used among nursing students to develop insights and understanding of ageing, older persons, living with long-term health problems, and caring for older persons.
- A deeper understanding of how older persons experience life with long-term health problems can support the development of students' ethical comportment.
- Age-suit simulation can help students identify and respond to loneliness in older persons, an important consideration given that involuntary loneliness is a debilitating condition.

- Simulating impaired vision was regarded as one of the most challenging impairments, highlighting barriers in the care environment such as the importance of proper lighting. Awareness of the home environment can also help students critically evaluate the use of WT in older persons' homes.
- Including accessories with the age suit provides a practical complement to nursing students' theoretical knowledge in geriatric care.
- Age-suit simulations can enhance students' understanding of how verbal and non-verbal communication affects the inclusivity experienced by visually impaired individuals. Simulating interaction-focused scenarios also raises awareness of the perspective of informal caregivers.
- Age-suit simulation can highlight less favourable behaviours among nursing students when interacting with visually impaired persons, which can then be addressed and used as opportunities for learning.

17. Future Research

There is potential to further develop and understand the impact of age-suit simulation in different contexts and among other participants. Including a broader range of care providers is particularly relevant in light of the Good and Close Care reform and the ongoing promotion of a PCC culture, as highlighted in this thesis. Future research could explore transdisciplinary simulations that involve both health and social care professionals. Additionally, it would be valuable to validate the PCOP-SF in Swedish and within the Swedish healthcare context, as well as to examine potential correlations between PCOP-SF scores and other outcome measures, such as empathy or knowledge about ageing.

Future studies could combine the PCOP-SF with other questionnaires, particularly those focusing on empathy, to gain a broader understanding of students' perspectives. Additionally, research could examine gender and cultural differences among students, especially regarding their motivational factors for caring for older persons. Other areas of interest include designing new simulation scenarios and personas, such as switching between the perspectives of an RN and an older person. Further studies could also explore simulation of cognitive impairments such as dementia, and the impact of specific personas on students' learning outcomes and attitudes.

Finally, an important gap in previous research has been the limited use of accessories with the GERT suit when comparing the physical performance of younger adults with that of older persons. Future studies could incorporate these accessories to examine whether the simulation experience more closely approximates the functional abilities and challenges of persons aged 85 and older.

18. Svensk sammanfattning

Bakgrund: God och nära vård innebär ett nytt perspektiv - att ställa om från organisation till person. Målet är att ge en nära, samordnad och personcentrerad vård som bidrar till en helhetssyn på människan vilket är särskilt gynnsamt för hälsan bland äldre personer som kan leva med flertalet olika och långvariga hälsoproblem vilket leder till komplexa vårdbehov. Förskjutningen av ansvar mot primär och kommunal vård innebär också att framtidens sjuksköterskor i större utsträckningen kommer att möta och vårda äldre personer i hemmet. Det finns dock utmaningar i att sjuksköterskestudenter kan känna sig oförberedda och omotiverade att vårda äldre personer. Vidare är ålderism ett problem som inte bara genomsyrar samhället men även hälso-och sjukvården och blivande sjuksköterskor. Det är därför viktigt att möta dessa utmaningar redan i sjuksköterskeutbildningen genom att utveckla nya didaktiska strategier så som simuleringen i äldredräkt. Denna simulering bygger på att studenten skiftar perspektiv och får en glimt av hur det kan vara att som en äldre person leva med olika åldersrelaterade hälsoproblem, viket i tidigare forskning visat sig kan stärka studentens empati och förståelse. Dock saknar tidigare studier kontexten av en hemlik miljö, teoretisk grund samt långvariga effekter av simulering i äldredräkt. Vidare har äldredräktens funktion ofta begränsats till att simulera det normala åldrandet och därmed inte inkluderat hälsoproblem som är vanligt bland personer över 85 år.

Syfte: Det övergripande syftet i denna avhandling var att studera sjuksköterskestudenters erfarenheter av en intervention med simulering i äldredräkt baserad på erfarenhetsbaserat lärande i en hemlik miljö.

Metod: Avhandlingens fyra studier omfattar olika design. I studie I tillämpades kvantitativ metod med en pretest-posttest design och en kontrollgrupp. Studie IV var också kvantitativ och inkluderade en kontrollgrupp i en longitudinell design. Skillnader mellan grupper analyserades genom Mann Whitney- U test. Multipel regressionsanalys tillämpades för att observera effekten över tid. Studie II baserades på gruppintervjuer från reflektionsseminarium och analyserades genom reflexiv tematisk analys. Studie III var en observationsstudie där video-data analyserades genom reflexiv tematisk analys.

Resultat: Studenter som deltog i interventionen förbättrande sina resultat i utfallsmåttet Perspectives on Caring for Older Patients - PCOP-SF både på kort och lång sikt, jämfört med kontrollgruppen. Att vara kvinna, äldre och ha mer än två års yrkeserfarenhet var signifikanta faktorer som var förenade med mer gynnsamma perspektiv på att vårda äldre personer. Simuleringen äldredräkten innebar ett förkroppsligat lärande som infattande både fysiska, psykologiska och sociala dimensioner av att leva med olika hälsoproblem och funktionsnedsättning. Resultaten visar att denna erfarenhet var en viktig utgångspunkt i studenters reflektioner som ökade deras insikt och förståelse för den utsatthet och ensamhet en äldre person kan uppleva i sin vardag. Studenterna beskrev att simuleringen även ökat deras fördjupning och förståelse av personcentrering i och med att vara närvarande, lära känna och ta sin tid med den äldre personen, bevara integritet och autonomi. Dessa var viktiga aspekter stundetern såg sig kunna integrera i klinisk praxis. Resultatet visar även att studenterna fick ett nytt perspektiv på hemmet som vårdmiljö där välfärdsteknologi sågs både som en möjlighet för personcentrering men även en fara för integritet och autonomi tekniken inte var anpassad efter individuella behov. Ett viktigt resultat var stundernas känsla av nedsatt syn som det värsta bland alla hälsoproblem. Synnedsättning studerades mer specifikt i sammanhanget av att vara en blind äldre person och att vara en äldre person som ledsagar den blinda. Resultatet visar att studenterna tog sig an dessa roller på två helt skilda sätt av att antingen samarbeta och arbeta tillsammans eller att fokusera på de egna behoven och bli allt mer distanserande från varandra. En avgörande aspekt i denna simuleringen och vilka roller som studenterna antog observerades som deras förmåga till verbal och icke verbal förmåga att kommunicera med varandra.

Konklusion: Denna avhandling visar på att stundeter som genomgått simulering i äldredräkt har mer gynnsamma perspektiv på att vårda äldre personer än stundeter som inte genomförde simuleringen. Avhandlingen ger även stöd för att andra året i sjuksköterskeprogrammet är en relevant tidpunkt att genomföra interventionen. Som denna avhandling visar användes äldredräkten som en geriatrisk äldredräkt vilket kan förklara att simuleringen blev särskilt uppslukande och utmanande för studenterna. Resultaten ger stöd för att simulering i äldredräkt lämpar sig att genomföra som en didaktisk strategi baserat på erfarenhetsbaserat lärande. Mer specifikt, upplevelsen i interventionen är förenligt lär-cykelns extraordinära upplevelse som en förutsättning för att fördjupa lärandet genom reflektion och tanke. Som påvisats i resultat och genom diskussion in denna avhandling, förefaller simulering i äldredräkt specifikt göra studenterna uppmärksamma på utsatthet vilket inkluderade olika perspektiv på ensamhet. Ett av dessa perspektiv var utsatthet i förhållande till ett hälso- och sjukvårdsystem som saknar personcentrering. Simuleringen hade även implikationer för studenternas fortsatta kliniska verksamhet, mer specifikt att vara närvarande, tålmodig och ta sin tid sågs som särskilt viktigt för att bevara värdighet och autonomi hos den äldre personen.

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Appendix 1.

Appendix 1

Interview Guide from Group Reflection Seminars

Introduction (roundtable reflection – each student provides their reflection)

Describe your experience of simulating with an age suit in SHC (how does it correspond to the participant's expectations, conceptions, and apprehensions?)

Questions (open group discussion)

Describe your thoughts and feelings regarding being a guide or providing guidance.

Describe your thoughts and feelings regarding ageing, older persons, and caring for older persons.

In what way has the age-suit simulation affected your view on:

Ageing and living with health problems, older persons, providing care to older persons, significance of the simulation environment (highly accessible apartment with welfare technology), and future career orientation in the profession.

Describe your thoughts and feelings when observing the simulations.

How do you relate your experience of simulation to central concepts of caring in regard to ageing, older persons, and caring for older persons?

How do you relate your experience in the age-suit simulation to the nurses' core competencies and person-centred care regarding ageing, older persons, and caring for older persons?

Closure (roundtable reflection – each student provides their reflection).

What is your take away from this age-suit simulation and describe how it has influenced your view on ageing, older persons, and future care of older persons?

Appendix 1

Original papers

as listed in the introduction

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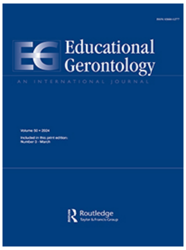

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Effects of an age suit simulation on nursing students' perspectives on providing care to older persons - an education intervention study

Björn Bouwmeester Stjernetun, Jenny Hallgren & Catharina Gillsjö

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Effects of an age suit simulation on nursing students' perspectives on providing care to older persons - an education intervention study

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ABSTRACT

Nursing students are important future health care providers to the growing number of older persons in society. However, two barriers are their common ageist attitudes and lack of interest in geriatrics. This is a concern in light of the global demand for nurses and a challenge that need to be addressed in nurse education. Age suit simulation has been shown to affect the attitudes of students toward older persons, but the important context of home is often missing from studies. Accordingly, the present study employed a quantitative approach with the goal of investigating the effects of aging simulation with an age suit in a home context as a part of experiential learning among second-year nursing students. The age simulation allowed the students to experience both specific and common health problems from the patient's point of view in a controlled environment and a relevant context: the home. Data were collected using a questionnaire in a quasi-experimental pretest – posttest design with a control group. Results showed that the intervention had a positive effect on various aspects of the nursing students' perspectives on caring for older persons. Work experience was associated with more positive attitudes. The control group was more negative toward geriatrics as a career choice than the intervention group. In conclusion, age suit simulation can be an innovative part of nurse education because it raises awareness and understanding of the health challenges of older persons, which are important in combating ageism among future nurses.

Introduction

The global rising number of older persons in the population is challenging for health and social care authorities, since aging often is associated with multiple long-term health problems and complex health care needs. Thus, rather than focusing on a single disease or comorbidity of older persons at a given point in time, their health must be considered from their own perspective and functions (World Health Organization [WHO], 2015). Registered nurses (RNs) are the largest workforce in the health care system and are central to the provision of health care to older persons (World Health Organization [WHO], 2020). In recent decades, policies on health and social care have been reformed from institutional care to home health care, which implies that persons' homes will be the main workplace of RNs in the future (Spasova et al., 2018). The home has been described as a part of an older person's identity but also a stronghold, a place for recovery and energy as well as for feeling connected to

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memories of loved ones (Gillsjö et al., 2011; Hestevik et al., 2019). It is thus not surprising that RN-led community-based care is also associated with reduced death rates and fewer hospital admissions of older persons with complex health problems (Bradbury & Lifvergren, 2016). To meet the dynamic health care needs of older persons, person-centered care (PCC) is suggested as a crucial component of health care provision, especially in a home and community-based long-term care setting. An important barrier in providing PCC is communication problems, which highlight the need for improving this skill in health care providers (Kogan et al., 2016). For nursing students however, community health care remains an unattractive career choice (Ng et al., 2019). This is a critical issue given the difficulty of recruiting RNs due to the global RN shortage, which is estimated to reach 5.7 million in 2030, to compensate for which the total number of RNs must increase by 8% yearly (WHO, 2020).

Ageism is a global issue that is widespread in society, media, and health and social care systems (World Health Organization [WHO], 2021). It is often reflected in nursing students as negative and unfavorable attitudes toward caring for older persons, which makes it difficult to recruit nurses for geriatric care (Kalogirou et al., 2021; Koskinen et al., 2022). Culture, poor gerontological and geriatric education with an overall lack of knowledge of the aging body (Hanson, 2014) have been identified as reasons for RNs' negative attitudes toward older persons. A systematic review (Venables et al., 2023) revealed that predicting the attitudes of nursing students toward older persons is complex and multifaceted and that increased knowledge about aging is associated with positive attitudes. Nurse education may address ageist attitudes by further developing an education curriculum regarding gerontology and geriatrics. However, research on the attitudes of nurse students in a health care context is needed since most studies only measure their general attitudes toward older persons. Studies have shown that nursing students enrolled in gerontology courses had less ageist attitudes than those who had not received such education and that the combination of theory and experiential learning had positive effects on ageism (Gallo, 2019). In contrast, nursing students reported that geriatric education was often misrepresentative, as older persons were only mentioned in the context of disease and disability and not normal aging. As a result of focusing on pathology and basic skills training, students reported that they were not prepared for the complexity of care associated with older persons, especially when cognitive impairment and communication were involved. Students may respond more positively toward caring for older persons if the education in gerontology and geriatrics is well structured, innovative, stimulating and interesting (Burbank et al., 2006; Garbrah et al., 2020) and if it includes a relevant context, such as a home environment (Salin et al., 2020). Given the declining number of nursing staff and the lack of interest of nursing students in gerontology and geriatrics, this issue is important to address in nurse education. Nursing faculty must confront ageism by engaging students in student-centered activities, such as simulations (Dahlke et al., 2020).

Overall, age suit simulation can be a relevant and useful methodology to increase the empathy and positive attitudes of nurse students toward older persons (Bearman et al., 2015; Sari et al., 2020). However, there are scarce contemporary research data on age suit simulations as study simulations over different cycles in nursing programs as well as over a broader spectrum of competencies (Coelho et al., 2017). Bearman et al. (2019) describe that simulation training in education can not only increase the confidence and specific skills of learners but also be a transformative experience that may have consequences for clinical practice even many years after the simulation experience. Negative emotions such as fear and anxiety during simulation are not uncommon and, importantly, can be a part of the learning process. Kolb (2014) defines experiential learning as the process through which knowledge is created by transforming experience and where learning is viewed as a continuous process. For experiential learning to take place, there has to be an element of confrontation with perceived ideas (Kolb & Kolb, 2018). Bauchat et al. (2016) argue that simulation-based training in a controlled environment in nurse education is key to prepare students for the complexity of care and communications skills required to care for older persons. Relloso et al. (2021) also conclude that a well-equipped clinical training milieu offers a safe place for students to develop clinical skills and build professional confidence. In addition, guidelines following an extensive research project on simulations in nurse education highlight the importance of a realistic and safe simulation environment that promotes active learning (Alexander et al., 2015).

Gerontology and geriatric education in nurse education has the potential to positively affect the attitudes of students toward older persons. A relevant and well-constructed simulation environment is vital. Therefore, the aim of this study was to explore the effects of an age suit simulation education intervention in a home environment on the perspectives of nurse students regarding providing health care to older persons. Furthermore, the aim was to examine whether the effect was similar for men and women, and for students with no or a minimal work experience compared to those with extensive experience of working with older persons.

Ethical considerations

Ethical approval was sought for this study. The Swedish Ethical Review Board (Dnr 2021–04056) reviewed the application and decided that approval according to the ethical legislation was not needed due to the way the intervention study would be conducted with no collection of sensitive data. This study followed national ethical regulations and conforms to the Declaration of Helsinki (World Medical Association, 2013). It complies with the ethical standards for research, which means that the four ethical principles of respect for autonomy, beneficence, non-maleficence, and justice (Beauchamp & Childress, 2013) were considered. The researchers were well aware of the innate risk of a power imbalance between teachers and students. This issue was discussed extensively among the researchers prior to the study. Extensive work was therefore put into creating a structured introduction and information about the study, both written and verbal. The presentation clearly illustrated the teaching aspect of the simulations as separate from the research aspect. Another issue was that participation could not be anonymous as the researchers were active in the simulations, which were a part of the normal nursing program. This issue was also presented to the students, though it was explained that individuals could not be identified in the statistics

Method

Design

To investigate the perspectives of nursing students on providing care to older persons, this study adopted a quasi-experimental pretest – posttest design with a control group. To examine the attitudes of nursing students toward caring for older persons (distinct from their general attitudes toward older persons), the Perspectives on Caring for Older Patients – Short Form (PCOP-SF) scale was used. The validity and reliability of the instrument were investigated using exploratory and confirmatory factor analysis from two independent studies, which resulted in a nine-item scale (Burbank et al., 2018). To date, the PCOP-SF has not yet been used in an education intervention for nurse students in the context of a home environment.

Study intervention

The intervention, age simulation using an age suit to explore nursing students' perspectives on and attitudes toward older persons, was designed by the research team. The age suit used was the GERonTologic simulator (GERT) suit (Figure 1), which simulates normal aging and age-related health problems by restricting and impairing psychical and cognitive functions. It has various parts that can be assembled and combined to simulate specific consequences of aging and common health problems (www.age-simulation-suit.com).

Figure 1. The GERonTologic simulator (GERT): A Description.

Persona used in the intervention

Before the simulations, each student in the intervention group was assigned a 'persona' that detailed specific health problems the student would experience while wearing the age suit. Each persona was unique and represented different health problems, such as problems with vision and hearing, musculoskeletal dysfunctions, neurological disorders, pain and chronic obstructive lung disease. The teachers assisted the students in wearing the suit when necessary.

Scenarios

Most of the scenarios were conducted in a highly accessible apartment. Each student performed five scenarios for approximately 50 min. The scenarios involved performing everyday chores – setting the dinner table, brushing the teeth, resting in bed, sit down and raise from an armchair, dusting the top of a bookshelf, writing down answers to some general and simple questions on a piece of paper, and using and interacting with various health- and welfare technologies and aids.

A pilot study to test the GERT suit and the scenarios was conducted in the fall of 2019 with 76 students, during which non-demographic data were collected, but all other aspects of the pilot study were the same as those of the simulations, so the pilot study was included in this study. Figure 2 shows the flow chart of the intervention.

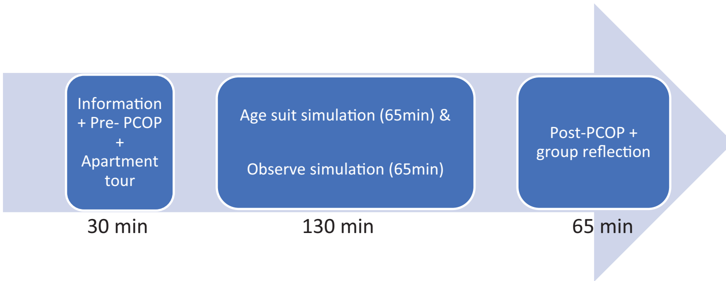

Figure 2. Flow chart of the education intervention.

Setting and participants

The simulations were performed in 2019–2022 at Skaraborg Health Technology Center (SHC), a health technology Center in a university in the western region of Sweden. SHC is a collaboration arena, knowledge center and testbed that focuses on innovation, research and education among actors in the public sector, business, academia, organizations, innovation actors and society at large. The simulations took place in SHC's highly accessible apartment, which is also equipped with health and welfare technology and other aids.

The participants in this study were 471 nursing students at a university in the western region of Sweden where 60–85 students were registered each semester. To become an RN in Sweden, completion of a three-year university-level program is required. Only nursing students who attended the fourth semester of the program were eligible for the study.

Intervention group

In the fourth semester of the university's three-year nursing program, the students take part in age simulations with the GERT suit at SHC as part of their mandatory education. The simulations are held in the fourth semester based on the progression of the content in gerontology and geriatrics education in the nursing program. In the second year of the program, there is a stronger emphasis on complex health problems and geriatrics than in the first year, which offers only an orientation on health and gerontology.

Control group

The control group also consisted of nursing students registered in the fourth semester in the academic year two. However, due to the coronavirus disease 2019 (COVID-19) pandemic, simulations with large groups of students were not permitted during that period. Thus, instead of taking part in simulations with the GERT age suit, the students in this group were asked to read and reflect on an article (Lee & Teh, 2020) about age suit simulation.

Data collection

Data were collected by asking all the participants to answer the PCOP-SF questionnaire both at the pre- and post-interventions, after they were informed about the study and after they gave their written informed consent to participate in it. All the students in the control group ($n = 72$) were digitally sent the same PCOP-SF that was sent to the intervention group, and 24 of them answered the questionnaire. The response rate in the intervention group was 471 pre and 464 post the simulation

PCOP-SF consists of nine questions on different aspects of caring for older persons. The answers are ranked on a five-point Likert-type scale, from 0 = *Strongly Disagree* to 4 = *Strongly Agree*. A high score indicates more positive attitudes. Negatively phrased questions are reversed in the analysis when comparing scores (Burbank et al., 2018). After the students answered the questionnaire in the pre-simulation, they were given a tour of the apartment. Following the tour, students were randomly divided into two equal groups. One group was instructed to change into the age suit, and the other group was asked to go to the innovation room at SHC to observe the simulation on a whiteboard in real time. This was possible since the apartment is equipped with cameras in each room. Then, the two groups were directed to switch roles. When both groups had completed the simulation and observation, they were asked to answer the PCOP-SF again.

Data analysis

The data were collected from 471 participants pre-intervention and 464 post-intervention. As the data were not normally distributed, non-parametric testing was conducted using Mann-Whitney U analysis to compare differences in the students' attitudes to caring for older patients. The control group's mean score was compared to that of the entire sample, which included the intervention group post-intervention and the pilot study group post-intervention. Sub-analyses that compared differences based on gender and work experience were also conducted. In the comparison of the differences between genders, the male students were coded as (1), and the female students, (2). Work experience was dichotomized as (1) no work experience or less than two years' work experience, and (2) two or more years' work experience. The significance level was set at 0.05. The internal consistency reliability of the PCOP-SF ($N = 471$) using Cronbach's alpha was satisfactory at 0.79 (Brace et al., 2018). The statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25.

Results

Pre-intervention

Intervention group

The intervention group pre-intervention consisted of male students ($n = 49$, 12.5%) and female students ($n = 343$, 87.5%). The students from the pilot study ($n = 78$) were included in the results of the PCOP-SF item scores but added no data to the gender differences and work experience differences, as demographic data were not collected in the pilot study. With regard to the work experience, 193 students (49.1%) had no or less than 2 years' experience, and 200 students (50.1%) had two or more years' experience (Table 1).

Control group

The control group consisted of 24 students—3 male (13%), 20 females (83%), and 1 undisclosed (4%). With regard to previous work experience, 12 participants (50%) had no or less than 2 years' work experience, and 12 (50%) had 2 or more years' work experience.

Comparison There was no significant difference between the intervention group and the control group at the baseline (as to age, gender, work experience and PCOP-SF score; Table 1)

The results for the intervention group versus the control group showed statistically significant differences in Items 2 and 9. The intervention group agreed to a higher extent than did the control group that it was frustrating to care for older patients. The control group ranked the item *Caring for older patients as an undesirable career choice* significantly lower than the intervention group. The mean total score showed no significant difference between the intervention group and the control group (Table 2).

Table 1. Participants baseline characteristics and pre-intervention PCOP-SF.

	$N = 495$	Intervention+Pilot ($n = 471$)	Control ($n = 24$)
Age, mean (sd)[a]	29.34 (7.37)	29.10 (7.28)	33.13 (7.92)
Sex[b]			
Male n (%)	52 (12.5)	49 (12.5)	3 (13.0)
Female n (%)	363 (87.5)	343 (87.5)	20 (87.0)
No or less than two years work experience (%)	197 (49.7)	193 (49.1)	12 (50.0)
Two or more years of work experience (%)	199 (50.3)	200 (50.9)	12 (50.0)
Working experience[c], mean (sd), (range 1–2)	1.51 (0.50)	1.51 (0.50)	1.50 (0.51)
PCOP-SF[d]			
(1) Caring for older patients is usually challenging and rewarding (sd)	2.89 (0.83)	2.88 (0.83)	2.96 (0.91)
(2) It´s frustrating caring for older patients (sd)	1.27 (1.01)	1.29 (1.00)	0.96 (1.04)
(3) Caring for older patients is often unpleasant work (sd)	0.88 (0.99)	0.86 (0.98)	1.17 (1.20)
(4) Caring for older patients is intellectually stimulating (sd)	2.45 (0.94)	2.44 (0.94)	2.79 (0.88)
(5) I would not choose to attend continuing education in nursing care of older patients (sd)	1.76 (1.30)	1.75 (1.30)	1.86 (1.42)
(6) Older patients are interesting to care for (sd)	2.76 (0.93)	2.76 (0.93)	2.83 (0.87)
(7) Caring for older patients is less rewarding than caring for younger patients (sd)	1.15 (1.07)	1.17 (1.08)	0.88 (0.85)
(8) Although caring for older patients is labor intensive it is worth the investment of time and energy (sd)	3.10 (0.85)	3.09 (0.85)	3.33 (0.82)
(9) Caring for older patients is an undesirable career choice (sd)	1.38 (1.16)	1.36 (1.15)	1.88 (1.26)

[a,b,c]Sex, age & working experience was not included in the pilot study.
[d]Scores are not reversed for PCOP-SF scale items, (range 0–4).

Table 2. Differences in post PCOP-SF score between the intervention and control group.

Question items, (range 0–4)	Intervention	Control	p*
(1) Caring for older patients is usually challenging and rewarding	3.07 (0.82)	2.96 (0.91)	.587
(2) It´s frustrating caring for older patientsa[a]	2.51 (1.07)	3.04 (1.04)	.012*
(3) Caring for older patients is often unpleasant work[a]	3.10 (0.98)	2.83 (1.20)	.337
(4) Caring for older patients is intellectually stimulating	2.54 (0.95)	2.79 (0.88)	.261
(5) I would not choose to attend continuing education in nursing care of older patients[a]	2.31 (1.30)	2.13 (1.42)	.616
(6) Older patients are interesting to care for	2.84 (0.92)	2.83 (0.87)	.726
(7) Caring for older patients is less rewarding than caring for younger patients[a]	2.89 (1.09)	3.13 (0.85)	.422
(8) Although caring for older patients is labor intensive it is worth the investment of time and energy	3.19 (0.89)	3.33 (0.82)	.471
(9) Caring for older patients is an undesirable career choice[a]	2.63 (1.16)	2.13 (1.26)	.049*
Total	2.78 (0.65)[c]	2.80 (0.57)	.891

[a]Scores are reversed for items 2,3,5,7 & 9.
[b]p value < .05.
[c]p value is based on Mann Whitney U test.

Post-intervention and comparison with the pre-intervention

The results for the pre- and post-intervention groups showed statistically significant differences in Items 1, 2 and 8. There was increased agreement post-simulation to *Caring for older patients is usually challenging and rewarding* and to *Although caring for older patients is labor-intensive, it is worth the investment of time and energy*. The intervention group also scored significantly higher post-intervention for the item that described caring for older persons as frustrating. The mean total score pre- and post-intervention increased, but the difference was not statistically significant (Table 3).

No statistically significant difference was observed between the female and male students (Table 4). However, the sub-analysis revealed that among the female students, there was a significant positive increase in the item *Caring for older persons is challenging and rewarding* post-intervention. They also scored significantly more negatively for the item *It's frustrating to care for older patients*. In addition, more of them agreed to the items *Caring for older patients is intellectually stimulating* ($p = .055$) and

Table 3. Differences in pre and post PCOP-SF score in the intervention group.

Question, (range 0–4)	Pre, mean ($n = 471$)	Post, mean ($n = 464$)	p
(1) Caring for older patients is usually challenging and rewarding (sd)	2.88 (0.83)	3.07 (0.82)	.000**
(2) It´s frustrating caring for older patients[a] (sd)	2.71 (1.00)	2.52 (1.07)	.006*
(3) Caring for older patients is often unpleasant work[a] (sd)	3.14 (0.98)	3.10 (0.98)	.499
(4) Caring for older patients is intellectually stimulating (sd)	2.44 (0.94)	2.54 (0.95)	.056
(5) I would not choose to attend continuing education in nursing care of older patients[a] (sd)	2.25 (1.30)	2.31 (1.30)	.441
(6) Older patients are interesting to care for (sd)	2.76 (0.93)	2.84 (0.92)	.183
(7) Caring for older patients is less rewarding than caring for younger patients[a] (sd)	2.83 (1.08)	2.89 (1.09)	.310
(8) Although caring for older patients is labor intensive it is worth the investment of time and energy (sd)	3.09 (0.85)	3.19 (0.89)	.014*
(9) Caring for older patients is an undesirable career choice[a] (sd)	2.64 (1.15)	2.63 (1.16)	.982
Total	2.74 (0.62)	2.78 (0.65)	.263

[a]Scores are reversed for items 2,3,5,7 & 9.
*$p < .05$.
**$p < .001$.
p value is based on Mann Whitney U test.

Table 4. Differences in PCOP-SF pre and post score between men and women in the intervention group.

Question, (range 0–4)	Men pre ($n = 49$)	Women Pre ($n = 343$)	p	Men post ($n = 48$)	Women post ($n = 335$)	p	Men pre/post p	Women pre/post p
(1) Caring for older patients is usually challenging and rewarding (sd)	2.86 (0.84)	2.91 (0.84)	.688	3.15 (0.74)	3.06 (0.87)	.624	.062	.010*
(2) It´s frustrating caring for older patients[a] (sd)	2.76 (1.01)	2.74 (1.03)	.899	2.60 (1.05)	2.56 (1.08)	.761	.464	.031*
(3) Caring for older patients is often unpleasant work[a] (sd)	3.29 (0.82)	3.16 (1.00)	.665	2.98 (0.91)	3.17 (0.98)	.075	.057	.856
(4) Caring for older patients is intellectually stimulating (sd)	2.35 (1.15)	2.44 (0.95)	.676	2.52 (1.07)	2.56 (0.95)	.837	.481	.055
(5) I would not choose to attend continuing education in nursing care of older patients[a] (sd)	2.14 (1.44)	2.33 (1.25)	.428	2.41 (1.20)	2.37 (1.26)	.861	.404	.665
(6) Older patients are interesting to care for (sd)	2.78 (0.77)	2.76 (0.96)	.907	2.79 (0.99)	2.90 (0.89)	.582	.666	.054
(7) Caring for older patients is less rewarding than caring for younger patients[a] (sd)	2.69 (0.94)	2.92 (1.08)	.088	2.75 (1.08)	2.96 (1.08)	.141	.565	.612
(8) Although caring for older patients is labor intensive it is worth the investment of time and energy (sd)	3.16 (0.75)	3.15 (0.85)	.914	3.27 (0.87)	3.23 (0.90)	.835	.293	.071
(9) Caring for older patients is an undesirable career choice[a] (sd)	2.67 (1.05)	2.69 (1.15)	.861	2.55 (1.16)	2.68 (1.13)	.537	.650	.867
Total	2.74 (0.56)	2.78 (0.64)	.804	2.74 (0.68)	2.83 (0.64)	.550	.976	.312

[a]Scores are reversed for items 2,3,5,7 & 9.
*p value < .05.
p value is based on Mann Whitney U test.

Older patients are interesting to care for ($p = .054$). The sub-analysis of the responses of the male students did not unveil any significant result, but there was less agreement to the item *Caring for older patients is often unpleasant work* ($p = .057$) post-intervention. The additional sub-analysis of the mean scores revealed no significant difference, but the mean score of the male students did not increase post-intervention (2.74 pre-, 2.74 post-), whereas the mean score of the female students increased (2.78 pre-, 2.83 post-). Statistically significant differences were also seen based on the students' work experience (Table 5). The pre-intervention group with less work experience reported more statistically significant negative scores for the items *Caring for older patients is often unpleasant work* and *I would not choose to attend continuing education in nursing care of older patients*. The group with more experience

Table 5. Differences in PCOP-SF pre and post between no or <2 years of work experience and 2 or > years of work experience in the intervention group.

Question, (range 0–4)	Non + < 2 years pre (*n* = 193)	≥2 years pre (*n* = 200)	*p*	Non + < 2 years post (*n* = 185)	>2 years post (*n* = 187)	*p*	Non + < 2 years Pre/ post *p*	≥2 years Pre/ post *p*
(1) Caring for older patients is usually challenging and rewarding (sd)	2.95 (0.77)	2.86 (0.90)	.531	3.12 (0.78)	3.01 (0.90)	.298	.015*	.077
(2) It´s frustrating caring for older patients[a] (sd)	2.72 (0.98)	2.76 (1.07)	.539	2.48 (1.02)	2.65 (1.10)	.111	.022*	.330
(3) Caring for older patients is often unpleasant work[a] (sd)	3.09 (0.92)	3.25 (1.03)	.008*	3.06 (0.96)	3.23 (0.96)	.049*	.861	.581
(4) Caring for older patients is intellectually stimulating (sd)	2.42 (0.92)	2.44 (1.02)	.757	2.54 (0.91)	2.56 (1.02)	.643	.185	.187
(5) I would not choose to attend continuing education in nursing care of older patients[a] (sd)	2.09 (1.31)	2.51 (1.23)	.001*	2.15 (1.27)	2.58 (1.21)	.001*	.669	.571
(6) Older patients are interesting to care for (sd)	2.68 (0.92)	2.83 (0.95)	.095	2.84 (0.90)	2.01 (0.88)	.511	.068	.476
(7) Caring for older patients is less rewarding than caring for younger patients[a] (sd)	2.84 (1.09)	2.95 (1.04)	.327	2.96 (1.09)	2.93 (1.06)	.637	.210	.863
(8) Although caring for older patients is labor intensive it is worth the investment of time and energy (sd)	3.09 (0.85)	3.20 (0.81)	.206	3.25 (0.92)	3.22 (0.84)	.483	.018*	.684
(9) Caring for older patients is an undesirable career choice[a] (sd)	2.56 (1.16)	2.79 (1.11)	.067	2.58 (1.16)	2.78 (1.08)	.123	.914	.862
Total	2.71 (0.59)	2.84 (0.66)	.029*	2.78 (0.64)	2.86 (0.61)	.353	.198	.946

[a]Scores are reversed for items 2,3,5,7& 9.
*$p < .05$.
p value is based on Mann Whitney U test.

had a significantly higher mean score, which indicated more positive attitudes overall at the pre-intervention. The sub-analysis of the work experience groups revealed that the group with less experience had a significantly positive increase for the items *Caring for older patients is usually challenging and rewarding* and *Although caring for older patients is labor-intensive, it is worth the investment of time and energy*. The less experienced group also reported statistically more negative scores for the item *It's frustrating to care for older patients*, post-intervention. The group with more experience showed no statistically significant difference for any item pre- and post-intervention. The additional comparative sub-analyses of the mean scores pre- and post-intervention of the group with less experience and the group with more experience did not show a statistically significant difference. The mean scores of both groups increased, but the group with less experience had a higher increase (2.71 pre-, 2.78 post-) than the group with more experience (2.84 pre-, 2.86 post-).

Discussion

In another intervention study that also used an age suit, no difference was found between wearing a placebo clothing and wearing an age suit that simulated actual health problems (Cheng et al., 2020). Those results are in line with the conclusions in a recent review on age suit simulation (Gerhardy et al., 2022) that there is still a lack of controlled studies on the topic and that the results of the few studies conducted are inconclusive. The results of the current intervention study provided several insights into the effects of the use of an age simulation suit in SHC on nursing students' perspectives on providing care to older persons.

Interestingly, the intervention group found caring for older persons more frustrating than the control group after the intervention This finding can be viewed as a novel contribution to research in regard to the perspective of nursing students. Karvelytė et al. (2021) and Bearman et al. (2019) found that negative feelings, such as frustration, are common in simulation training from a patient perspective. It would therefore be compelling to investigate if simulations from the patient perspective also affect perspectives on providing health care.

In this study the students in the control group were less motivated to continue their education on nursing care of older persons than those in the intervention group. Moreover, motivation to continue education in nursing of older persons was associated with more years in the work force. The association of work experience with positive attitudes toward older persons is also supported by the findings of Koskinen et al. (2022). Notably, however, this study also revealed that students with little or no work experience improved their scores significantly more than did the more experienced students. This indicate that the intervention had a stronger effect on the students with less experience. Kogan et al. (2016) describe that PCC offers a holistic perspective where a deep understanding of patient needs, which requires good communication skills, is crucial. Therefore, the concept of perspective taking is relevant in understanding the needs of older persons in health care provision. It would thus be interesting to further investigate age simulation and the influence of work experience in relation to perspectives on PCC and communication skills. Simulation as a teaching methodology can be important in preparing students for the complexity of caring for older persons (Bauchat et al., 2016). This preparation may not only be relevant for the students' clinical practice as graduated nurses but may also be valuable in their encounters with older persons during their education.

With regard to gender, there was no statistically significant difference between the male and female students in this study. However, the sub-analysis revealed that the female students increased their scores for *Caring for older persons is challenging and rewarding* even though they simultaneously scored high in the item where the job was described as frustrating. There were strong positive tendencies among the female students in the items that describing caring for older persons as intellectually stimulating and interesting. Previous studies indicated that gender differences in attitudes toward older persons seemed to vary. In one study, men were slightly more positive toward caring for older persons than were women (Dai et al., 2021), but another study showed that gender as well as age had no impact on willingness to work with older persons (Carlson & Idevall, 2015).

A number of reviews on age simulations (Coelho et al., 2017; Eost-Telling et al., 2021; Gerhardy et al., 2022; Karvelytė et al., 2021) showed several methodological differences among age suit simulation studies and that most of those studies measured empathy or attitudes. However, the specific context of the simulation was hardly considered and discussed or not at all. Yet, due to the mentioned transformation in health care, older persons will remain at home to a larger extent and will receive health care there – a setting in which the nurse is a key health professional. Context is important, as the home is not just a roof over the head but signifies comfort, security, recovery, freedom and peace (Gillsjö et al., 2011). As this study was conducted in a home environment in SHC, it added knowledge on the relevance of this scarcely evaluated environment.

This specific context in which SHC provides experience of common health problems associated with aging through the use of age suit simulations adds to the body of evidence that age suit simulation is a vital part of nurse education because it gives nursing students first-hand experience of aging and living with health problems, as demonstrated in a relevant context of health care: the home. From a pedagogical perspective, the simulations in SHC can be referred to as *experiential learning situations* or events outside everyday experience (Kolb & Kolb, 2018). Age suit simulation in SHC can be regarded as an innovative teaching model on gerontology and geriatric in undergraduate nurse education. The results of this study can be of interest not only from an educational perspective but also in the wider context of future nurses' provision of home healthcare and of other staff groups' conduct of health and social care, as well as for older persons receiving care and their next of kin. From a qualitative perspective, however, it would also be interesting to explore in depth, in future studies, nursing students' reflections on participating in age suit simulations. Moreover, as the context of the home was not the focus of this study, the relevance of a home environment would be interesting to follow up in future studies.

Strengths and limitations

Simulating health problems in young persons is a challenge. Thus, the choice of an appropriate age suit is important. Studies (Lauenroth et al., 2017; Vieweg & Schaefer, 2020) have shown that the GERT suit is a reasonable choice for simulating age-related health problems in young people in intervention studies. However, the possibility was recognized that the participants in this study wanted to present favorable answers, given the power imbalance in the teacher – student relationship.

All the students who were asked to participate in this study did so and provided almost all the requested data. However, individual-level data were not collected, and the demographic data of the participants in the pilot group were insufficient. It should also be noted that the inclusion of a control group was due to the COVID-19 restriction on-campus, as withdrawing students from parts of the normal program would have been unethical. Nevertheless, the addition of a control group further established the statistical significance of the effect of the intervention.

While the questionnaire had items in their original form and items that were translations, which could have affected their understandability, Swedish students are well educated in the English language, and the researchers were always present to clarify the questions. The internal consistency indicated by Cronbach's alpha in the present study was satisfactory (0.79). This value is lower than the original value of 0.85 (Burbank et al., 2018), but a recent validation of the PCOP-SF in the Chinese language had a lower Cronbach's alpha of 0.74 (Cheng et al., 2020). The item *Caring for older patients is usually challenging and rewarding* can be seen as a double-barreled item and could therefore be interpreted as both positive and negative. Despite this issue, the scale is validated (Burbank et al., 2018) and used in other studies and thus considered appropriate to use in the current study. Students were also given the opportunity to have the question items clarified by the researchers during the data collection. In addition, the author (BBS) ran a factor analysis which showed that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.85. Interestingly, frustration increased after the simulations. Unfortunately, this study cannot provide a reason for this outcome.

The PCOP-SF focuses on perspectives on caring for older persons, but it would have been interesting to explore how an additional scale, such as on the students' knowledge about older persons, could have complemented the results. For example, in a recent quantitative study, several questionnaires were used that elucidated that nursing students generally had moderately positive attitudes toward older persons but simultaneously expressed their low interest and motivation to work with such older persons. Social factors, such as previous experience with older persons and general attitudes toward older persons within a family, were highly associated with a more positive attitude (Guo et al., 2021). The decision to set the cutoff to two years for work experience for the lower end could have impacted the results, as it was not possible to compare those who had non-existent work experience to those with some or more extensive experience. The decision, however, was based on the assumption that most students would consider themselves to have at least some level of experience from their clinical training or part-time employments. For future studies, other control groups – for example, students from other universities and professions or single case studies could be considered.

Conclusion

The results of this study indicate that the intervention had a positive effect on the nursing students' attitudes to working with older persons. The total mean score of participants increased after the intervention but not significantly. However, statistically significant differences were noted in specific items, though the explanation for this was not within the scope of the study. The intervention group responded more positively to caring for older persons as a career choice than the control group. The scores for the items that described frustration with caring for older persons were higher in the intervention group post-intervention and when compared to the control group. There was no statistically significant difference between the male and female students, although the female students responded significantly more negatively to some of the PCOP-SF items than did the male students. More years in the work force was associated with more positive attitudes to caring for older persons, but the students with less experience were more positively influenced by the intervention.

Implications

This study added to the empirical evidence that age suit simulation can be an effective tool for nurse education. The evidence presented herein pertains to the use of an age suit in the specific context of the home, which is an important milieu for future RNs' provision of health care to older persons. Age suit simulation was shown to be a unique way of creating an embodied learning experience by enabling nursing students to experience the same common health problems of older people as future care receivers would. Thus, age suit simulation has the potential to enable nursing students to understand better the aging body and living with common health problems, and to make them aware of their preconceived ideas about caring for older persons. Addressing nursing students' perspectives of, and attitudes to, caring for older persons is highly relevant during their education to improve their care of older persons in their clinical training and to prepare them for their future profession as an RN. Thus, age suit simulation can be seen as a supplement to theory that can help future RNs to better integrate a person-centered care approach into their professional skills.

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”It´s like walking in a bubble”, nursing students´ perspectives on age suit simulation in a home environment – group interviews from reflection seminars

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Abstract

Background Older persons with age-related and complex health problems will increasingly depend on care provision from nurses in their own homes. However, a barrier to quality care is ageism and nursing students´ disinterest in geriatrics. In addition, nurse education often falls short in preparing students for the complexity of geriatric care. Welfare technology (WT) is progressively implemented in home care to help older persons live at home despite their health problems. However, this process is intricate and requires acceptance and digital literacy among caregivers and older persons. Despite these challenges, nurse education can address and change negative attitudes through innovative teaching methods such as age suit simulation. Therefore, the study aims to describe nursing students´ experiences of age suit simulation in a home-like environment with WT and technical aids, and will reveal their perspective on ageing and providing care to older adults.

Methods A qualitative explorative design using semi-structured group interviews (n=39) among nursing students. Data was analysed through reflexive thematic analysis.

Results The analysis generated three main themes; "It's like walking in a bubble", "An eye opener" and "Concerns about ageing and the current structure of geriatric care". The main themes included eight subthemes. Adapting to the sensory and physical limitations of the age suit was an immersive experience and caused feelings of frustration, loneliness and disconnection. A prominent result was a raised awareness of cognitive loss, especially impaired vision, and students felt the simulations had made them aware of the everyday challenges older persons faced. Students highlighted the importance of patience and giving enough time in care situations by being present and having a critical perspective of WT. The students were mostly negative towards their own ageing and could better relate to older persons´ vulnerability.

Conclusions Age suit simulation was described as an embodied and eye-opening experience, raising nursing students´ awareness of older persons´ functional limitations and the consequences for dignity and independence. Coping with cognitive loss was especially difficult. Students were motivated to apply their new knowledge to clinical practice. Age suit simulation can complement geriatric education, preparing students for the complex care needs of older persons.

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Keywords Age suit simulation, Education, Nursing students, Ageism, Older persons, Welfare technology, Experiential learning theory

Background

The World Health Organization (WHO) acknowledges that the ageing global population presents challenges for future health care provision, where nurses are often the primary health care provider. Ageing is highly individualised but is primarily associated with various health problems, leading to difficulties in daily life and a need for health care interventions. Older persons today are generally healthier than their previous generations and wish to remain active members of society. However, ageist attitudes in society and the health care system negatively impact the quality of care older persons receive [1]. Ageism is a global issue and has consequences on both a structural and individual level, including denied access to health care services, exclusion from research, shorter life expectancy, less likelihood of recovering from injury, mental illness and declining social life and relationships [2].

Since the early 2000s, there has been a shift from residential care for older persons in favour of home care, signalling that older persons should receive care in their own homes [3]. This trend, coupled with the use of digital solutions, necessitates innovations in home care provision [4, 5] and the need for nurses to be comfortable with any technology associated with patient care [6]. Welfare technology (WT) is often implemented with the intention of helping older persons to live at home despite complex health care problems. There is no universal definition of WT, but it generally refers to digital technology used in health and social care with the aim of preserving and increasing safety, activity, participation or independence for persons with function disabilities [7]. Implementing WT is intricate and requires acceptance and digital literacy among caregivers and older persons [8]. Despite the widespread use of WT in healthcare, nursing students express the need for increased understanding of this technology through practical training and interaction during their education [9]. Nurse educators should therefore incorporate content in the curriculum to enhance students´ digital literacy [10].

In geriatric care, nurses must understand the older persons' perspective and, at times, advocate for their patients. Crucial skills in this context include effective communication, thoughtful care planning, and a solid knowledge base in gerontology and geriatrics, enabling nurses to monitor and assess a patient's health and cognitive status [11]. But a challenge to the health care needs of an ageing population is a global nurse shortage, where it is estimated that the number of nurse graduates must increase by 8% in order to meet global health care demands by 2030 [12].

In addition, geriatrics is often rated unfavourably as a career choice among nursing students. Reasons for this perception include the complexity of care and the belief that the work can be slow-paced and depressing [13]. Nursing students with low interest in geriatric care tend to have less favourable attitudes towards older persons [14] and these attitudes can be part of a distancing culture, where young persons avoid thoughts of ageing and perceive little meaning in growing old [15]. Fear of ageing and death are also related to reduced optimism among young persons [16]. Therefore, nursing students need motivation and guidance to see that caring for older persons is complex, stimulating, and skill-intensive [17]. Challenging experiences can help students develop ethical awareness and identify ethical issues in practice [18]. However, students are often ill-prepared for geriatric care as courses often focus on skills rather than the complexity of care and healthy ageing, especially when it comes to caring for persons with cognitive impairments [19].

Despite these challenges, nursing education can change students´ attitudes. Simulations involving experiential learning are particularly effective in empathy training [20]. The use of age suit simulations where students experience the perspective of an older person dealing with health issues is one such intervention that has proven to be effective in increasing nursing students´ empathy [21] and positive attitudes towards older persons [22]. An age suit is composed of components that simulate age-related impairments and health problems that affect older persons, for example reduced mobility, muscle mass and grip strength, arthritis, chronic obstructive pulmonary disease, hearing loss and impaired vision. Younger persons who wear the age suit can therefore experience the age-related impairments and health problems of older persons [23]. To our best knowledge no study has investigated age suit simulation in the context of home like environment where students also interact with WT. The context of home and WT in combination with age suit simulation is highly relevant in nurse education, especially in light of the ongoing change internationally [24] and nationally [25] with the transfer of provision of care from institution to home. This ongoing transition will change the working environment for future nurses. Therefore, this study aims to describe nursing students´ experiences of age suit simulation in a home-like environment with WT and to reveal their perspective on ageing and providing care to older adults.

Method

Research design

A qualitative explorative design was chosen using semi-structured group interviews among nursing students. According to Polit and Beck [26] semi-structured group interviews are useful when the researcher wants to generate a comprehensive dialogue about specific topics. The interview guide that was developed for this study is provided as a supplementary file (Appendix 1).

Sampling and recruitment

The recruitment of participants began during the period 2019–2022 when nursing students during their second academic year at a university in the western region of Sweden participated in an age suit simulation at Skaraborg Health Technology Center (SHC). The participants were recruited by convenience sampling. The inclusion criteria for participation were: to be nursing students, enrolled in the nursing program, during their second academic year. Fourteen to 16 students, divided into two groups, participated in four-hour sessions, either in the morning or afternoon, involving age suit simulation followed by group interviews. The group interviews were conducted in both the morning and afternoon sessions.

Simulating in the age suit at SHC

The GERonTologic age suit (GERT) [23] was used by the nursing students to simulate ageing and age-related health problems. The GERT suit comprises different accessories such as straps, weights, eyeglasses, gloves and headphones that simulate age-related and specific health problems, for example hemiparesis, impaired vision and eye diseases, tremor, tinnitus and overall restricted movements and unstable gait. In the present study, the students were assigned one out of eight *personas* (a character with specific health problems created from the age suit). During the simulations at SHC the students were instructed to perform ordinary tasks in an apartment at SHC, such as getting into and out of bed, brushing their teeth and combing their hair, writing a simple message, cleaning and setting the table. During the task, the students interacted with the apartment's WT and aids. The simulations lasted for approximately 50 minutes.

Data collection

Data collection through group interviews was a collaborative effort carried out by B.B.S., C.G. and J.H. In total, 59 group interviews were conducted and recorded during the period 2019 to 2022, of which 39 interviews were selected for inclusion in this study. The selection process involved systematically choosing one interview from the morning class and one interview from the evening class from each scheduled simulation. To ensure a rich and representative dataset, the selected group interviews cover a timeframe that spans before, during, and after the COVID-19 pandemic. All interviewers had prior to the study worked as clinical nurses with an advanced degree. They had also previous experience of collecting data through interviews. All the interviewers worked as teachers in the nursing program at the time of the data collection. The interview questions were semi-structured and focused on nursing students´ experiences with age suit simulations, their thoughts regarding ageing and older persons, caring for older persons, related core values, central concepts, and their interactions within the simulation environment. This environment included a highly accessible apartment equipped with WT and other aids. The duration of the group interviews varied, and ranged from 30 to 60 minutes. The group interviews were audio-recorded and transcribed verbatim. In the opening question, the students were asked to describe their experience of simulating in SHC from the viewpoint of their individual persona.

Analysis

The analysis involved 39 group interviews, amounting to a total of 564 pages. Reflexive thematic analysis (TA) [27, 28] was employed, which is a flexible approach for analysing qualitative data, such as group interviews, to uncover meaningful patterns. The results of this study are described in the form of themes which reveal important aspects of the research topic. Reflexive (TA) aims to go beyond surface description and topic summaries, delving into rich and in-depth storytelling. It encompasses six phases of the analysis, engaging the researcher in an iterative process that involves constant interaction between the data and its interpretation. The analytic table (Table 1) should therefore not be confused with a straightforward approach to the analysis, rather it represents a constant back and forth process. The analysis is described in depth below.

Results

The data analysis of the students´ experiences of partaking in age suit simulation generated three themes and eight subthemes (Fig. 1), which are described in detail below. Representative quotes from the students have been included in the description of each theme and subtheme.

Table 1 Table with an overview of the analysis process [27–29]

Phase one - familiarisation	Provided the entry point for analysis and familiarisation with the dataset in an immersive process. It started with data collection and transcribing, reading and listening to the interviews. In addition, rough notes and initial ideas were written down on a separate Word document that served as a reflective journal.
Phase two - coding	Extracts, with both semantic and latent content, relevant to the aim of the study were drawn and labelled with a code. The codes were the building blocks of analysis. The codes were revisited and refined after discussing and reflecting on them with the co-authors.
Phase three - generating initial themes	Through reflective engagement with the data, the codes with shared meaning generated three candidate themes and eight subthemes.
Phase four - review and develop themes	The data extracts and codes in relation to the initial themes were reviewed and the main and subthemes were further developed through a subjective and increasingly interpretative analysis of the data.
Phase five - refining, defining and naming themes	Final phase of naming themes to capture and tell the story, which required an immersive process of refining and defining through back and forth discussions among the authors. A few themes were given new names that more accurately captured the meaning of what was written in the transcripts.
Phase six writing the report	The report was written and finalised.

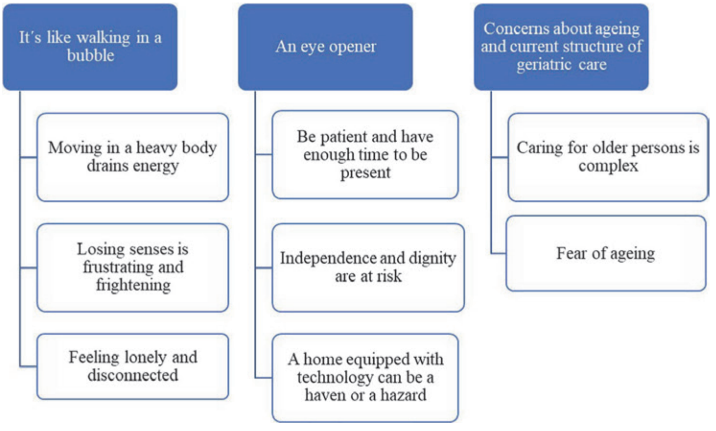

Fig. 1 Overview of themes and subthemes

It´s like walking in a bubble

The theme "It's like walking in a bubble" includes three subthemes; "Moving in a heavy body drains energy", "Losing senses is frustrating and frightening", and "Feeling lonely and disconnected". This main theme encapsulates various aspects of the simulation related to the students´ experiences of sensory and physical limitations. Adapting to these changes caused feelings of frustration, loneliness and disconnection from others, as said by one student: "*I saw people talking, and I could make out a few words. It was like you were in your own bubble, it was really like you were shut away somewhere*". The students described a sense of being confined in an unfamiliar body and the challenge of adapting to movements that were painful, slow, sluggish and restrained. Additionally, the loss of sight and hearing intensified the need to concentrate on themselves, limiting their social interaction and engagement. The age suit simulation affected students in ways beyond just wearing a physical suit; it provided an immersive experience, allowing them to identify with older persons´ vulnerability when living with health problems and pain.

Moving in a heavy body drains energy

Carrying out ordinary tasks in age suit was experienced as time-consuming and required increased focus and energy, which was in strong contrast to how the students normally felt Finding a comfortable resting position was experienced as difficult, especially for those with knee and back pain. One student expressed "*I just wanted to sit down and rest as often I could; it was pretty heavy and exhausting, it really was. You felt like you were lagging behind because you were so slow and had no energy, just raising an arm was strenuous, it was really tough*". The struggle to adapt to their disabilities prompted a raised awareness of how ordinary things like picking something up from the floor or using fine motor skills became a real challenge. The students described how they tried and were motivated to find alternative ways to complete the tasks in the home environment while coping with age related impairments and health problems such as stiff joints, heavy legs, insecure gait and pain. Experiencing these energy draining physical limitations affected the students´ mood and they expressed feelings of being vulnerable and exposed: *"Everything goes more slowly, it´s demanding and heavy so obviously you become more vulnerable in a whole other way"*.

An issue often related to feelings of vulnerability and frustration was the realisation that everyday tasks became more difficult or even impossible and took significantly more time than they were used to.

Losing senses is frustrating and frightening

Having impaired vision and hearing was described as an emotional experience by the students. Adjusting to impaired vision and hearing loss was described to be frustrating and frightening since it was challenging and accompanied by many trial and error situations. Not being able to see or hear also made students feel vulnerable and dependent, especially since being able to see or hear was something they often took for granted in their own life. The loss of these functions was something they had therefore not reflected on, as expressed by this student: "*I still think this thing with your eyesight feels like the worst impairment you could have. You use your eyes way more than you think*". Even when compared to pain problems like arthritis or decreased mobility, impaired vision was described as an even stronger limitation in everyday life, causing stress, frustration and exhaustion. The exhaustion was in part associated with a constant search for the best lightning source. Another aspect was that their cognitive decline prompted an increased attentiveness to barriers in the apartment that previously they were unaware of. For example, being able to approximate the distance to a certain item of furniture or finding the correct switch in the kitchen. In one scenario, one student, apart from having health problems, was "blind" and was guided by another student who also experienced cognitive impairments and health problems. The students described being blind as daunting as they had to trust their peers in every step they took. Being blind was experienced to severely reduce the students´ sense of direction, making them more sensitive to barriers in their environment that potentially could hurt them, as expressed by one student: "*Scary being disoriented in an unfamiliar environment. Perhaps you could manage in your own home but not here. It felt like we were walking diagonally when you said we were going straight; it was really unpleasant*".

Impaired vision and hearing were also related to an experience of stagnation in cognitive abilities. The students expressed that they had to concentrate harder and some even felt like they wanted to "give up". According to the students, the loss of senses also made it challenging to locate sounds and identify people around them. They experienced that the sudden appearance of a person standing right beside them could startle and throw them completely off guard. The students were in general disturbed by sounds coming from the radio and TV: "*It was just horrible not being able to read, and that damn TV, you couldn't see it but there was noise everywhere*". These sounds aggravated the students´ experience of an impaired vision making it even more difficult to focus when they tried to read.

Feeling lonely and disconnected

The students mentioned that one consequence of the experience of walking in a bubble was a cognitive decline and feeling lonely even when among others. It was associated with feeling like "zombies" pacing about the apartment disconnected from others. Being lonely and disconnected was often related to the students´ impaired hearing and vision, as these impairments diminished the possibility to communicate. One issue due to the experience of cognitive decline was to even understand if they were being spoken to which made them sometimes feel insecure about initiating a conversation in the first place. Among students who were completely blind, feelings of insecurity and vulnerability were often related to the level of trust in their peers. As one student described it: "*As soon as she left me I thought 'What's happening, what are we supposed to do? Where are you going?' …and I could not make out what she said and suddenly she was gone. Then I felt insecure*". The difficulties in communicating sometimes caused students to give up on socialising with their peers, which resulted in them ignoring one another completely. One student voiced this experience as: *"I could barely see, you become lonely. You don´t try and communicate with anyone else you focus on yourself; that was difficult enough*".

Some students also reported that the experienced cognitive decline made them feel embarrassed to ask for assistance from their peers, which aggravated the social distancing. The disconnection and loneliness evoked feelings of sadness, dependence, loneliness and isolation: "*One thing that I reflected on the whole time wandering around was that there were people everywhere yet I could not see who they were. They passed me by so quickly and I felt alone*". This highlights a common feeling among the students that when deprived of their senses they felt lonely even though surrounded by their peers. Another aspect of isolation expressed was related to the fear of going outdoors. Staying "at home" was regarded as the safer option because they could not imagine themselves daring to go outdoors. This fear they said added to their feelings of being lonely and disconnected.

An eye opener

The second theme "An eye opener" and its three subthemes; "Be patient and have enough time to be present", "Independence and dignity are at risk" and "A home equipped with technology can be a haven or a hazard" reflect aspects of what matters in caring for older persons. Students expressed that the simulations had opened their eyes in a way that increased their ability to better relate to and understand older persons´ experiences. The simulation experience was often more challenging than they had anticipated and opened up the possibility of viewing health care provision from the perspective of the challenges older persons face in their everyday lives, as expressed by one student "*You can actually relate to some extent, it´s not just 'I understand'. It's tough, you actually know what it´s like*". Preserving dignity and independence were seen as important goals and therefore patience and time in caring situations become crucial for inclusive care. Being present was related to the importance of giving the older persons space and time to express themselves.

Be patient and have enough time to be present

Wearing the age suit made students realise that ordinary tasks became very time-consuming and caused a multitude of negative feelings such as frustration and a sense of vulnerability. The students´ own experience in the age suit contributed to feeling more respectful of older persons´ everyday struggle. One student described it as: "*You get a deeper understanding and more respect, you understand their situation in a whole new way*". This deeper understanding was experienced to be useful and implemented in the provision of care in their future profession. They had therefore increased their overall understanding of the importance of giving enough time in regard to the provision of care. An important aspect of giving enough time they described was to be present, not to rush to allow the older person to express themselves and reveal their individual needs. Being present in caring situations was seen by the students as a way of being respectful and more attentive to allow for this time. One student revealed: "*It has affected me a lot today, and it will help me in the future with caring for older persons. I´ll let them take all the time in the world*". Students felt that the burden of health problems might make older persons lose the initiative to talk about health and wellbeing as the students themselves had experienced how a cognitive decline affected communication and motivation. A common reflection on observing their peers was that it was difficult to see if the person was suffering or not. With the roles reversed from observing to partaking in the simulations the students described becoming aware of this discrepancy of passive observation and active participation. It was therefore seen as important that they, as future nurses, took their time and listened to what the narratives of older persons could reveal about their everyday lives as those experiences would otherwise go unnoticed.

Independence and dignity are at risk

As a result of the self-experienced vulnerability of wearing the age suit the students experienced that dignity and independence now had a new meaning to them. The students related this new understanding of losing abilities to losing a part of one´s identity. The students expressed that they were stunned by the sudden shift from "healthy" to experiencing multiple impairments in the age suit, and they felt concerned about the consequences this loss had on independence. Therefore, the students said, focusing on what matters to the older person is essential to preserve independence. According to the students, one central aspect related to living an independent life was dignity and they raised concerns about the care of older persons having a "one size fits all" approach. The students described the notion of that dignity could be lost if the older person experienced that their resources were not taken into consideration and asserted that it was important for health and social care workers not to "take over". Therefore, as future nurses, they stated the importance of providing care using a person-centred care (PCC) approach, which was seen as a perspective ensuring the older persons´ needs were accounted for, as described by one student: "*It´s crucial to see the whole individual; not just the disease but how the disease affects this individual person, and fit the care accordingly. 'You mean person-centred…?',"Yes exactly*". The students reflected on the various roles of different social and health care providers and the dissonance that may occur in care provision if they do not share a view of the older person as capable and full of resources despite health problems. The students argued that for PCC to work, an understanding of older persons´ needs on all levels of the health care structure is needed. Students also argued that if care providers were not aligned it could lead to stressful care interactions that could cause the older person to become more passive: "*You take a step back and perhaps don´t want to try because you know the care provider is so stressed out, so you become more passive than you could be*". However, the students stated that PCC is a team effort. They, therefore, saw age suit simulations as an important opportunity for other caregivers to become more attentive to older persons´ needs, for the sake of preserving dignity and independence. This sentiment was expressed with words to the effect of "*everyone should try this*". The students experienced that time is precious, and therefore, care providers must be attentive to activities that truly matter to the older person, ensuring their energy is not spent on something that is meaningless. However, the students also argued that it could be a delicate balance between helping too much or too little. The loss of functions, as students felt, was understood to have the potential to affect the older persons' identity and self-worth. Therefore, students argued for the importance of not only assisting older persons in daily life but also supporting their emotional needs.

A home equipped with technology can be a haven or a hazard

The students experienced that the simulation made them increasingly aware of their environment since they identified both positive and negative aspects of using WT. A central aspect related to the environment noted by the students was the importance of proper lighting. This concern was often raised in relation to them describing challenges with impaired vision. A proper light source was experienced as crucial in for example being able to read a piece of paper, communicate with a peer or just navigating safely in the apartment. During simulation, students often felt nervous about falling due to poor lighting conditions and unstable gait. Students experienced that WT have a great potential in assisting older persons to live at home longer because the technology could help them to manage their daily life challenges. They also stressed the importance of adapting the technology to individual needs. If not, the home is at risk of becoming a hazard, which can lead to negative feelings such as frustration and loneliness. For example, if a person with impaired vision cannot distinguish where a certain button to lower kitchen cabinets is located, the whole concept of that technology is useless, which was described by one of the students as: "*It needs to be suited for the individual because if you´re blind you have the need for specific aids whereas if you have arthritis, a hunched back or whatever you need something different*". Another example in the kitchen was that some students became startled when the cabinets descended from the wall because they could not see or hear it. However other students praised this function as it compensated for the lack of mobility and the pain in their upper limbs and made carrying the kitchen utensils easier. Other aids were also experienced to be of great use to them, for example students with arthritis experienced that it was a relief to get some assistance from the toilet lift when sitting down and standing up from the toilet seat. The students also transferred their understanding of the home environment to hospital health care, discussing the importance of not misplacing items and being more attentive about ensuring proper lighting, and the impact of sounds in the environment. Sounds from the radio or the television were now understood as something that could be potentially very distracting. The students reflected on how often it was assumed by home care providers that older persons like to have the radio or television on, when in fact it could be annoying for those with cognitive impairments. Leaving the radio and television on was also the situation in many service homes, according to their experience. In light of these discussions, the students provided suggestions on how to improve technical solutions as well as other aspects of the environment.

Concerns regarding ageing and the present structure of geriatric care

The last theme and the two subthemes "Caring for older persons is complex" and "Fear of ageing" conveyed the students´ new insights about the complexity of geriatric care but also their own fear of getting older. The students feared an uncertain future where they would be in a potentially vulnerable position. The students´ insights into complex care needs made them also aware of the older persons´ vulnerability in the health care system: "*You only have 20 minutes, then you clock out, run to the next one; it´s not right. We are working with people, you can´t say that you only have 20 minutes and therefore you don´t get to shower properly because someone else is waiting*". These experiences illustrate what the students would refer to as older persons being caught in a system they have little or no influence over.

Caring for older persons is complex

The students reported that experiencing health problems first-hand through the simulations gave them a deepened understanding of older persons' complex care needs. One student expressed her experience in these words: "*It is so difficult working with multiple care needs, like you have this feeling something is wrong but they [the older person] doesn't tell you...and now I felt pain in my knee but I also had trouble hearing, it's like everything is wrong but I can't* *find the right words to explain what the real problem is. It´s so hard to care for such a complex person".*

They also related this understanding to a broader perspective describing how the nurse was just one of many professions and providers that the older persons are dependent on in the health and social care system. Furthermore, the context of providing care in someone´s home requires good communication skills but also a positive attitude towards older persons. From their own experience of having cognitive impairments, they stressed the importance of continuity in building trusting relationships. They recognized that living with health problems makes older persons more vulnerable, and therefore, allowing a care provider you don´t know into your home can be terrifying. The students described a frustration where there is an inherent imbalance regarding decision-making and resources between health and social care providers and older persons. The age suit had made the students aware of the value of time, and the students often reiterated that this extra time was something they rarely saw in clinical practice. The students argued that a serious problem in the health care system were limited resources. This problem was often exemplified as a tight time schedule and a lack of adequate training among care providers. They found this troublesome since quality care requires a team effort, and with limited resources time should be spent on what matters to each individual. However, the simulations made them aware that being sympathetic and genuine can make a huge difference in building a relationship, and it requires no extra time. Some students stated that they had observed care providers act disrespectful towards older persons during their clinical practice and these observations contributed to their negative view on geriatric care. The students now felt more worried for the future of geriatric care because they feared care providers did not have the proper training, attitude or skills to respond to complex health care needs. One student conveyed this in the following quote: "*It feels like health care provision is not taken as seriously as back in the day, that you don´t feel the same responsibility and respect when caring for older persons, and that worries me actually*".

Even though the students were worried about the future they expressed hope that WT could be of great help to compensate for a tight time schedule and the complexity of care. But at the same time, students were concerned about issues related to this technology such as integrity, especially when using cameras, and user-friendliness. They concluded that in implementing WT, individual needs such as poor vision and digital literacy must be taken into consideration:

> *"I am not so technically skilled and with all the impairments you had it became even more difficult to figure out what you were supposed to do with it [WT]. And it was very difficult to make out the sounds from the iPad and it was hard to read."*

The students also raised concerns about older persons tripping over cables or accidentally disconnecting sensors. There was also the concern about technology increasingly replacing actual human contact. Implementing WT was described as a balance between the older persons´ and care providers´ needs. The students stressed that adapting WT to individual needs requires a unified understanding of complex care needs from all health care providers. The students conveyed another concern which was the lack of continuity in health care provision, and they said that those in charge, such as politicians and care managers, did not have knowledge about older persons´ needs. Nurse assistants were often mentioned as the care givers closest to the patient and therefore were thought of as an important group that could benefit from age suit simulations. The students argued that since the age suit simulation had been an eye-opener for them, the same could be true for anyone in the health care system in reaching a deeper understanding of older persons' complex care needs.

Fear of ageing

Students frequently raised concerns about the future of geriatric care in relation to their own ageing process. The fear of ageing was, in part related to the pain of physical limitations and, in part, related to social aspects such as becoming lonely, dependent, and isolated. The students thought society at large did not value geriatric care enough and they worried that this would impact what resources would be available for themselves in the future. As future older persons they could think of few positive aspects of reaching old age, even though they hoped technology and improved aids would facilitate healthy ageing, independence, and remaining at home. However, many still feared an uncertain future and the disabilities they would have to struggle with. This feeling was described by one student: "*Fear of becoming limited and not being able to get through the day, not knowing how… well fear of not knowing what disabilities you will have, you don´t know what the future holds*". The student felt that uncertainty was among the worst parts of growing or becoming older as the age suit had given them an indication of what they might expect as older persons. The negative feelings about ageing were also said to be reinforced by encounters with older persons who described ageing as something terrible or unworthy. Those who were already worried about ageing experienced that the simulations added to those emotions and they described fear of trusting care givers to support and care for their needs as older persons. The students experienced however that their negative feelings prompted a greater understanding of why older persons sometimes express feelings of distress or wanting to end their life. The students also reasoned that in the age simulation they transitioned quickly from being young and capable to experience multiple health problems. They noted that in real life this transition takes more time and therefore there is a chance of getting used to the decline in capabilities and health. The simulations also prompted students to converse about the importance of staying healthy during the ageing process.

Discussion

The main results of this study show that nursing students find age suit simulation valuable for increasing their understanding of older persons´ care needs through the raised awareness of functional challenges in everyday life and because it enhances their perspectives and understanding regarding ageing and associated health problems. Another study [30] conclude that age suit simulation is an effective educational tool that increased health care professionals´ awareness of their feelings and knowledge about age-related limitations. Eppich and Reedy [31] argue that research on simulations should focus on how they work rather than whether they work. They also stress the importance of qualitative methods being based on learning theory.

It was obvious that the students found the simulations challenging in many ways, and they were often more demanding than expected. The physical challenges of age suit simulation have previously been highlighted [32] as well as how the simulation affects students´ emotional state and increases empathy towards older persons [21]. The physical challenges as well as the students´ emotional response to the simulations previously mentioned resonate with the findings of students being both frustrated and humbled by the simulation. Even though the students were not specifically asked about empathy, the results indicate that students felt more sympathetic towards older persons´ health problems.

A possible explanation of why the age suit simulation evokes strong emotions is that it provides a unique and immersive experience of living with health problems from the patient´s point of view and this is unlike anything else the students have experienced during their training. Demirtas and Basak [33] study shows something similar in regards to students becoming emotional during the simulations. The immersive experience of losing function and autonomy can be described as a direct confrontation with perceived ideas of ageing, older persons and age-related health problems. A review article on Experiential Learning Theory (ELT) describes how emotions influence students´ learning process in that students´ emotional state dictates what information is retained in their memory. In short, attention is directed at what resonates with one´s emotions at the time [34].

Simulating with the age suit at SHC, we argue, resonates with the concept of a *concrete experience* in ELT, which Kolb and Kolb [35] describe as an experience out of the ordinary that challenges previous convictions and ideas. In a review article, ELT is described as a hands-on experience where learners are active and engaged socially, intellectually and physically, which explains the embodied nature of ELT [36]. The concrete experience is therefore an essential part of experienced-based learning [35]. Emotions are often neglected in simulation training and the focus is on logic and problem-solving. However, emotions play an important role in learning. For example, negative emotions can both be a barrier as well as enhance learning and motivation [37]. This relates to our results describing students´ fear of ageing. Arguably, if a person, prior to the simulations, feels anxious or scared of age-related problems, it is possible in our opinion that those emotions will be enforced by experiencing health problems in age suit simulation. In the present study, the students´ feelings were often an important starting point for insightful reflections that were transferred into other perspectives. Based on the results of the present study, it can be argued that implementing age suit simulation must be done at the "right" time in the curriculum for students to benefit from them. This is because nursing students need a theoretical and clinical reference frame to relate to. Kolb and Kolb [35] argue that in order to make sense of the world and our experiences, both concrete experience and abstract thinking are needed. For a dialogue to occur there is a need to reflect on one´s actions. Students are more aware of how vulnerable the patient is, which is important for health care provision and the practice of PCC.

Another important finding, we argue, is the students´ intention of including their new knowledge about functional challenges in future interactions with older persons in a clinical setting. This is similar to a study by [38] that concluded that age suit simulation is effective in raising students´ awareness of functional challenges among older persons as the age suit replicates normative values for older persons based on mobility and balance metrics. Even though metric testing was not part of this study, the nursing students often described their experience of being able to relate to older persons´ challenges as it was an embodied experience. Interestingly, our findings not only highlight functional awareness among the students but also attentiveness to older persons´ feelings. Another study [38] also showed students experienced guilt and sadness because they realised they had not had the proper knowledge or demonstrated attentiveness to older persons´ needs, which corresponds with our results of students raising the complexity of geriatric care. Illuminating the complexity of geriatric care resonates with previous studies calling for improved geriatric education [17, 19].

The study also emphasises a critical perspective on WT, and students find it to be both a helpful and important feature of the provision of modern health and social care as well as a potential threat to safety and integrity. Interestingly a recent article exploring attitudes towards the use of technology over different generations (from 30-79 years old) showed similar results. The raised awareness of technology use in health and social care situations in the present study therefore aligns with the perspectives of potential end users, which arguably is an important aspect of implementing and understanding WT [39]. Technological literacy has also been highlighted as an essential skill for nurses. A scoping review on this topic revealed that nursing students´ technological literacy in general is heterogeneous. The authors of the review stress that because nurses are the persons closest to the patient, they are the ones most aware of the patients´ daily needs and therefore have a significant role in developing and implementing technology. Research and pedagogical development regarding technical literacy are essential for both educators and nursing students [6]. These findings resonate with the accessible and technically advanced simulation environment at SHC, signifying the importance of students interacting with WT and other technical aids to improve their technical literacy but also to develop critical thinking regarding its use and relevance for the individual.

Beyond expectation was how emotional the students were regarding different eye impairments. Vision is the most dominant human sense and most people of old age will experience some kind of eye condition. The students described communication as a means of being involved and active. Not being able to communicate is regarded as posing a risk of being separate from a social context. Impaired vision therefore has several implications. According to the WHO´s World Report on Vision [40], societies are built on the ability of sight; thus integration, everyday activities and social interactions are dependent on functioning vision. The current study touches upon an important aspect of home care provision to older persons, namely informal caregivers. This aspect is experienced in the scenario where one student is blind and is assisted by a peer who also suffers from health problems. According to a study on informal caregivers, 15 % of the adult population in Sweden provide care as informal caregivers, which is significant given that Sweden is regarded as a country with a liberal welfare system [41]. In light of the students´ experience of sensory impairment these specific impairments, blindness in particular, will be the focus of an upcoming study from the authors.

In line with the results in the current study, another study [42] showed that students experienced frustration, anger, loss of independence, fear and vulnerability. They also reported, in correlation with our study, that students with work experience expressed increased understanding of the emotional response from older persons as a result of partaking in the simulation. Increased understanding can be seen as an underlying focal point throughout the themes. In our study, students described their intention to put their new knowledge to use in clinical practice. This intention is often related to improving the quality of care but also to preserving older persons´ dignity. Another study [43] suggest nursing students mostly agree that dignity is a skill that can be taught in education through *experience*. Based on the findings in the current study it can be argued that simulation is a relevant complement to didactic education. It is about balance, as Kolb and Kolb [35] explain that for learning to occur there must be a balance between activity and reflection, where both theory and experience are important pieces of a puzzle. Future studies may include age suit simulation used by other health care professionals and settings.

Strengths and weaknesses

Braun and Clarke [29] stated that the aim of reflexive TA is to make sense of patterns of meaning across a dataset. Quality in reflexive TA is reflected in complex and multifaceted themes, and as Byrne [44] points out, quality in reflexive TA is not represented by providing a single right answer. A strength of the present study was the collaboration between the researchers in exploring and achieving rich interpretations of the material. Regular peer meetings to discuss thoughts and ideas on the evolving data to strengthen a study´s trustworthiness which are in line with a previous study [45] on quality in TA. On the issue of quality, Braun and Clarke [46] state that if themes could be created beforehand or merely reflect a research question, it is a sign of poor-quality reflexive TA. They refer to these themes as topic summaries. Rather, themes should be generated which could bring together seemingly unrelated topics [46]. In the present study, two of the authors were familiar with reflexive TA and could provide valuable insights, which was helpful in generating the themes. The nursing students were not invited to reflect on the analysis, which could be seen as a limitation as there may be gaps of understanding. Another possible limitation is author bias during data collection as the interviewers were working as teachers in the nursing program at the time of the study and therefore had a relation to the students. However, the interviewers reminded the students several time that participation was voluntary and that they could withdraw their participation at any time. Data was collected separately by three of the authors using the same interview guide. There is still little research about objective quality measures in thematic analysis [45]. Therefore, trustworthiness measures as described by Graneheim and Lundman [47], such as credibility, dependability and transferability, were also used. Interviewing all students and not excluding anyone from participation is considered to add to the study´s credibility as is the use of multiple perspectives on the investigated phenomenon. Credibility was also enhanced by using representative quotes from the students. Dependability relates to the stability of the data collection, especially if it is performed over longer periods of time [47] In the present study, no significant alterations were made to the research design or questions, meaning that students were asked the same question at the same point in time of their education. Transferability relates to the extent to which the results can be generalised to other contexts and is facilitated by providing a clear and transparent description of the study design and considerations as well as by presenting the results in a logical and precise manner [47]. However, ultimately it is up to the reader to judge to what extent the results can be transferred to different contexts. NVivo version 1.7 was used to facilitate the process of coding due to the large data and the programme helped the researchers in organising and sorting data but was not used to perform or guide the analysis. The benefits of using NVivo for large amounts of data in thematic analysis is confirmed in a previous study [45]. Replicating age-related health problems in age suit simulation among young adults also has limitations. In another study [38] the age suit was considered to replicate the age-related risk of falling reasonably well in both male and female students. However, among some of the male students, the age suit had little or no effect on their physical capabilities, which was related to men in general having larger muscles. Therefore, it is possible that there are gender differences in age suit simulation related to physical capabilities, which may have influenced the present study.

Conclusions

This study concludes that taking the point of view of "an older person" in age suit simulation became an embodied and eye-opening experience for nursing students. The results highlight that cognitive loss was especially difficult for the nursing students to handle. In light of the increased shift from care provision in institutions to home care, the context for the simulation and the simulation intervention, affect nursing students´ attentiveness to older persons´ needs resonates with PCC, which is a crucial concept of home care provision. After the simulations, the students felt more aware of older persons´ vulnerable position in the health care system and stressed the importance of PCC as a measure to safeguard older persons´ dignity and independence. The study design also illustrates the pedagogical value of including ELT in age suit simulations because it requires students to critically reflect on their preconceived ideas of aging, older persons, health problems and providing care to older persons. This study therefore illustrates how age suit simulation can be an important part of nurse education in preparing students for the complexity of geriatric care, but could also be of relevance to other health care professionals .

Abbreviations

WT	Welfare Technology
GERT	GERonTologic age suit
SHC	Skaraborg Health Technology Center
PCC	Person-Centred Care
ELT	Experiential Learning Theory

Supplementary Information

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Additional file 1: Appendix 1. Interview guide.

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Authors' contributions

B.B.S analysed the data and drafted the manuscript. B.B.S, J.H and C.G collected the data. B.B.S, J.H, E.O and C.G all contributed to the data analysis and the intellectual content of the manuscript. All the authors read and approved the final version of the manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was sought from The Swedish Ethical Review Authority (https://etikprovningsmyndigheten.se/en/) (Dnr 2021–04056). An advisory opinion was obtained, instead of a formal approval, since no sensitive data would be collected in the intervention study. This study was conducted according to the ethical guidelines of the Declaration of Helsinki [48]. All the participants were given oral and written information about the aim of the study, that their participation was voluntary, and that they could withdraw from the study at any time without giving an explanation. Informed consent was obtained in written form from all participants

Consent for publication

Not applicable.

Competing interests
The authors declare no competing interests.

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Publisher's Note

III

Title

Pull through together or be detached? A qualitative study of experiential learning in nurse education during interaction in age suit simulation

Abstract

Aim

To illuminate nursing students' interactions during age suit simulation from the perspective of being a blind older person and being an attendant guiding the blind person.

Design

The research design of this study is qualitative.

Methods

During the autumn of 2022 to the spring of 2024 as a part of a larger intervention study project, nursing students (n = 68) were video-recorded during age suit simulation. The data was analysed through reflexive thematic analysis.

Findings

Three main themes were constructed: (1) Pulling through together, (2) Dialogue is key when adapting to health problems and (3) Detached from each other. The third theme signifies the importance of being able to communicate in a meaningful way to adapt to each other's health problems. Students took different approaches to this challenge, which is reflected in the ways the students interacted with each other.

Conclusion

The results of this study can be used to formulate a learning strategy to teach nursing students about the perspectives of being an older person with health problems. The simulations can also be utilized to enhance nursing students´ knowledge and skills when guiding a blind person in the context of a home environment. Furthermore, the results can be useful in highlighting a holistic perspective regarding care needs as a shared experience by older couples, which is relevant knowledge for any health and social care profession. This embodied understanding of health problems can be used to support and practice person-centred care for older persons.

Keywords

Age suit simulation, blindness, education, health problems, nursing students, older persons

1. Introduction

Registered nurses (RNs) are at the forefront of the health care system, and sustaining the RN workforce skilled in the management of age related long-term health problems is essential for providing health care to the ageing population (1). RNs respond to unpredictable and complex situations and need a broad spectrum of knowledge and skills when encountering older persons with complex care needs (2) (3, 4). Since RNs are essential care providers to older persons, nurse education needs to address students´ lack of motivation to work with older persons (5). In addition, nurse education often focuses on acute care and lacks gerontology and geriatric content, thereby excluding from the curriculum knowledge about the needs of older persons (6).

Long-term health problems, such as diabetes, arthritis or cardiac-related diseases, which are prevalent among older persons, often lead to different impairments such as reduced mobility or poor eyesight and hearing (7). Subsequently, these long-term health problems are associated with challenges in daily life activities but also with falls and geriatric trauma injuries. It is therefore important that health care providers are educated in the complexity of geriatric care and early recognition of problems that can cause dependence in daily life (8). For example, point of view simulations, where health care students "step into the shoes" of an older person has been used to raises awareness of the daily life challenges faced by older persons (9).

Experiencing functional and psychological limitations in daily life can challenge a person's perception of their personhood, especially in the context of a health care system that focuses on treatments for deficits and decline rather than on potential and what matters to the patient (10). Sensory impairment (vison and hearing impairment) is a prevailing and debilitating condition among older persons and is associated with negative self-perceived health, additional long-term health problems, and increased hospitalisation (11). Individuals with impaired vision and hearing may feel unsafe in their own homes, making it essential for RNs to be supportive and to communicate with them patiently and attentively (12). Similarly, person-centred care focuses on caregivers establishing close relationships with care receivers and their significant others, characterised by respect and mutual trust (13). Age suit simulation is a point of view simulation where a commercially available suit is used to simulate age-related health problems in younger persons. This has been shown to improve nursing students´ empathy towards older persons. Still, a gap in research remains regarding more complex tasks, such as those experienced in the daily living context of older persons (14). Living with long-term health problems has increased the global need for older persons to receive care in their own home, both from care providers and informal caregivers (15). The Swedish health care reform "good and close care" was established to facilitate the transition of care from institution to home, as a response to make health care more available, coherent, equal and person-centred to the growing number of persons with long-term health problems (16). An example of such strategy to make health care more accessible is the Swedish Mobile Integrated Care Model, which has been the subject of research. Encounters with patients and relatives in their homes were described by RNs and physicians as facing the patient on their own terms, and providing an insight into their everyday lives (17). With increasing age, older persons often have to live with multiple health problems all of which make their care needs increasingly complex (18).

It has been highlighted that it may be disheartening for students to be placed in a clinical setting caring for older persons without being provided with the proper gerontological education in the first place (19). Even though efforts have been made over the last decade to increase nursing students' interest in caring for old persons, students have a prevailing lack of interest in this field of nursing. This is a serious and multifaceted issue and more research on the subject is needed (20). Factors that may favour nursing students' positive attitudes towards working with older persons are life experience, knowledge about ageing, and feeling comfortable around older persons (21). Nurse philosopher Patricia Benner recognises that nurse education often downplays the knowledge gained from direct practice about building relationships and caring behaviour (22). This statement resonates with research showing students' need for a supportive learning environment that can adequately prepare them for clinical practice (23, 24). The call for learning through practice aligns with research indicating that nursing students are unlikely to acquire relevant communication and interpersonal skills through theoretical education alone (25). Simulations, including various methods using mannikins, standardised patients and role-playing have been highlighted as one method to train skills, communication, self-efficacy and critical thinking (26). Experiential learning theory highlights the importance of learning from experience, which often involves interactions with others and the environment. An optimal learning experience takes into account the concepts of retaining and transforming knowledge though experiencing, reflecting, thinking and acting (27, 28).

This study is part of a larger research project on an age suit simulation intervention in nurse education (29, 30). In one study, students' experiences of wearing the suit, for example, when performing daily chores with knee pain and navigating an apartment with impaired vision and hearing, were described as challenging. Students also described how they would adapt and resort to problem-solving in order to overcome their impairments. The challenging experience also became the starting point for discussion and reflection, which took place after the simulations. Students were encouraged to relate their experience to the nurse´s competencies and key concepts in nursing. The reflections gave the students new insights and understanding of providing care to older persons and how they could implement this knowledge in their practice (29). However, one concern that has been raised is that simulations, if not performed carefully, can confuse people about the realities of the impairments, which can contribute to discrimination (31).

Additionally, there is a call for the further development of simulations in nursing education, addressing how social context is intertwined with physical and cognitive impairments (32).

In one situation during the simulations described in the previous studies (29, 30), students took on the roles of a blind person and their attendant, which caught the researchers' attention and inspired their curiosity. The literature search revealed that this kind of simulation is rarely studied, especially among nursing students. Therefore, this study of the intervention addresses the challenging situation in which two students simulate these health problems either as blind persons or attendants. It is noted that simulations as described in this study may also be referred as disability simulations (31, 33)

2. Aim

To illuminate nursing students' interactions during age suit simulation from the perspective of being a blind older person and being an attendant guiding the blind person.

3. Method

3.1. Design

This study had a qualitative inductive design using reflexive thematic analysis (34) in which inductive is described as being 'grounded in' the data. Using reflexive thematic analysis allowed the researchers to interpret the data from theoretical assumptions as well as insights and perspectives gained from previous experiences (34, 35), which in this study included experiential learning theory (ELT) and insights from earlier studies of the intervention (29, 30). The simulation design was based on the learning cycle of ELT and included; *the concrete experience*- the direct sense experience of students engaging in the age suit simulation, *reflection*- the students reflect on their feelings, ideas and key aspects of the simulating, *thinking* – the students further analyse and evaluate their experience and how it relates to concepts of their profession, *acting* – the students can apply what they learned during the age suit simulation into their practise. The earlier studies (29, 30) had provided the authors of this manuscript insights about the impact vision impairment had on students during age suit simulation, which was an important motivator for the present study.

3.2 Study context and participants

On the grounds that age suit simulation was a novelty in the nursing programme the education intervention also became a larger research project about how age suit simulation among nursing students impacts insights and understanding of ageing, being an older person, living with age-related long-term health problems and providing care to older persons (29, 30). In the fourth semester, all nursing students in the Swedish university's three-year nursing programme undergo age suit simulation at Skaraborg Health Technology Center (SHC) as part of the mandatory curriculum in gerontology and geriatrics (30). Pensioners' associations, which is a non-profit interest organization that advocates for the interests of older persons, were invited to take part in designing the infrastructure of the SHC, which consists of a highly accessible apartment equipped with welfare technology (WT) and technical aids. In addition, a certified attendant who guided blind persons provided an opportunity to test digital guidance systems at the SHC. The certified attendant had undergone formal training regarding how to assist and guide blind persons. She also teaches other persons including formal and informal caregivers how to guide, which often include how to describe the surroundings, warn of dangers and assist the blind person in daily life.

During each simulation four students (two pairs) were assigned the persona of either being blind or being an attendant. Students who did not want to appear on video were assigned other personas carrying out scenarios in a designated home environment. In total sixty-eight students (34 pairs) participated in the study. In the age suit simulation, students assigned a persona, experience the perspective of an older person with long-term health problems by wearing an age suit - the GERonTologic simulator (GERT). The suit can adapted using different weights, straps, eye glasses, ear protection and gloves to simulate various health problems such as tremor, arthritis, impaired vision and hearing, tinnitus, hemiparesis, lung disease and overall restricted movement and unstable gait (36).

The simulations were conducted at Skaraborg Health Technology Center (SHC), an accessible authentic home environment equipped with health and WT in the form of various sensors. There is a digital twin of the 80 m^2 apartment which is illustrated below (Figure 1). The sensors in the apartment react when activated by use, movement or pressure, causing furniture and appliances to change colour on the TV screens in the environment. The bed is also equipped with sensors detecting heart rate and respiratory rate. The red dot on the bed indicates the location of the person in the bed (Figure 1).

INSERT FIGURE 1 ABOUT HERE

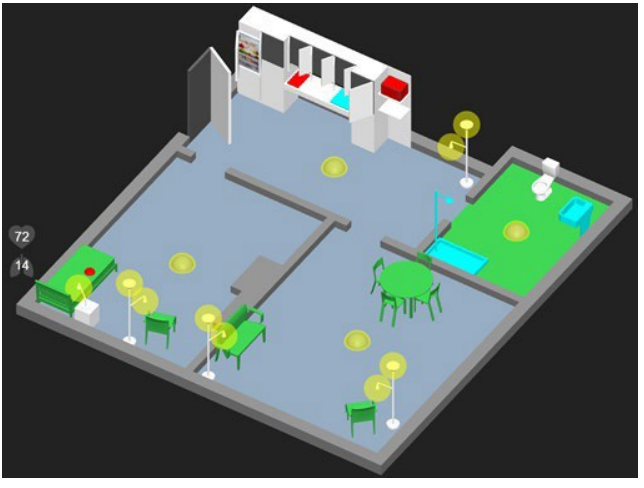

Figure 1. Digital twin of the apartment used in age suit simulation. Illustration designed and provided by Mikael Lebram, engineer at SHC

3.3. Simulating using and age suit while assigned a persona

The focus in this study was on observing two students who worked together in the personas of 1) being completely blind with impaired hearing and knee pain, and 2) experiencing knee pain, impaired hearing (tinnitus) and impaired vision (diabetic retinopathy) and being an attendant to the blind person.

After being assigned their respective persona by the teacher, they dressed in the age suit. The attendant was instructed by the teacher to convey the details of the activities to the blind student. The pair were also informed that one teacher would be close by throughout the simulation. The instructions detailed specific activities and scenarios that would take place in the apartment. For example, in the kitchen they had to interact with an automated cupboard in order to collect a glass, a plate, and knife and fork, before setting a dinner table located in the living room. As another example, in the bathroom they had to sit on an automated toilet seat, get up (usually by pressing a button to elevate the seat), pick up their toothbrush and toothpaste, brush their teeth and comb their hair.

The simulations lasted approximately 65 minutes. Afterwards, all the students gathered with one of the teachers for a guided group reflection. During the reflection the students reflected on their experience and to shared thoughts about ageing, older persons, living with long-term health problems and caring for older persons, relating their ideas to core nursing values, central concepts and the care environment. No data from this group reflection was used in the present study.

4. Data collection

In preparation for the data collection, the first author performed an interview with a legally blind person and a certified attendant (described in the context section). The interviews focused on different aspects of how an attendant should guide a blind person and how it feels to be guided as a blind person. For example, both the attendant and the blind person stressed the importance of building a good rapport with each other, including establishing agreed-upon verbal cues to ensure safe navigation. Therefore, the attendant needed to take time to understand the preferences of the person they were guiding. The blind person advised holding onto the attendant using an arm hook or by placing a hand on the attendant's shoulder, especially if the attendant was taller. Furthermore, the attendant has to be clear in their instructions including describing the environment but without overwhelming the blind person with information. Both the blind person and the attendant highlighted the importance of sustaining the blind person's autonomy and dignity by including them in daily activities as much as they wished. They noted that maintaining this balance could be delicate - avoiding both taking over and failing to provide appropriate support. The observational data was collected through video footage and reflection notes (37). Thematic analysis can include different types of data in the same data set (38, 39). Data was collected by the first author (BBS) from the spring of 2022 to the fall of 2024. The researcher recorded the interactions using a hand-held smartphone to enhance mobility as the activities took place in multiple locations allowing the researcher to be present in the same room/space as the participants. Using a hand-held device also allowed the researcher to stay close to the students as well as move out of their way when necessary.

In this study, the researcher was well-known to the students and had no intention to interfere with the students' performance while they were simulating. However, at times interference was necessary, such as giving cues to answer questions and, on some occasions, intervening, which is why the researcher's role mostly aligned with the description of a *participant as observer*. In this role the researcher must balance not being too distant with too close (40).

The recording and note taking started as soon as the students began simulating, and in order to uphold consistency, all the simulations started in the same location and proceeded along the same route. The simulations started with a longer initial sequence (approx. 4 minutes) when the pair in their age suit walked from the changing room towards the elevator, opened a pair of glass doors. Took the elevator down to the ground floor, went outside and then went back to the elevator and went back up again to the third floor and moved through a long corridor towards the apartment. When they arrived at the apartment the recording stopped. About midway through the simulation the same couple of students were recorded again in shorter sequences (around a minute) when they were performing scenarios in the apartment.

The data collection included 143 video sequences of the 68 students - approximately five hours of video footage (table 1) all of which was included in the data analysis. These sequences represent footage from the 68 students (34 pairs). Some observations of the student pairs included several sequences and others fewer but longer sequences. The reasons for this variation were sometimes technical, such as pausing and adjusting to get a better angle, or the teacher stopping the recording to assist students before resuming.

The first, second and last authors are lecturers in the nursing programme. They are responsible for the age suit simulations and conducted reflection seminars in groups with the nursing students at the end of the age suit simulation. The third author, a lecturer at a different university participated in age suit simulations and reflection seminars.

Table 1. Overview of the video sequences used for analysis

Student pair	Year	Sex (F=Female, M=Male)	Number of sequences	Minutes of video
1	2022	F+F	3	07:51
2	2022	M+F	2	06:25
3	2022	F+F	3	10:41
4	2022	F+F	5	09:23
5	2022	F+F	3	05:41
6	2022	F+F	4	08:16
7	2022	F+F	4	09:05
8	2022	F+F	3	10:43
9	2022	F+F	3	08:06
10	2023	F+F	4	07:36
11	2023	F+F	3	06:08
12	2023	M+M	4	07:37
13	2023	F+F	5	09:40
14	2023	M+F	4	07:14
15	2023	F+F	3	08:37
16	2023	F+F	5	09:34
17	2023	F+F	3	07:15
18	2023	F+F	4	07:56
19	2023	M+F	3	08:52
20	2023	F+F	3	06:56
21	2023	F+F	2	08:53
22	2023	F+F	2	10:13
23	2023	M+F	2	07:38
24	2023	M+M	3	06:33
25	2023	F+F	3	08:51
26	2023	M+F	5	07:48
27	2024	F+F	8	12:10
28	2024	F+F	5	13:51
29	2024	F+F	8	08:49
30	2024	F+F	8	12:08
31	2024	F+M	8	11:56
32	2024	F+F	6	09:10
33	2024	F+F	6	13:12
34	2024	F+F	6	13:14
		M = 9, F = 59	Total: 143	Total: 308,033min ≈ 5 h 8 min.

5. Ethical considerations

The Swedish Ethical Review Board approved the study with an advisory opinion (Dnr 2021–04056) because no sensitive data would be collected. All the participants were given oral and written information about the aim of the study, and were told that their participation was voluntary, and they could withdraw from the study at any time without giving an explanation. The participants were informed that they were not expected to do anything apart from be active in the simulations. Being videotaped was optional as the students were informed during an initial briefing, thus students who did not want to appear on film were not recorded but were not excluded from participating in the simulations. Instead, they were assigned a different persona that was not videotaped. During the simulation, the observer was open to answering questions along the way and occasionally intervened, for example when the students were unsure how to proceed or how to prevent harm. After the simulations, the students participated in reflections where they could share their experiences (not included in this study).

6. Analysis

For this study, reflexive thematic analysis (41) was employed since it is a flexible and iterative method for analysing qualitative data, and analysis is shaped by the researcher's subjectivity and creativity (42). Moreover, the analysis is about telling a story (41). All of the authors of this study were involved in the analysis in an iterative process, which is a feature of reflexive thematic analysis. In this study, the meaning units in the analysis were specific video sequences that appeared relevant to the study's aim of telling a story of two roles: being blind and being an attendant to a blind person. Choosing a meaning unit in video analysis can be based on very specific events such as time segments, gestures and speech but can also be based on ideas or patterns (43). The reflection notes included comments and observations about the students' interactions during the simulations. These reflection notes were included in the analysis and were helpful when interpreting the interactions or naming themes. The iterative process between the steps of the analysis is outlined in detail in Table 2.

INSERT TABLE 2 ABOUT HERE

Table 2. The analysis Table

One: Familiarisation	The entry point of the analysis. Viewing the video material. Starting to identify interactions that corresponded with the study aim. At this stage, the general characteristics of the attendant and the blind student were understood as patterns of being either close to or distant from each other. This observation was also noted in the reflection notes and these general characteristics became the interest for deeper analysis.
Two: Generating initial codes	Semantic and latent excerpts were identified in the data and written down in a Word document. The excerpts included interpretive and descriptive texts (descriptions and interpretations of students' interactions and spoken words between the students). The excerpts were labelled with a code, which sometimes was refined, for example, merged and/or expanded on, replaced or discarded.
Three: Generating themes	Reflecting on the refined codes (n=58) and going back to the data to find patterns of meaning. Codes that shared similarities were sorted into seven clusters in an Excel file. The clusters were the building blocks for generating sub-themes and main themes. During this process, notes and ideas about the theme development were written on separate sheets of paper to serve as a helpful visual tool.
Four: Reviewing themes	Themes were reviewed and refined to make sure they were relevant to the data excerpts and the data set as a whole, and that themes resonated with the participants' quotes and interactions. The authors discussed how

	themes could best represent a story. At this stage, the idea of using pictures from the simulations to represent the themes was introduced. At this stage input from the reflection notes also informed naming of the themes.
Five: Defining and naming	The authors engaged in intersubjective discussion and reached agreement on defining and naming themes, as well as selecting imagery to represent them.
Six: Producing the final report	The final report was written.

7. Findings

The findings consist of three main themes showing contrasting ways in which the students interacted with each other. These main themes are, first, “Pulling through together” which includes three sub-themes: “A cheerful approach helps navigate challenging circumstances”, “Being one step ahead” and “Trial and error”. The second main theme is “Detached from each other” and includes: three sub-themes “The frustration of managing more things at once”, “Placed as a bystander” and “Keep at arm´s length”. The third main theme, “Dialogue is key when adapting to health problems” includes two sub-themes: “Helpful conversations” and “Communication breakdown”. The third theme underscores the central aspect of communication (figure 2.). The sub-themes are illustrated by quotes from the students and descriptions of their interactions.

INSERT FIGURE 2 ABOUT HERE

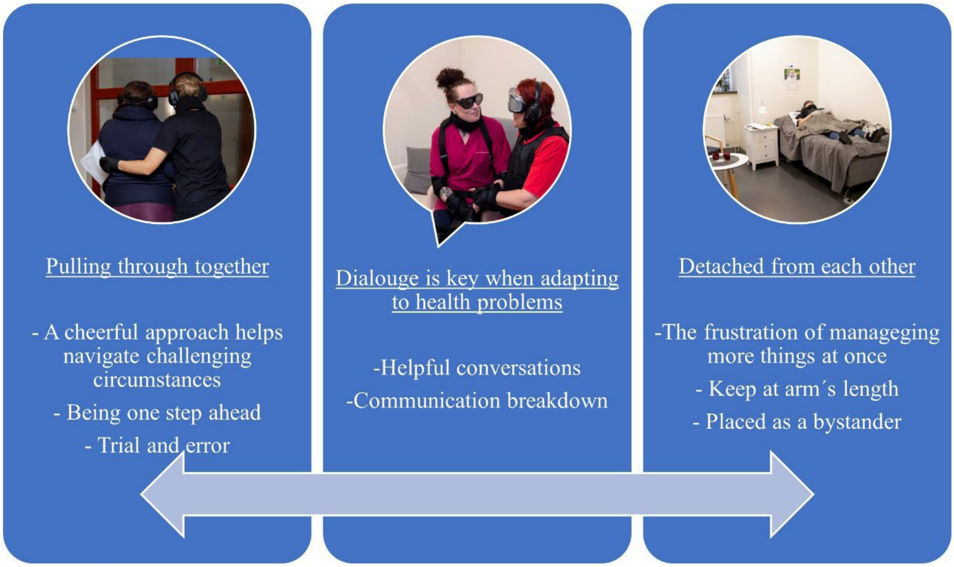

Figure 2. Overview of the themes

7.1 Pulling through together

The main theme highlights students working together in a positive spirit as a team, experimenting and using trial and error to navigate scenarios. The attendants guided blind students step by step, showing awareness of environmental hazards like thresholds or obstacles. Through meaningful conversations, the students understood each other's challenges and adapted to their strengths and weaknesses, enhancing teamwork.

7.1.2. A cheerful approach helps navigate challenging circumstances

The analysis revealed that students who worked well together enjoyed small talk, joking, and laughing. Humour helped them cope in challenging moments, even veering into dark comedy. For instance, when reading a fire warning sign, an attendant joked, "If I have this much pain in my knees, I'm certainly going to burn to death" (230918-2). Both students showed mutual concern and support; during one elevator ride, the attendant asked, "How is it going?" The blind student replied, “Good, how about you?” eliciting a cheerful “Fine!” and laughter (230918-3). Humour also encouraged participation. After struggling to get into bed, a blind student was teased to “Pull up the sheets as well!” prompting a playful “For God’s sake!” as they complied (240220-1). These cheerful interactions were key to managing challenges in the age suit and balancing the students' dynamic.

7.1.3. Being one step ahead

The attendant displayed an overall caring attitude towards the blind student by carefully and purposefully guiding and giving physical and verbal support. Being one step ahead involved the intention to foresee obstacles and to inform and guide the blind student through these barriers. Barriers they often encountered were slopes in the floor, doors, furniture standing in their pathway or other students. Another aspect of being one step ahead was getting the timing of verbal and physical cues right. Timing was essential in navigation, for example, informing about an obstacle such as a threshold too soon was unhelpful because it was very difficult for the blind student to estimate distance as well as keep their balance. In one situation the attendant first paid attention to her gait, and adjusted her speed to the blind student so they could walk in sync. Then the attendant said; “It’s just along the corridor straight ahead, you can feel the wall on your side, it is coming up right now”. At the moment the wall was in reach on the blind student´s side she nudged the blind student’s right hand onto the wall and the blind student could touch the wall with her hand all along the corridor to give her a sense of direction (230313-1). This situation illustrates the attention of the attendant getting the timing of verbal and physical cues right. In another situation, the attendant stopped the blind student just before a door, told the student that she was using the automatic door opener, waited until it fully opened, then said; “I have now opened the door here” and at the same time physically guided the blind student through the doorway and said; “We are going through now” (230918-2). In regard to body language, the attendant would usually offer their arm to the blind student and/or discuss how they best wanted to be assisted. Staying close to each other helped the attendant to coordinate verbal and physical cues. The blind student also seemed to prefer closeness by drawing near to the attendant.

Another aspect of this theme was the attendant's awareness of not leaving the blind student alone, in order to protect them from physical harm while being vulnerable in an open space. On occasions, leaving the blind student was necessary, for example when the attendant needed both hands. In these instances, the attendant often informed the blind student they were going away, and "parked" the blind student by something solid, for example in one situation the attendant said to the blind student in the elevator; "You can hold on here [a metal bar]", in this way the attendant could let go of the blind student and focus on the panel and on choosing the right button to press (230925-3). Other objects that were used to "park" the blind student was often a bed or a chair.

7.1.4. Trial and error

This theme represents how both students actively tried to complete the activities while manoeuvring in an unfamiliar environment. Despite the barriers imposed by the age suit the students explored alternative strategies to manage the tasks they were given. The attendant, who also had a visual impairment (though not blind), was trying to read instructions and convey the message to the blind student. This task was also challenging because the attendant had to find the "right" light in order to read the text. The attendant also had knee pain and in one scenario, the attendant went to get a feather duster on the lowest shelf but she could not bend down that low, so instead she put her foot on the duster and dragged it out towards her and picked it up (231009). In another situation, the attendant was reading questions on a paper and included the blind student in the task by asking her for the answers. In a similar situation, the attendant gave a pencil and paper to the blind student and said; "Here you have the pencil, and here is a post-it note", then she waited by her side until the blind student had completed the task (221004-1).

This situation was representative of the attendant's inclusive attitude towards the blind student and was characterised by an unspoken assumption that they could autonomously perform even a complicated task, such as writing on a small piece of paper, without seeing. Another example of the blind student acting autonomously was observed in a situation when the student was determined to pour herself a glass of water from a canister even though the attendant insisted on helping her multiple times. The blind student first fiddled with the glass and canister with her hands to get a feeling for their size and positions and began to pour. "Stop!" the attendant said when the glass almost overflowed. The blind student asked out loud; "How do I know when the glass is full?". "Just put your finger in the glass", the attendant answered (230925-1). These examples highlight situations that show that when the attendant had an inclusive attitude it made the blind student more confident about taking the initiative in the scenarios.

7.2. Detached from each other

This theme describes interactions between students that created a distance between them rather than a working relationship. In particular, the attendants seemed overwhelmed by managing their own health problems, supporting the blind student and navigating their way forward. The attendants took it upon themselves to complete the activities with minimal or no involvement of the blind student, which also resonated in their body language. Being excluded from the activities also made the blind student less inclined to take the initiative in conversations, or to voice their needs and participate in the scenarios.

7.2.1. The frustration of managing more things at once

This theme illustrates how the attendants became overwhelmed trying to manage both their own health problems while at the same time focusing on the blind student. They would often concentrate on the instructions and performing the scenarios themselves, leaving out the blind person. In one observation the attendant and the blind person struggled to communicate with each other, causing frustration, and when they were in the elevator the attendant seemed to completely forget she needed to press the elevator button, and needed to be reminded by the teacher (240205-2). In another situation the blind student called out; “Where are we going? I can´t hear you”, but the attendant ignored her. When they arrived at a pair of glass doors the attendant fumbled to open them. The situation seemed to make her frustrated as she instead pushed the door open, dragging the blind student, who was facing in the opposite direction, through the door. This rough behaviour continued through the simulation, and at one point when the blind student was pushed forward through a doorway she cried out; “What the hell!” (220214-2). This example is illustrative of how attendants acted towards the blind student as if they were more of a problem than someone who could be included in the scenarios.

7.2.2. Placed as a bystander

This subtheme represents how the blind students increasingly refrained from being active participants as a result of the attendant excluding them. The attendant had the “power” of sight (though limited) and therefore was the only one able to read the instructions on how to complete the scenarios. Consequently, the blind student had to be informed by the attendant about what to do. Attendants who were focused on just completing the scenarios did not share this information with the blind students very often. Being left out made the blind students more uncomfortable and they became less interested in participating in the simulation scenarios. This lack of participation was sometimes so significant that the blind person almost did not speak a word during the entire simulation. In one particular situation, it was observed that the blind person was left on her own multiple times. The situation culminated in the attendant leaving the blind student alone on a chair in a separate room while going to rest on the bed for several minutes (240205-3). In one situation the blind students sat beside the attendant while the attendant was reading the instructions. Not a word was spoken between them for almost a minute. A few minutes later in the kitchen, the blind student was left by the stove and the attendant performed all the activities in the scenario herself (220214-2). In a similar situation the attendant pushed on towards the elevator but did not inform the blind student about what was going on. There was not a word spoken between the students for almost a minute. The consequences of this lack of instructions were highlighted when the blind person spoke up and asked; “Am I in the elevator?” (220221). This example illustrates how dependent the blind student is on the attendant—not only for inclusion in various scenarios but also for maintaining a sense of orientation.

7.2.3. Keep at arm´s length

When navigating around the environment the blind student had to completely rely on the attendant. Interestingly, this responsibility was ignored by some attendants as they were either reluctant or inattentive in regard to physically guiding the blind student. There were varying degrees of both physical distances maintained by the attendant and discussions about how the blind student preferred to be held and guided. In some instances, the attendant let the blind student wander off without any physical cues as to where they were or what they were supposed to do. In one situation at the very beginning of the simulation, the attendant had no physical contact with the blind student who was walking insecurely and waving her arms in front of her. In this instance, the teacher had to intervene because the attendant showed no intention of getting closer, and the teacher suggested that the attendant should hold on to the blind student. Throughout the simulation the attendant only held the blind student lightly by the hand and always kept her at arm’s length (220926-2). Such interactions highlight what can be described as reckless behaviour on the attendant’s part. In some of these instances, the teacher had to intervene and adjust the attendant’s behaviour.

There were also times when the blind student was left all alone without knowing where the attendant was. Another way of keeping a distance was when the attendant moved at a fast pace, dragging the blind student behind, seemingly causing the blind student to lose their footing trying to keep up. In one situation the attendant kept up a fast pace then span around and pushed the blind student towards the main entrance door at the bottom level, causing the blind student to collide with the door frame. A few minutes later the blind student collided once again with a doorframe because the attendant was dragging her along. It was also noted that neither the attendant nor the blind student said anything about these collisions; however, the blind student´s body language indicated she was startled (230918-1). These interactions were typical examples of how keeping a distance made it more difficult to navigate and made the blind student more vulnerable.

7.3 Dialogue is key when adapting to health problems

This theme reveals a strong demarcation regarding students´ communication which influenced the kind of relationship they had described in the themes; “Pulling through together” and “Detached from each other”. Considering both students had health problems that impacted hearing and sight, communication proved to be a challenge. The arrow (figure 1.) illustrates that there were students who had a good rapport with each other throughout the simulation and even made improvements in their collaboration. In addition, this theme also explains that students who were “detached from each other” sometimes improved their communication during the simulation and negotiated how they should best adapt to each other’s health care problems. For that reason, they were able to move from a state of disengagement to becoming more attuned to each other and worked better together.

7.3.1. Helpful conversations

Small adjustments made a big difference, for example, adjusting the voice (speaking more clearly and/or louder) or leaning in towards and looking at each other when speaking. In one situation the blind student asked; “Can you hear me alright?” “Yes, but barely, I have tinnitus you see”, the attendant answered. “Oh, ok I see”, the blind student replied (220919). This short conversation served as a confirmation that the two students understood each other’s limitations. It also illustrates the importance of expressing the problem. It sometimes took some students more time to talk to each other about the problems they experienced and how they could best adjust for them. In one example, the attendant had noticed that the blind student could not hear her properly and halfway to the apartment she said in a raised voice; “Can you hear anything of what I am saying?”. “Yes, but can you hear me?”, the blind student replied. “Yeah, I can hear you if you talk louder” said the attendant (220919). In another situation the blind student asked the attendant; “How much can you see?”. The attendant answered; “Well not much, do you see anything?”. “No, I don’t” the blind student responded (230918-3). These are short conversations, but signal the students had a caring intention towards each other which helped them understand their respective limitations. Communicating needs could also be subtler, in one example the blind student was surprised by the effect of the suit on her balance and said; [not explicitly targeted at the attendant], “Oh God, my balance is really off!”. “Are you OK?” the attendant asked her (220919-3). This situation illustrates that helpful conversations could involve voicing a limitation (poor balance). In this case, attention was given to this articulation and there was a verbal response.

7.3.2. Communication breakdown

A breakdown in communication related to miscommunication such as not being able to hear each other clearly or misinterpreting what was being said. In one simulation, differences in height between the students seemed to play a role in miscommunication. The attendant was significantly taller and when the blind students spoke, he misheard or did not hear at all. When they were in the elevator, he had to bend so far down that they bumped their heads together (220919-2). Another aspect of mishearing was when the attendant was directed towards or away from the blind student. In one situation the attendant spoke in a low voice and faced away from the blind student, which prompted an irritated response; “I can´t hear you!” from the blind student (240205). Other examples were when the blind student voiced their need for orientation or they repeated a question but were met with silence. These conversations were observed at various points in the simulation. In one simulation, the attendant only spoke to the blind student on two occasions in almost four minutes, saying: “We are going straight ahead” when leaving the changing room, and “We are taking the elevator”, just as the students reached the doors of the elevator going down to the main floor. No words were exchanged about obstacles, such as a door leading to the elevator or threshold, and no feedback were given where they were going (230918-1). This sequence illustrates how silence can reinforce the attendant’s power and the blind student’s withdrawal. Another aspect of poor communication was manifested in the attendant’s use of unhelpful instructions when navigating and orientating in the environment. Typical of these situations was the attendant’s use of verbal directions such as “here” or “there”, although these directions were useless to the person experiencing blindness. In one situation for example the two students reached the elevator and the attendant leaned in front of their peer and said; “There should be a button *here*”, but the blind student had no idea they were even standing in front of an elevator door (240220-1).

8. Discussion

This study explored age suit simulation with a focus on interactions and sheds light on how health problems can influence the interaction and relation between two persons. This focus is innovative and novel and expands the use of age suit simulation. The context of the simulations of this study resonates with Bertogg and Strauss (44) who state that living and dealing with health problems is a common shared experience between older persons, where the less functionally limited person often cares for their spouse. As care needs become more intense, the need to share the care responsibilities with a professional caregiver is the only option, and this shared arrangement is complex.

The implication that the RN should be part of this arrangement signifies a holistic perspective on long-term health problems which resonates with person-centred care and includes taking the perspective of family members into account Ekman, Ebrahimi (45). The findings show two distinct approaches how the students worked together. It is plausible that students who worked well together also were more problem solving oriented whereas students who became distant focused more on the limitations. On this note, research shows that simulations with a focus on physical impairments in nursing education can be useful to raise awareness and empathy but often lack a representative lived experience that encompasses structural barriers to participation in society. (32, 46). Accordingly, recommendations have been made to include debriefing and reflection but also include representative input from the community and to focus on possibilities rather than functional limitations. Nevertheless, positive outcomes have also been shown to come from such simulations, such as students´ improved communication skills and confidence, as well as increased empathy and knowledge about impairments (47). The interactions observed in the theme *Detached from each other* show students being uncomfortable with each other in the simulation. However, from a pedagogical view, experiential learning requires the learner to be exposed to a situation that disrupts their habitual everyday experience because this disruption is the necessary entry point that sparks reflection in the first place (48). Moreover simulating with impairments should be considered as complementing other didactic methods in the curriculum (33).

As seen in the main theme *Pulling through together* and sub-themes *Trial and error* and *being one step ahead,* students found ways to navigate daily life together, where the attendant took it upon themselves as the less functionally impaired person to care for the blind student. Similar observations are highlighted in other research which also shows that spousal caregiving can be a lonely experience (49) and affects the relationship negatively over time (50). One example is adapting to each other's health problems, which includes the intention to create new strategies for everyday tasks involving both persons (51). Finding new strategies ties in with the findings of *Trial and error* where students were determined to carry out the scenarios in creative ways. This mindset of adapting to health problems ties in with the concept of communal coping, which occurs when health problems affect the couple as a whole and prompt collaborative actions (52). Therefore, age suit simulation can be relevant in understanding older persons' health care needs as a shared experience. Arguable and as highlighted in the theme *Pulling through together* supports the pedagogical value of the simulations, and seem to align with recommendations where there is a focus on success and possibilities rather than barriers (33). In addition, the design of the present study rests on ELT where reflection is an essential part of the learning process. As highlighted in another study the pedagogical value of age suit simulation is recognised in the students' reflections and insights about the value of giving enough time and being present when interacting with older persons, as well as their insights about the unique care environment of a person's home (29). Furthermore, in the reflection the blind person and attendant also provide feedback to each other. The findings show that some students improved their skills of interacting, guiding and communicating with a blind person, which supports previous research suggestions (31). In addition, the pre analysis interviews confirmed many aspects of the study´s findings, for example, the importance of developing a good rapport between attendant and blind person, and that the attendant should never take over but rather support the blind person in being as autonomous as possible. The legally blind person also shared her experience of feeling insecure around persons who had no experience of guiding a visually impaired person. An important insight she provided was that there are no certified attendants in home care; the attendants are care givers who may have no training in guiding blind persons whatsoever. The pedagogical value of the present study is therefore that it offers a unique opportunity for students to develop interpersonal and practical skills in a situation in which they interact with a person with multiple health problems including sensory impairments.

Furthermore, previous research also (53) suggests that incorporating a shared perspective provides a more accurate description of a couple's care needs, giving health care providers insight into how to support and strengthen mutuality within the relationship (54). The theme *Dialogue is key when adapting to health problems* highlights the consequences of communicating well or poorly when experiencing health problems. Interestingly some students managed to improve their communication and adapt to each other's health problems in a learning process observed throughout the simulation. The hands-on experience of learning through experience is also the hallmark of experiential learning (55). In comparison, another study (56) stressed the particular importance of improving nursing students' interpersonal skills with older persons because of barriers such as long-term diseases and cognitive impairments. The findings showed that simulations were appreciated as a unique opportunity for students to improve and become more confident when communicating with older persons. Interpersonal skills are also described as among the broader skills of the RN (2) as well as a prerequisite for performing person-centred care (57), and they are highlighted in the nursing ethical code (58). In regard to the simulation of blindness, previous research indicates that such simulations do not take not account being blind for many years (31, 33). Even so, first-hand experience of simulating a health problem can be useful for students to learn about the adaptations a person with health problems makes to manage everyday life (33). In addition, simulating using the personas of being blind and an attendant can help students learn about the needs of a blind person and develop skills in how to assist them. It can be argued that students' interactions described in the theme *Detached from each other*, were dominated by the impairment being simulated. Building on that point, blind persons can be met with low expectations because of their impairment (59). In the current study, the blind student was sometimes placed as a bystander and kept at arm's length rather than included as an active participant. It is plausible that the attendants distancing themselves from the blind students represented an expression of low expectations. With this in mind, the experiential learning strategy of age suit simulation can be valuable in nurse education to reveal such conceptions.

Furthermore, being an attendant to the blind can be a novel strategy for nursing students to develop their skills in guiding a blind or visually impaired person. Similarly, other research shows that when simulations in nurse education are built on the pedagogy and framework of experiential learning it can provide relevant skills training (60) and improve communication skills when educating older persons (61). An important concept in experiential learning is the learning space, which represents a challenging but safe and supportive environment where the students´ experience is respected (27). In the present study, the context of the simulations included all the above aspects in a realistic home environment. Learning in a relevant context is also advocated by nurse philosopher Patricia Benner who stresses that experiential knowledge is always contextual (62). From a broader perspective, the age suit simulations can be seen as a concrete example of merging Benner's philosophy of learning through practice with the pedagogy of experiential learning in the context of gerontology and geriatrics in nurse education. This approach can have a significant impact on nursing students' insight and understanding of older persons.

9. Strengths and limitations

The study's trustworthiness was considered in regards to the concepts of credibility, dependability, conformability and transferability (63, 64). A strength is that there was no bias regarding which students participated in the simulations as well as a large sample size implying there was a large variation in demographics which is an important aspect of credibility and transferability. The prolonged engagement of the authors in the simulations as well as the consistency in how the simulations were conducted also strengthened creditability. Creditability and transferability were enhanced by the thick description of the study's findings and context, but in the end, it is up to the reader to decide on the degree of transferability to other contexts. Dependability and conformability were strengthened by continuous discussion and feedback as the first authors kept a reflexive journal, an audit trail recording the methodological decisions and reflections. Another strength of the study was that the design of the simulations was based on the theory of experiential learning, which is relevant for educational purposes. The observer in this study was also a teacher to the students, which is recognised as a power imbalance and a possible limitation. However, in regards to potential bias, students rarely took notice of the researcher when recording the interactions. Also, as shown in the findings and especially in "detached from each other", students did not seem to have an agenda to "please the teacher". Bias may however still be considered a limitation in this study, but at the same time in reflexive thematic analysis it is assumed that the method is influenced by the researcher (42).

In regard to gender, there were substantially fewer men than women; however, investigating gender differences was not within the scope of this study but would be of interest for future studies. Another limitation is the nature of the observations because the design choice does not include the students' own perspectives on their experience. However, a future study is planned including the students' reflections on the experience of being blind and an attendant to the blind.

10. Conclusion

The findings of this study can be used to raise awareness of the value of using age suit simulation in nursing education to increase understanding of ageing with health problems such as blindness and being dependent on another person in daily life, as well as being an attendant with one's own health problems. The findings show how vision and hearing impairment can manifest in interactions between a blind person and an attendant in relation to other common health problems. Age suit simulation can therefore be an experiential teaching method in nurse education to reveal how these impairments impact communication and the challenges of adapting to each other's strengths and weaknesses. Building upon this point, the simulations provide unique experiential learning opportunities to help students develop skills in how to guide a blind person in the context of a safe home environment and achieve useful insight into being blind. The findings can also be used to support students´ understanding of informal caregivers as well as understanding of long-term health problems as a shared experience between the attendant and the person being guided. A deeper and broader understanding of the impact of health problems in daily life in a home context can expand students' knowledge of how to provide person-centred care to older persons to promote and preserve health and well-being. This study also provides insights and suggestions how to design simulations involving impairments.

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IV

Abstract

Aim

To explore the long-term effects of age-suit simulation on nursing students' perspectives towards caring for older patients

Design

The study used a prospective longitudinal design.

Methods

Multiple linear regression analysis was performed to evaluate the sustainability of age suit simulation intervention over a 4-year period among nursing students. The Perspectives on Caring for Older Patients – Short Form (PCOP-SF) scale was used.

Results

Intervention participation, female gender, prior work experience, and older age predicted higher PCOP-SF mean total scores over the course of the nursing program, including up to 1 year after graduation. The control group required almost 2 years to reach the equivalent PCOP-SF mean total score achieved by the intervention group immediately after the 2nd year post-intervention. Significant differences between men and women were observed throughout the entire nursing program and 1 year after graduation.

Conclusion

Age-suit simulation can be an effective didactic strategy to improve students' attitudes toward older patients during their training. To sustain the effects of age-suit simulation, it should be integrated consistently throughout the curriculum.

Implications for the profession and/or patient care

Age-suit simulation extends the broader concept of simulation. Such simulations are essential to future nurses' geriatric education, which requires a holistic approach for addressing older persons with complex care needs.

Relevance for clinical practice

Age-suit simulation bridges theoretical and practical knowledge of person-centered care.

Keywords

Age-suit simulation, nursing education, longitudinal, attitudes, older persons

Introduction

Nursing, a practice-based discipline, requires lifelong learning and the ability to store and retrieve knowledge over time (International Council of Nurses, 2021). The dynamic profession demands nurses' continuous development of knowledge and skills to keep pace with new developments in the field. Nurses regard continuing education as integral to their professional commitment and as a motivation to provide better patient care (Marinela Krespani et al., 2021). In Sweden, the *Close Care* reform *Nära Vård* signifies a transition in responsibilities from hospital-centred care to primary and community-based care. The reform was initiated by the Swedish government to provide person-centered care for the increasing number of predominantly older persons living with age related and multiple health problems. The reform aims to strengthen collaboration across multiple care providers, promoting coherent and seamless care across organisational boundaries for older persons. However, a challenge lies in sustaining the nursing workforce and maintaining the knowledge and skills required for this shift in responsibilities (National Board of Health and Welfare, 2025). Nursing students describe clinical practice in geriatric care as limiting to their learning process, preferring to seek other specialties and develop different nursing skills (Lea et al., 2018). This lack of interest is concerning, as nurses' attitudes influence their behavior and the quality of care they provide (Basturk & Solpan, 2022; Kydd et al., 2014). Factors associated with nursing students' attitudes toward older persons are complex, and their willingness to work with older persons can decline during clinical practice (Chai et al., 2019; McCloskey et al., 2020). Nursing curricula have also been criticized for insufficient emphasis on developing gerontological skills among future nurses. There is an international call to improve geriatric care content in nursing education. Specifically, educators must strengthen students' knowledge, understanding, and skills in caring for older persons (Venables et al., 2023). Simulation has been highlighted as an opportunity to improve students' attitudes toward caring for older persons (Lee et al., 2018;

Venables et al., 2023). It promotes positive learning outcomes, such as improved technical skills, confidence, and knowledge (Moran et al., 2018; Vangone et al., 2024), and has the potential to bridge theory and practice, making students feel more prepared for clinical placement (Hustad et al., 2019). Similarly, nursing students have emphasized the importance of developing a progressive understanding of their profession (Lundell Rudberg et al., 2022). Simulation has a long-standing tradition in nursing education as an important and flexible learning approach for teaching clinical and nonclinical skills through knowledge acquisition and critical thinking (Cant & Cooper, 2017). From an international perspective, simulation-based teaching generally focuses on developing students' clinical competence (Chabrera et al., 2021). In addition, the gap between didactic knowledge and clinical practice remains a persistent challenge in nursing education (Noone, 2023). There is also ambiguity regarding how well knowledge gained through simulation translates into clinical practice (Cant & Cooper, 2017), and a need for innovation and creativity to sustain student engagement and motivation (Martínez-Arce et al., 2024). Students who feel unprepared or perceive a discrepancy between education and clinical practice are at greater risk of leaving nursing programs (Bakker et al., 2019) or the profession early in their careers (Kox et al., 2020). International guidelines for planning and conducting simulation are well established (Alexander et al., 2015). Nevertheless, research identifies variations between countries and universities in how simulations are implemented within curricula, including differences in simulation hours, intended learning outcomes, simulation environments, and available technologies (Chabrera et al., 2021). A lack of standardization has also been observed in Scandinavian countries, despite similarities in healthcare infrastructure and bachelor's degree structures, and some consensus regarding the training of practical skills (Bölenius et al., 2024). There is evidence that simulation can enhance healthcare professionals' empathy, skills, and knowledge relevant to providing high-quality geriatric care. However, such simulations are often designed from the healthcare professional's perspective (Arrogante et al., 2022; Siew et al., 2021). Future studies should consider how different simulation designs affect students' learning, including skill development and emotional responses (Oliveira Silva et al., 2023). Age suit simulation represents a shift in perspective within simulation training, as nursing students themselves experience age-related health challenges. This perspective change has been shown to improve nursing students' empathy toward older persons (Gerhardy et al., 2022). However, controlled longitudinal studies of simulation in nursing programs remain scarce (Hayden et al., 2014). There is also a need to understand the long-term impact of age suit simulation (Nelson et al., 2023) and to explore outcome measures beyond empathy alone (Venables et al., 2019). Previous research on age suit simulation has examined students' perspectives on caring for older patients in realistic home environments, indicating that this perspective shift is a relatively new method in simulation-based nursing education. Age suit simulation can foster students' reflection on older persons' experiences, a critical component when delivering person-centered care (Bouwmeester Stjernetun et al., 2024; Bouwmeester Stjernetun et al., 2023). The objective of this study was to address this knowledge gap by exploring the long-term effects of age-suit simulation on nursing students' perspectives towards caring for older patients.

Method

Design

This study was conducted within a larger research project on age suit simulation in nursing education (Bouwmeester Stjernetun et al., 2023). A longitudinal panel design was used, involving the same sample of participants providing data at two or more points in time. This type of longitudinal design is appropriate for studying change over time (Polit & Beck, 2021). In this study, data were collected at the group level and included two cohorts: an intervention group and a control group.

Study intervention

In the 2nd year of the 3-year (180 credits) nursing programme, all nursing students participate in age suit simulation (Bouwmeester Stjernetun et al., 2023). The simulations were conducted between 2019 and 2025 at the Skaraborg Health Technology Center, located at a university in western Sweden. The center includes a highly accessible 80 m² realistic apartment equipped with health and welfare technology. By wearing an age suit and accessories (age-simulation-suit.com), students experienced age-related and long-term health problems. Each simulation session included 14–16 students, divided into two groups. The scenarios were designed by the research team.

Participants

Participants in the present study were nursing students at a university in the western region of Sweden. The sample comprised two cohorts: students (n = 2076) who had undergone the simulation intervention in the 2nd year during the fourth semester (intervention group) and students (n = 24) who had not participated in the intervention in the 2nd year during the fourth semester (control group). All students who were registered and active in the 1st, 2nd, and 3rd years of the 3-year nursing program were eligible for inclusion. Students who provided consent during the 3rd year of the program were contacted 1 year after graduation. An overview of participant characteristics is presented in Table 1.

Table 1. Participant characteristics

Participant characteristics*	Total (intervention + control)	Intervention group	Control group
Mean Age (SD)	28.72(7.16)	28.66(7.10)	33.13(7.12)
Gender			
- Male (%)	82(13.0)	79(13.5)	3(13.0)
- Female (%)	524(87.0)	504(86.5)	20(87.0)
Work experience			

- No or less than 2 years of experience (%)	78(13.5)	66(12.0)	12(50.0)
- >2 years (%)	498(86.5)	486(88.0)	12(50.0)

* Because no demographic data was collected for the control group in the 1st year, characteristics are based on the 2nd year. There is missing data for gender in one of the participants in the control group

Participants in the intervention group were nursing students in their 1st, 2nd, and 3rd years, as well as newly graduated nurses 1 year after graduation. All participants in the intervention group had taken part in the age suit simulations during the 2nd year of the nursing program. The control group comprised nursing students enrolled in the same program at the same university who, due to the coronavirus disease 2019 (COVID-19) pandemic, were unable to participate in the simulations. Instead, students in the control group were assigned to read and reflect on an article about age suit simulation (Lee & Teh, 2020). An overview of the PCOP-SF mean total scores for the total sample, as well as the intervention and control groups, is presented in Table 2.

Table 2. Overview of PCOP-SF mean total scores between total, intervention, and control groups at baseline*

Measurement (PCOP-SF)	Total (intervention + control)	Intervention group	Control group
1. Caring for older patients is usually challenging and rewarding	2.91(0.93)	2.89(0.96)	3.01(0.82)
2. It's frustrating caring for older patients	2.75(1.08)	2.85(1.04)	2.35(1.15)
3. Caring for older patients is often unpleasant work	3.09(1.08)	3.21(1.01)	3.00(1.17)
4. Caring for older patients is intellectually stimulating	2.42(0.94)	2.42(0.96)	2.40(0.85)
5. I would not choose to attend continuing education in nursing care of older patients	2.20(1.44)	2.19(1.46)	2.00(1.38)

6. Older patients are interesting to care for	2.75(1.02)	2.74(1.04)	2.78(0.96)
7. Caring for older patients is less rewarding than caring for younger patients	2.83(1.17)	2.84(1.16)	2.80(1.19)
8. Although caring for older patients is labor intensive, it is worth the investment of time and energy	3.19(0.90)	3.27(3.00)	2.89(1.04)
9. Caring for older patients is an undesirable career choice	2.75(1.25)	2.83(3.00)	2.44(1.22)

* A higher score indicates more favorable perspective on the statement of the item.

Data Collection

Data were collected throughout the 3-year nursing program (180 credits) and 1 year after graduation, between 2019 and 2025. Overall, data were collected at five time points: during the 1st, 2nd (pre- and post-intervention), and 3rd years of the nursing program, and again 1 year after graduation. In addition, demographic data (gender, work experience, and age) were included in the questionnaire.

Year 1

In the 1st year, students were informed about the study and administered the questionnaire by the research team at the start of the program, at a time when they were all gathered at the university. Data were obtained through completion of the *Perspectives on Caring for Older Patients – Short Form* (PCOP-SF) questionnaire (Burbank et al., 2018). Students were informed that completion of the questionnaire implied consent to participate in the study.

Year 2

In the 2nd year during the fourth semester, students participated in the age suit simulation intervention. The questionnaire was administered in person both before and after the intervention, following information about the study and after students provided written informed consent to participate. Students in the control group (n = 72) were sent the same questionnaire digitally via the university's survey system, and 24 of them responded.

Year 3

In the final year, the researcher (BBS) handed the students the questionnaire during their last week at the university. This questionnaire included an additional item about consent to be contacted 1 year after graduation, and, if agreed, to provide a personal email address.

1 year after graduation

One year after graduation, students who had agreed to be contacted were sent the PCOP-SF questionnaire digitally via the university's survey system using their personal email addresses.

Outcome measure

The outcome measure was the PCOP-SF questionnaire (Burbank et al., 2018) (supplementary table 1). The questionnaire consists of statements regarding perspectives toward caring for older patients, rated on a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). Higher scores indicate a more favorable perspective on the statement, with scores for negatively phrased items reversed in the analysis.

The instrument's validity and reliability were previously assessed using exploratory and confirmatory factor analyses in two independent studies, resulting in a 9-item scale. The PCOP-SF has been used in research with undergraduate and registered nurses in hospital settings (Baumbusch et al., 2017; Burbank et al., 2018), nurses in hospital and home care (Lampersberger et al., 2023), nursing students (Cheng et al., 2022; Dale et al., 2025; Liu et al., 2022), and in a Swedish nationwide study on nurses' perspectives on caring for the oldest age group (80+ years) (Holmberg et al., 2022).

Reliability analysis for the present study yielded a Cronbach's alpha of 0.738, indicating satisfactory internal consistency (Pallant, 2020). Inter-item correlation was also assessed at 0.245, which falls within the acceptable range of 0.2–0.4, particularly given that the scale contains fewer than ten items (Pallant, 2020).

Supplementary Table 1. Perspectives on caring for older patients (Burbank et al., 2018)

1. Caring for older patients is usually challenging and rewarding
2. It's frustrating caring for older patients*
3. Caring for older patients is often unpleasant work*
4. Caring for older patients is intellectually stimulating
5. I would not choose to attend continuing education in nursing care of older patients*
6. Older patients are interesting to care for
7. Caring for older patients is less rewarding than caring for younger patients*
8. Although caring for older patients is labor intensive, it is worth the investment of time and energy
9. Caring for older patients is an undesirable career choice*

* Scores are reversed in the analysis.

Analysis

For the statistical analysis, the Statistical Package for the Social Sciences (SPSS) version 28 was used. Descriptive statistics were employed to present demographic data. Chi-square analyses were conducted to compare baseline characteristics, including gender and work experience. The variable work experience was dichotomized into no work experience and work experience (0–2 years and >2 years).

As the data were not normally distributed, the nonparametric Mann–Whitney U-test was used to compare differences in the PCOP-SF mean total and item scores between groups. To evaluate differences among four groups of students, the nonparametric Kruskal–Wallis test was performed. The Kruskal–Wallis test is appropriate when there are three or more groups

(McKight & Najab, 2010; Polit & Beck, 2021). Bonferroni correction was applied in the post hoc analysis to provide a more conservative alpha value when conducting multiple comparisons (Polit & Beck, 2021; VanderWeele & Mathur, 2018). In addition, multiple regression analysis was performed with PCOP-SF mean total score as the dependent variable and work experience, gender, age, and intervention participation as predictor variables.

Results

Table 3. Response rate

Data collection method	Year 1	Year 2 pre-intervention	Year 2 post-intervention	Year 3	1 year after graduation
Questionnaire PCOP-SF (*intervention group*)	388	684	679	285	40
Questionnaire PCOP-SF (*control group*)*	91	24	-	65	11

* The control group did not participate in the age suit simulation and therefore the lack of responses post-intervention.

Change over time: Intervention group versus control group

To interpret the PCOP-SF scores, higher scores indicate more favorable perspectives on the item statement, whereas lower scores reflect less favorable perspectives (Figure 1).

PCOP-SF mean total scores

Compared with the control group, the intervention group reported significantly higher PCOP-SF mean total scores in Year 1 (2.80 vs. 2.62, $p = 0.021$), Year 2 (2.74 vs. 2.27, $p < 0.001$), and Year 3 (2.80 vs. 2.34, $p < 0.001$). One year after graduation, the intervention group still reported a higher mean total score compared with the control group (2.74 vs. 2.72), although this difference was not statistically significant ($p = 0.920$).

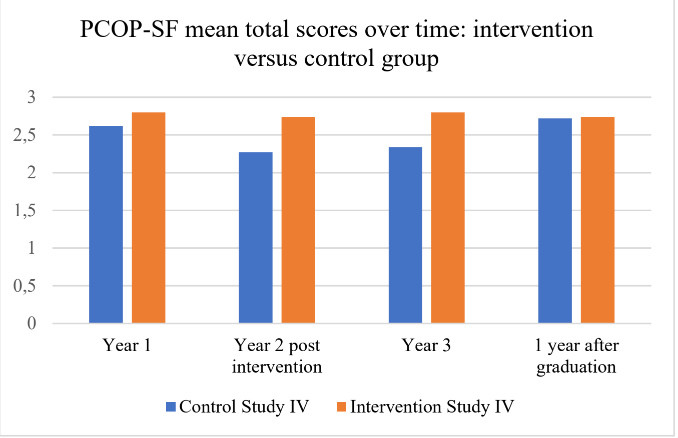

Figure 1. Comparison between the intervention and control groups in changes in PCOP-SF mean total scores from the 1st year in the nursing program to 1 year after graduation

Specific PCOP-SF items

The analysis revealed several significant differences in PCOP-SF item scores between the intervention and control groups over time (Table 5).

Table 5. Comparison between the intervention and control groups for changes in PCOP-SF items from the 1st year in the nursing program to 1 year after graduation

	Year 1		**Year 2 post-intervention**		**Year 3**		**1 year after graduation**	
Item	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control
1	2.89	3.01	3.05	2.96	3.14	2.95	3.25	3.27
2	2.85	2.35	2.32	0.67	2.74	0.56	2.48	2.36
3	3.21	2.58	3.08	2.13	3.40	2.91	3.30	3.09
4	2.42	2.40	2.39	0.96	2.49	0.98	2.53	2.27
5	2.19	2.21	2.39	2.83	1.86	3.42	1.67	1.73
6	2.74	2.78	2.80	2.83	2.71	2.5	2.65	2.64
7	2.84	2.80	2.83	2.13	2.83	1.98	2.90	3.27
8	3.27	2.89	3.20	2.88	3.14	1.06	3.15	3.09
9	2.83	2.44	2.68	3.08	2.96	2.92	2.90	2.73

Compared with the control group, the intervention group reported significantly higher scores ($p < 0.001$) on Item 2 ("It's frustrating caring for older patients") and Item 3 ("Caring for older patients is often unpleasant work") throughout Years 1 to 3. These differences persisted 1 year after graduation, although they were no longer statistically significant.

Significant differences ($p < 0.001$) were also observed for Item 4 ("Caring for older patients is intellectually stimulating") in Years 2 and 3, with higher scores in the intervention group. This trend continued 1 year after graduation, although it was no longer statistically significant.

In Year 1, the intervention group scored significantly higher on Item 8 ($p < 0.001$) and Item 9 ($p = 0.004$). In Year 3, the control group scored significantly higher on Item 5 (“I would not choose to attend continuing education in nursing care of older patients”) ($p < 0.001$). For Item 7 (“Caring for older patients is less rewarding than caring for younger patients”), the intervention group scored significantly higher in Years 2 ($p = 0.014$) and 3 ($p < 0.001$).

Regarding effect size (Table 6), a small effect was observed for the PCOP-SF mean total score in Year 3. For specific items, small effect sizes were found in Year 1 for Item 3, in Year 2 post-intervention for Item 4, and in Year 3 for Items 4, 5, and 7. A medium effect size was also observed in Year 3 for Item 2. No significant effect sizes were observed 1 year after graduation.

Table 6. Effect size of PCOP-SF items and mean total score across Year 1 to 1 year after graduation – intervention versus control group

PCOP-SF Item Effect Size	**Year 1**	**Year 2 post-intervention**	**Year 3**	**1 year after graduation**
Mean total effect size	-0.110	-0.153	-0.321	-0.015
1	-0.044	-0.020	-0.086	-0.128
2	-0.171	-0.224	-0.609	-0.075
3	-0.231	-0.150	-0.181	-0.128
4	-0.000	-0.215	-0.473	-0.109
5	-0.002	-0.059	-0.426	-0.025
6	-0.005	-0.001	-0.083	-0.005
7	-0.011	-0.093	-0.229	-0.142
8	-0.151	-0.066	-0.110	-0.005
9	-0.134	-0.054	-0.037	-0.002

Effect size interpretation: small 0.20, medium 0.50, and large 0.80 (Cohen, 2012) *$p < 0.05$, **$p < 0.001$s.

Change over time within the intervention group

Mean total score

Within the intervention group, the PCOP-SF mean total score was higher in Year 1 (M = 2.80) compared with Year 2 pre-intervention (M = 2.69). Following the intervention, the mean total score increased in Year 2 post-intervention (M = 2.74) and Year 3 (M = 2.81), before declining 1 year after graduation (M = 2.74) (Figure 2).

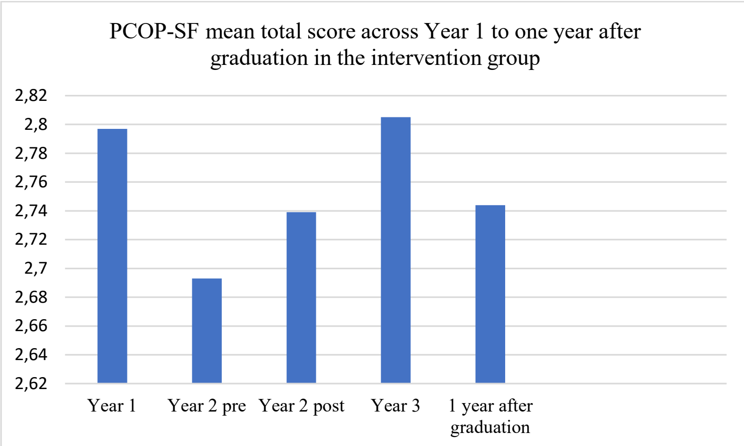

Figure 2. Mean total score of the intervention group across Year 1 to one year after graduation

Mean total scores for gender

Within the intervention group, no significant differences in PCOP-SF mean total scores were found for gender in Year 1 (p = 0.076) or Year 2 pre-intervention (p = 0.051) (Figure 3). Significant differences were observed in Year 2 post-intervention (p = 0.006) and Year 3 (p = 0.002).

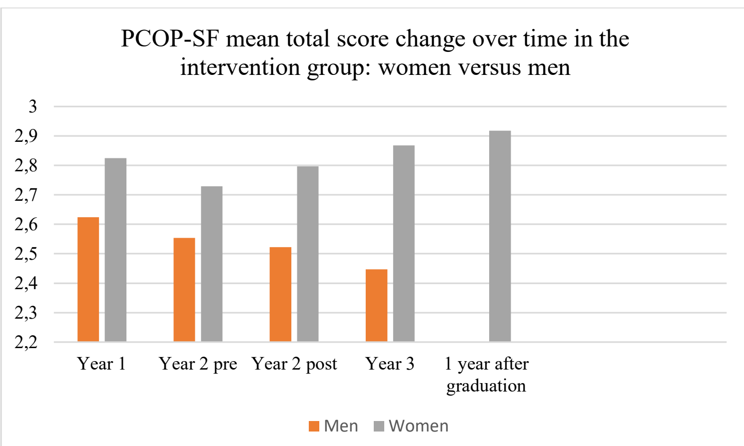

Figure 3. Comparison of PCOP-SF mean total scores between women and men in the intervention group

Men reported their highest mean total score in Year 1 (M = 2.62), followed by declines in Year 2 (pre-intervention M = 2.55; post-intervention M = 2.52) and Year 3 (M = 2.45). No data were available for men 1 year after graduation.

Women showed a slight decline from Year 1 (M = 2.83) to Year 2 pre-intervention (M = 2.73), but their scores increased after the intervention and continued to rise throughout the program: Year 2 post-intervention (M = 2.80), Year 3 (M = 2.87), and 1 year after graduation (M = 2.92).

Women versus men: Specific items

Women reported higher scores compared to men across all items and years (Table 7). Significant differences were noted as follows: Year 1, Item 4; Year 2 pre-intervention, Items 3 and 7; Year 2 post-intervention, Items 3 and 7; Year 3, Items 3, 7, 8, and 9; and 1 year after graduation, Items 4, 6, and 8.

Mean total scores for work experience

Across all years, students with no work experience and those with 1–2 years of experience did not differ significantly. The most experienced students consistently scored higher than the inexperienced group in Years 1 and 2. They also outperformed the 1–2-year group in Year 1, Year 2 pre-intervention, and Year 3. However, no significant differences were observed between the most experienced and 1–2-year groups post-intervention in Year 2, nor between the most experienced and inexperienced groups in Year 3 (Figure 4).

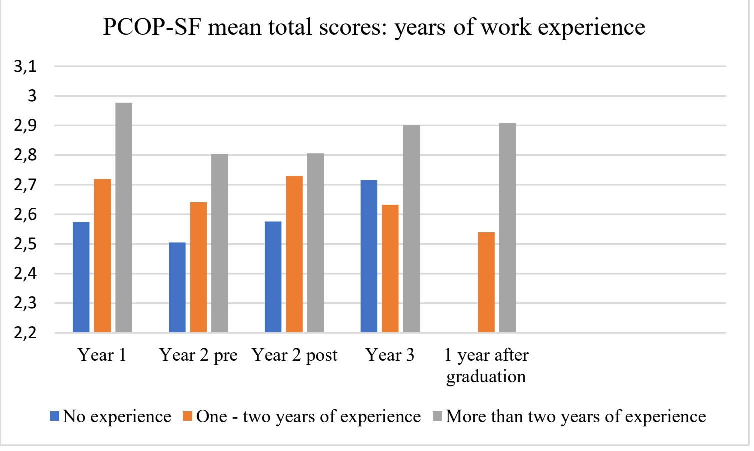

Figure 4. Comparison of PCOP-SF mean total scores across Year 1 to 1 year after graduation for work experience

Students with no work experience improved their PCOP-SF mean total score over the course of the nursing program, except for a decline between Year 1 (M = 2.57) and Year 2 pre-intervention (M = 2.51), reaching their highest mean total score in Year 3 (M = 2.72).

No data were available for students with no work experience 1 year after graduation. Students with <2 years of experience reported a lower PCOP-SF mean total score in Year 2 pre-intervention (M = 2.64) compared with Year 1 (M = 2.72). Their scores increased post-intervention (M = 2.73) but declined in Year 3 (M = 2.63) and 1 year after graduation (M = 2.54).

Conversely, students with >2 years of experience scored higher in Year 1 (M = 2.98) than in Year 2 pre-intervention (M = 2.80). Their scores increased post-intervention (M = 2.80), continued to rise in Year 3 (M = 2.90), and showed a slight further increase 1 year after graduation (M = 2.91).

Multiple regression analysis

Multiple regression analysis revealed that all predictor variables—gender, work experience, age, and intervention participation or control group—significantly influenced PCOP-SF mean total score (Table 7).

Table 7. Four-model multiple regression analysis including the factors of work experience, intervention participation, gender, and age

Mode	Factor	B	SE	Beta	t	Sig
1	(Constant)	2.397	0.054		44.065	<.001
	Work experience	0.144	0.022	0.155	6.609	<.001
2	(Constant)	2.408	0.054		44.721	<.001
	Work experience	0.149	0.022	0.161	6.914	<.001
	Intervention or control	-0.42	0,067	-0.146	-6.295	<.001
3	(Constant)	2.003	0.096		20.841	<.001
	Work experience	0.147	0.021	0.158	6.835	<.001
	Intervention or control	-0.401	0.066	-0.14	-6.049	<.001
	Gender	0.22	0.043	0.117	5.074	<.001
4	(Constant)	1.756	0.115		15.34	<.001
	Work experience	0.14	0.021	0.151	6.531	<.001
	Intervention or control	-0.42	0.066	-0.146	-6.334	<.001
	Gender	0.227	0.043	0.121	5.24	<.001
	Age	0.008	0.002	0.091	3.922	<.001

More prior work experience, being part of the intervention group rather than the control group, female gender, and older age were associated with higher PCOP-SF mean total scores, indicating more favorable perspectives toward caring for older patients.

Discussion

This study provides insights into the long-term effects of age suit simulation on nursing students' perspectives toward caring for older patients. Considering the increasing aging population and the prevalence of ageist attitudes, occurring at both interpersonal and institutional levels within the healthcare system and which undermine the quality of life of older persons (Araújo et al., 2023), it is important to more fully understand how future nurses' attitudes are shaped during their education (Dahlke et al., 2024). In this study, the PCOP-SF scores in the intervention group consistently exceeded those in the control group. The improvement in PCOP-SF scores persisted across the 3-year nursing program. By comparison, one previous study investigated the long-term effects of age suit simulation using empathy as the outcome measure. Although the intervention showed limited long-term effects, these were limited to 3 months post-intervention (Jeong & Kwon, 2021). In contrast, the present study spanned 4 years, and both intervention and control groups reported higher mean total scores in the 1st year compared with later in the program. These initial positive attitudes align with previous research indicating that students may have positive, and sometimes idealized, views about the nursing profession (Lundell Rudberg et al., 2022). Similarly, a review found that students expressed greatest interest in gerontology at the beginning of the nursing program, potentially due to positive clinical experiences during the early stages in the curriculum (McCloskey et al., 2020). Conversely, other research has reported that nursing students may have less favorable attitudes at the start of their education compared with the final year (Venables et al., 2023). In the present study, following the intervention, PCOP-SF mean total scores continued to increase up to the 3rd year of education. This finding aligns with a previous study suggesting that students with the least experience derive the greatest benefit from age suit simulation (Bouwmeester Stjernetun et al., 2024). This is consistent with evidence that previous experience with older persons contributes to positive attitudes among nursing students (López-

Hernández et al., 2021). Another study using the same 9-item instrument, along with other measures of nursing students' attitudes, found that a general positive attitude predicted increased willingness to care for older persons (Cheng et al., 2022). A sense of professionalism is another factor associated with more positive attitudes toward older persons (Bahadir-Yilmaz, 2018). An important finding in the present study was that it took the control group approximately 2 years—from Year 2 post-intervention to 1 year after graduation—to reach a mean total score close to that reported by the intervention group immediately after Year 2 post-intervention. On a related note, educators have highlighted the challenges of addressing the complex care needs of older persons (Rayner et al., 2023). It is therefore plausible that age suit simulation can, to some extent, compensate for the lack of practical experience, serving as an important complement to theoretical knowledge in gerontology and geriatric care.

Strengths and limitations

A strength of this study is the use of a validated instrument with satisfactory internal consistency across a large sample and an extended duration. Another strength, in terms of internal validity, is that there was no selection bias, as all students were eligible to participate. The diversity of participants also enhances external validity. Regarding the simulation context of experiencing health problems in a home-like environment, the results are considered relevant for multiple healthcare professionals. A limitation related to validity is that the questionnaire was completed at the university, which some students may have perceived as a test they needed to perform well on. Other limitations include the small size of the control group, the low response rate 1 year after graduation, and the potential influence of confounding factors during clinical practice as novice nurses. A particular challenge was the very low number of students responding to the questionnaire 1 year after graduation. To the best of our knowledge, this is the only longitudinal study exploring the outcomes of age suit simulation on students' perspectives on caring for older patients over a 4-year period.

Conclusion and future directions

This study indicates that age suit simulation has positive effects on students' perspectives on caring for older patients during the course of their education. Future studies could examine additional factors influencing novice nurses' perspectives toward caring for older persons, such as knowledge about aging.

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Knowing Me, Knowing You

- Bridging Perspectives through Age Suit Simulation Intervention in Nursing Education

Following the Good and Close Care reform, future nurses are expected to a greater extent to care for older persons in the home, where person-centred care is a fundamental underpinning value. In light of the fact that nursing students may feel unprepared and unmotivated for geriatric care, as well as internalize negative stereotypes of older persons, there is a need for innovative didactic strategies that can support nursing students' understanding of the perspective of older persons experiencing age-related and long-term health problems.

Age suit simulation is designed to allow students to 'walk in an older person's shoes' and has been shown to improve attitudes and empathy toward this population. In this thesis, the need to expand the understanding of age suit simulation as a didactic strategy in nurse education was further explored. The overall aim of this thesis was to study nursing students experiences of an age-suit simulation intervention grounded in experiential learning in a home environment.

The results showed that the age suit simulation was an embodied and challenging experience that when reflected on facilitated the students' self-awareness. They gained new insights and understanding regarding age, older persons and caring for older persons. The results also indicate that some effects of the simulation are sustained over the course of the nursing program and into one year after graduation.

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