

**A CASE STUDY ON THE ACCEPTABILITY OF A STANDING  
INTERVENTION AMONG RESIDENTS IN LONG-TERM CARE SETTINGS**

by

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## **ABSTRACT**

Older adults living in long-term care institutions spend about 90% of their time sitting or laying down which can be linked to health conditions. Few studies explored if standing is deemed acceptable among adults in long-term care settings. The purpose of this case study was to explore how residents living in long-term care institutions accept a standing intervention and why or why not did they accept standing according to an acceptability framework. There were 10 participants interviewed after completing a 5-month intervention with standing sessions 100 minutes a week. Interviews, participant characteristics, and standing time was analyzed. Most residents seemed to accept the intervention by reporting a positive attitude, limited burden, good ethicality, intervention coherence, no opportunity costs, perceived effectiveness, and self-efficacy which aligned with the acceptability framework. Participants stood a median of 53% of the intervention. Standing seemed to be an accepted and novel intervention in long-term care.

## **DEDICATION**

I dedicate this report to my grandparents who have supported me throughout my entire academic career

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## Chapter 1 - Introduction

As the proportion of older adults increases worldwide (United Nations Department of Economic and Social Affairs, Population Division, 2019), more people are in need for accommodations with greater level of services. In fact, aging normally brings forth life transitions resulting in relocating to more supportive environments like long-term care institutions where residents have specific needs. Threats to quality of care have been reported in long-term care settings partly due to their services not being built around their needs (Vaismoradi et al., 2016; Wang et al., 2016). For example, residents are spending up to 90% of their day in a sitting or lying position (Lee, Sénéchal, Hrubeniuk, et al., 2020) even if it is recommended to limit sedentary activities to eight hours per day while awake and to break up sitting time as much as possible (Canadian Society for Exercise Physiology, 2021). Increased sedentary time could decrease physical function and increase the risk of disability and mortality (Copeland et al., 2017).

Standing has been recommended to be the first step to engaging in more activities among people who are inactive (Dogra et al., 2021). However, there is limited research on sedentary behavior interventions (Petrusevski et al., 2020) especially in long-term settings since participants with declines in physical and mental function are usually excluded from studies. Additionally, the acceptability of any intervention is important to consider when having effective long-term implementation. Specifically in the area of sedentary behavior in long-term care settings, to our knowledge, not much is known about the acceptability of a standing intervention. Although Giné-Garriga, Dall, et al. (2020) deemed that prompted resident-led movement goals was a highly acceptable sedentary behavior intervention in long-term care settings, acceptability was only



measured through satisfaction rates and preliminary effects and standing was not the main focus. A pilot study conducted by the Cardiometabolic Exercise and Lifestyle Laboratory reported that a standing intervention consisting of ten-minute standing sessions, three times a day, four days per week over ten weeks were attended more during the mornings and weekdays in long-term care settings (Lee, Sénéchal, Read, et al., 2020). Using a framework of acceptability to help explore how residents respond to a standing intervention would help allow participants' voices to be heard, give insight into the different components of acceptability, and overall help determine if standing interventions are acceptable in such settings (Sekhon et al., 2017).

In 2019, the Stand If You Can randomized control trial registered at the 'ClinicalTrials.gov' (NCT03796039) was conducted that aimed to improve the physical function of ninety-six older adults living in long-term care institutions. Participants were randomized to either the intervention group where they were encouraged to stand 100 minutes per week or the control group where they were not invited to stand. The results concluded that there were no significant differences in physical function in the intervention group when compared to the control group (Bouchard et al., 2021). However, the research team reported that the residents had a positive attitude towards the intervention.

Exploring the perspectives of older adults with various cognitive and physical limitations living in long-term care institutions would be novel since the perspectives of this population are usually not considered in interventions (Tak et al., 2014; Vaismoradi et al., 2016). Having the voices of long-term care residents be heard could help develop interventions that meet the interests and needs of residents. Therefore, the purpose of this

case study was to explore the acceptability of this standing intervention through the lens of the theoretical framework of acceptability (Sekhon et al., 2017). This was a secondary analysis of the data collected from the Stand If You Can randomized control trial. Based on the purpose, this research addressed the following questions:

1. How was a standing intervention accepted among older adults in long-term care institutions?
2. Why or why not did older adults accept the standing intervention according to the Theoretical Framework of Acceptability?

To address the following research questions, an intrinsic case study was used to explore how long-term care residents accept standing. The interviews were analyzed inductively and deductively guided by the Theoretical Framework of Acceptability to gather comprehensive findings on participants' acceptability of standing by using a thematic analysis method. As a result, an article-based thesis approach was taken to address these research questions.

## **Chapter 2 - Literature Review**

With the population currently aging, there is an increased risk of more adults experiencing decreases in physical and mental capacities which could lead to becoming frail, losing independence, and requiring support from long-term care institutions. Despite long-term care institutions having the responsibility to give high quality of care, most residents are classified as highly sedentary which can increase the amount and severity of adverse effects on their health that they experience. With the underrepresentation of research on sedentary behavior interventions for older adults living in long-term care institutions and the growing importance of considering the acceptance of an intervention, a thorough literature review must be conducted on these concepts. This literature review reports on how the population is aging and its ramifications, describes the need for supportive living arrangements like long-term care institutions, goes over sedentary behavior and the importance of having sedentary behavior interventions for residents in long-term care settings, and goes over the importance of assessing the acceptability of sedentary behavior interventions and using a Theoretical Framework of Acceptability.

### **World Population Aging**

An important demographic shift happened in the past decades where the average age around the world has increased dramatically, especially in developed countries (World Health Organization, 2018). The proportion of older adults (65 years and over) has nearly doubled on average from 9% in 1960 to 17% in 2017 across countries and is expected to continue to rise to 27.1% by 2050 (Organisation for Economic Co-operation and Development, 2019). The population is aging due to a constant decrease in fertility

rates and increases in life expectancy (Organisation for Economic Co-operation and Development, 2019; Statistics Canada, 2013; United Nations Department of Economic and Social Affairs, Population Division, 2020). The global fertility rate has decreased since 1990 from 3.2 births per woman to 2.5 in 2019 and this trend is predicted to continue (United Nations Department of Economic and Social Affairs, Population Division, 2019). Additionally, the global life expectancy has increased from 64.2 years in 1990 to 72.6 years in 2019 with a predicted 77.1 years in 2050 (United Nations Department of Economic and Social Affairs, Population Division, 2019).

Although the average age of the population is increasing, the oldest age group (people 80 years of age and older) has been even more rapidly rising globally (United Nations Department of Economic and Social Affairs, Population Division, 2019). People aged 80 years and over are predicted to triple from 143 million in 2019 to 426 million in 2050 (United Nations Department of Economic and Social Affairs, Population Division, 2019). Even centenarians (people ages 100 and older) that only make up a small portion of the world's population are growing due to gains in life expectancy (Statistics Canada, 2018). Overall, the proportion of older adults is increasing which could place a large demand on addressing the needs of this population.

Having an aging population would not strain the economy if people were experiencing their extended lifespans in good health. Healthy life years is also known as “disability-free life expectancy” and it is defined as “the number of years spent free of activity limitation” (Organisation for Economic Co-operation and Development, 2019, p. 220). People at age 65 can currently expect to live another 19.7 years on average across countries that are members of the Organisation for Economic Co-operation and

Development (2019). Although this sounds promising, not all additional years gained are in good health (de Meijer et al., 2012). Only 9.5 years out of the 19.7 additional years (48%) are expected to be healthy life years across many countries (Organisation for Economic Co-operation and Development, 2019). It is important to note that males live a greater proportion of their healthy life years after age 65 compared with females living with possible mild disabilities (Bushnik et al., 2018) despite females living almost an additional three years (Organisation for Economic Co-operation and Development, 2019). Overall, extended lifespans are still shown to be accompanied by declines in physical and mental capabilities since the risk of chronic diseases and other adverse conditions rise with increasing age (World Health Organization, 2015).

### **Impacts of Aging**

Aging begins at birth affecting all physiological processes. However, aging is typically associated with later stages of life where there is an accumulation of physiological changes that leads to progressive deterioration that results in declining independence and frailty (Bouchard & Webb, 2021). Aging occurs as molecular and cellular damage accumulated over time that leads to a gradual decrease in mental and physical capacity (World Health Organization, 2018).

It is important to note that the effects of aging impact people differently despite their chronological age (World Health Organization, 2018), which is defined by the years lived (Belsky et al., 2015). For example, people accumulate health problems at different rates as they age (Abellan Van Kan et al., 2009; Belsky et al., 2015). Therefore, older adults are a challenging population to study since they constitute a heterogeneous

population due to huge differences in disease profiles and health statuses that result from aging (Abellan Van Kan et al., 2009; de Souto Barreto et al., 2016; Tobis et al., 2021).

There are many different common conditions associated with aging. Older adults (65 years and over) commonly experience hearing loss, cataracts, pain, osteoarthritis, chronic obstructive pulmonary disease, diabetes, depression, and dementia (World Health Organization, 2018). As people age, they are more likely to experience multiple conditions (Fried et al., 2004; Lee et al., 2009). For example, one-third of Canadian older adults are living with two or more chronic diseases (Public Health Agency of Canada, 2020).

Older age is also characterized by the emergence of geriatric syndromes which are multi-factorial conditions that commonly affect older adults that are not clearly classified as a specific type of disease (Copeland et al., 2017). Research has stated that geriatric syndromes include frailty, functional/mobility decline, falls, urinary incontinence, delirium, depressive symptoms (Copeland et al., 2017; Flacker, 2003; Inouye et al., 2007; World Health Organization, 2018), and loss of senses (Flacker, 2003). Cognitive impairment is a prevalent geriatric syndrome and has been shown by a longitudinal observational study of 1760 older adults to be independently associated with a higher risk of functional decline (Fedecostante et al., 2020). The Mini-Mental State Examination is a validated tool that can assess overall mental status; therefore, indicating whether older adults have dementia (Kurlowicz & Wallace, 1999; Trivedi, 2017). This tool is flexible since it can be used in a variety of settings since it is effective with institutionalized older adults (Kurlowicz & Wallace, 1999; Trivedi, 2017). Studies that focused on institutionalized adults' physical activity, sedentary behavior, or perceptions have used

the Mini-Mental State Examination to evaluate participants' cognitive levels (de Souto Barreto et al., 2016; Lehto et al., 2017; Tak et al., 2015).

A cross-sectional analysis of 11 093 older adults suggested that geriatric syndromes are better predictors of death than specific diseases while also having an independent strong association with functional disability (Cigolle et al., 2007). Therefore, it was not surprising that geriatric syndromes were highly prevalent in frail older adults (Flacker, 2003; Inouye et al., 2007).

### ***Frailty***

Physical function is an indicator of a person's health status, overall quality of life, and is a predictor of death (Copeland et al., 2017). It was hypothesized that diseases or physiologic changes of aging could initiate frailty. There is currently no standard definition of frailty; therefore, there are multiple tools to quantify it (Chen et al., 2014; Ofori-Asenso et al., 2019; Yaksic et al., 2019). However, members of a consensus group agreed that frailty should be defined as "A medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death" (Morley et al., 2013, p. 393). Frailty can be described based on physical, psychological elements with the underlying idea that this is a condition that can be either worsened or improved over time (Morley et al., 2013). The ability to perform basic activities of daily living affects the enjoyment levels and independence of older adults (Bouchard & Mayo, 2021). As an individual's physical function levels decrease, the risk of institution increases since assistance is needed for daily activities (Rikli &

Jones, 1999). Therefore, frailty can initiate the need for living in a long-term care institution and affect participation in activities.

Although the phenotype and the accumulation of deficits model measured by the frailty index has been the two main approaches to frailty assessment (Chen et al., 2014; Clegg et al., 2013; Lachmann et al., 2019), the Clinical Frailty Scale has emerged to become a popular assessment tool as well (Rockwood et al., 2005). The Clinical Frailty Scale is a 9-point scale (0-9; 0 being best) that has been used across many different settings (in-patient and out-patient care) and is associated with death, function/mobility, and institutionalization (Church et al., 2020). This assessment tool can help inform intervention developers on the range of services needed for a certain population that aligns with their overall needs. Therefore, frailty status is important to consider when describing a population.

### **Living Arrangements for Older Adults**

While the majority of older adults want to stay in their homes as they age, aging may bring forth life transitions in living arrangements where relocations to more supportive environments are needed to support their needs. In Canada, 7.9% of older adults lived in collective dwellings where full support was needed (Statistics Canada, 2018) which is often referred to as long-term care settings.

### ***Long-Term Care Settings***

Long-term care refers to “a range of services required by persons with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent for an extended period to help with basic activities of daily living (e.g., bathing, dressing, eating, going to the bathroom)” (Colombo et al., 2011, p. 11). Since demand for long-



term care is highly dependent on age, the increasing proportion of older adults will increase the need and length of long-term care services (de Meijer et al., 2012). This situation increases the need and the public costs related to long-term care settings (de Meijer et al., 2012; Statista Canada, 2021).

Once living in a long-term care setting, residents try to make it feel like home by focusing on continuity in their normal activities, preserving personal identity, belonging, and being active and working (Cooney, 2012; Vaismoradi et al., 2016). Tobis et al. (2021) applied a cluster approach to group 242 residents aged 75-102 years old based on similar cognition, depression, and level of dependency scores. Unfortunately, they found residents with a higher score in depression and with cognitive and physical impairments had more needs and unmet needs than their peers. Therefore, there is a need to provide activities that are inclusive for all or most residents.

Worldwide, threats to the quality of care in long-term care institutions focusing mostly on just keeping residents alive, not supporting dignified and meaningful living, and having services built around service providers were reported (Kehyayan et al., 2015; Vaismoradi et al., 2016; J. Wang et al., 2016; World Health Organization, 2015). This highlighted the need to have services built around the needs and preferences of residents. Caring for people with cognitive impairment was ranked as the top research priority followed by maintenance of physical function, and meaningful daily activities from an international policy survey across a range of knowledgeable stakeholders and disciplines (Morley et al., 2014). These priorities were also supported by research (Vaismoradi et al., 2016).

Many residents of long-term care institutions have specific characteristics such as low physical function (Srithumsuk et al., 2020), frailty (Clegg et al., 2013), being majority female (Kehyayan et al., 2015; Lee et al., 2009; Srithumsuk et al., 2020; Tobis et al., 2021), and living with multiple chronic conditions (Lee et al., 2009; Nihtilä et al., 2008). Srithumsuk et al. (2020) followed 1098 older adults aged 70 to 100 through a cohort study and found that being in the oldest age group was a predictor for needing long-term care which illustrated that older people usually show a decrease in health. Gaugler et al. (2007) found that three or more activities of daily living dependencies, cognitive impairment, and prior use of long-term care services were the strongest predictors of long-term care institution admission through a meta-analysis. A systematic review of 47 articles concluded that there is an increased risk in long-term care institution admission for each point decrease in the Mini-Mental State Examination score as well (Wang et al., 2013). At no surprise, another systematic review explained that the prevalence of dementia in long-term care institutions was almost five times higher than in the general population (Toot et al., 2017).

Rolland et al. (2009) found that residents live in a long-term care institution for an average of  $4.1 \pm 4.4$  years while Tobis et al. (2021) found the average length of stay was  $6.1 \pm 5.6$  years. It was shown that institutionalized older adults with dementia, Parkinson's, mental health problems, or a stroke stayed in institutions longer compared to residents with other conditions (Nihtilä et al., 2008). One of the emerging topics related to older adults living in long-term care settings is the fact that they spend most of their days sitting and laying. This attracted attention since sedentary behavior was identified as an independent predictor of health (Biswas et al., 2015; Ekelund et al., 2016).

## **Sedentary Behavior**

The most widely adopted definition of sedentary behavior is “any waking behavior characterized by an energy expenditure  $\leq 1.5$  metabolic equivalents while in a sitting or reclining posture” (Tremblay et al., 2017, p. 5). Sedentary behavior is different than physical inactivity since it is defined as not meeting the physical activity recommendations of achieving a minimum of 150 min/week of moderate to vigorous-intensity physical activity often called exercise (Bull et al., 2020). The World Health Organization Guidelines on physical activity started incorporating sedentary behavior in their newly released physical activity guidelines (Bull et al., 2020). These new recommendations were made based on the growing literature showing that all levels of physical activity are impacting health. It was recommended to limit sedentary activities to 8 hours per day while awake and to break up sitting time as much as possible (Canadian Society for Exercise Physiology, 2021).

Overall, this modifiable behavior has been associated with undesirable health conditions like chronic diseases (Copeland et al., 2017), low physical (Barone Gibbs et al., 2017; Copeland et al., 2017; Gennuso et al., 2016; Mañas et al., 2017; Santos et al., 2012; Seguin et al., 2012) and cognitive function (Falck et al., 2017), frailty (Kehler et al., 2018), and an increased risk of mortality (Copeland et al., 2017; Dogra et al., 2017). A large study of diverse women (n= 63, 231) aged 50-79 years old highlighted that sitting time is associated with reduced physical function (Seguin et al., 2012). The study showed that women sedentary less than six hours a day had three times greater physical function scores compared to women reporting more than 11 hours of sedentary behavior a day once adjusted for physical activity. Prolonged sedentary time is also independently

associated with falls (Copeland et al., 2017), especially among those with mobility limitations (Jefferis et al., 2015). Not only total time sitting but also the number of breaks in sedentary time is associated with increased performance on functional tests (Copeland et al., 2017), reduce odds of limitations in instrumental activities of daily living (Copeland et al., 2017), and adverse conditions like obesity (Healy et al., 2008). Therefore, a systematic review of observational studies has shown that frailty can be impacted deleteriously by high levels of sedentary behavior (Kehler et al., 2018).

Sedentary time is an important topic among older adults since the proportion of time spent sedentary increases with age (Sparling et al., 2015). In long-term care institutions, it was reported that residents were spending 90% of their awake time either sitting or lying (Lee, Sénéchal, Hrubeniuk, et al., 2020).

### ***Interventions to Reduce Sedentary Behavior***

The research suggested that reducing sedentary behavior through regular exercise interventions is not as effective as specific sedentary behavior interventions (Barone Gibbs et al., 2017; Petrusovski et al., 2020; Prince et al., 2017). Sedentary behavior interventions focused on either breaking up periods of prolonged sitting time or decreasing overall sedentary time (Petrusovski et al., 2020). Specifically, in long-term care settings, it may be more practical and attainable to focus on the lower end of the physical activity spectrum such as standing among residents since not all residents can perform moderate-to-vigorous physical activity (Copeland et al., 2017; de Souto Barreto et al., 2016; Dogra et al., 2021; Ross et al., 2020; Sparling et al., 2015). When releasing the new physical activity guidelines in Canada, Ross et al. (2020, p. 77) supported this

view by stating that “engaging in light physical activity is feasible for most if not all adults regardless of age” since the benefits outweigh any potential harm.

Although most sedentary interventions showed promising results in reducing sedentary time (Butte & Levy, 2020; Martin et al., 2015; Petrusevski et al., 2020; Prince et al., 2017; Rosenberg et al., 2020) and increasing standing time (Butte & Levy, 2020; Rosenberg et al., 2020), most studies were quantitative and focused on relatively young, healthy, or community-dwelling older adults (Butte & Levy, 2020; Copeland et al., 2017; Petrusevski et al., 2020; Voss et al., 2020). Additionally, most studies were focused on individual behavior change like education, increasing self-awareness, and goal setting (Copeland et al., 2017; Petrusevski et al., 2020; Voss et al., 2020). For example, Butte and Levy (2020) conducted a 12-week sedentary intervention called “Stand Up Now” that recruited 71 inactive older adults with an average age of  $86.6 \pm 6.6$  who were still independent in their living environment for activities of daily living, but had either moderate to low physical function. Butte and Levy (2020) primarily aimed to examine if behavior change techniques (goal-setting, self-monitoring, counseling sessions, discussions, prompts, feedback, etc.) could either increase sit-to-stand transitions (break in sedentary time) or decrease total sitting time. They found that sitting time was reduced and standing increased after 6 weeks which was maintained for 12 weeks. Voss et al. (2020) tested a sedentary behavior intervention with a similar sample as Butte and Levy (2020) and they found no significant changes in measured and self-reported sedentary behavior and standing time. However, it is important to note that the sample that had the lower baseline physical function decreased their sitting time the most after the

intervention. Therefore, sedentary behavior interventions might be best suited for older adults with lower baseline physical function.

Although there were limited sedentary behavior interventions on older adults in long-term care institutional settings, Giné-Garriga, Dall, et al. (2020) and Lee, Sénéchal, Read, et al. (2020) both conducted interventions that concluded being acceptable for this population. Giné-Garriga, Dall, et al. (2020) conducted a 12-week pilot randomized clinical trial testing the acceptability through satisfaction rates and preliminary effects of a sedentary behavior intervention among 31 residents (mean age 82.9 years). This was the first study that co-created the intervention with residents, staff, family members, and policymakers. Residents were encouraged to make and complete movement goals through regular sessions and goal-oriented prompts. Their only exclusion criteria were residents with an end-stage disease or with severe dementia. Although their study was deemed highly acceptable and resulted in health improvements, staff reported on the importance of having interventions that are simple and flexible to account for people with reduced functional and cognitive capacity (Giné-Garriga, Sandlund, et al., 2020).

Lee, Sénéchal, Read, et al. (2020) conducted a 10-week pilot study in a long-term care institution that consisted of 24 residents participating in planned and supervised 10-minute standing sessions three times a day for four days a week. Participants just had to be able to stand for five consecutive minutes, provide consent or had a power of attorney provide consent, and have the status of independent transfer. They found that there was low attendance (35%), but showed that standing was a safe and well-accepted activity, especially during the weekday morning sessions, by considering attendance and resident comments throughout the intervention. These findings supported Ross et al. (2020) and

Dogra et al. (2021) in suggesting that an effective sedentary behavior intervention for inactive adults is to reallocate sedentary behavior to light physical activity by starting with just standing for short periods. Therefore, individuals that can do a sit-to-stand transition are given an attainable starting point that hopefully will lead to more sustainable behavior changes in being active.

Overall, Petrusovski et al. (2020) highlighted that future studies need to start addressing sedentary behavior among older adults in long-term care institutional settings. Research suggested that a good start is to implement sedentary behavior interventions that focus on increasing standing time for people that have functional and/or cognitive limitations. Although research has indicated that standing seems to be acceptable, there are limited intervention studies that assessed acceptability qualitatively to explore contextual and personal factors among older adults (McGowan et al., 2019). Additionally, there has not been any research found on directly examining the acceptability of a standing intervention for adults in long-term care settings.

### **Acceptability of Interventions**

According to Sparling et al. (2015), more research is needed on how to promote the reduction of sedentary behavior, especially for older adults living in long-term care settings where the feasibility is unknown (Barone Gibbs et al., 2017; Petrusovski et al., 2020). An important component of feasibility is acceptability (Skivington et al., 2021). As older adults' needs and capabilities differ from general adults, finding the most acceptable approach to reducing sedentary time is crucial for adherence and yielding successful results. Skivington et al. (2021) explained that interventions could fail at being implementable, cost-effective, and transferable if they are not acceptable. Acceptability

may also help explain reasons to why participants discontinue or withdraw from an intervention (Sekhon et al., 2017).

The Medical Research Council in the United Kingdom has published guidance documents on how to appropriately design and evaluate complex interventions so they can be effective (Campbell et al., 2000; Craig et al., 2013; Skivington et al., 2021). A complex intervention is when it includes several interacting components and is commonly used in health and social services (Skivington et al., 2021). Acceptance is a growing concept since the most recent guideline published in 2021 referenced the term at least double the amount of time of any other guideline published beforehand. However, there was no mention of a standardized conceptual and operational definition of acceptability. Sekhon et al. (2017, p. 4) conducted an overview of reviews on the acceptability of healthcare interventions and proposed the following conceptual definition: “A multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention”. Therefore, they are stating that acceptability can be measured before, during, or after the intervention.

One way to improve the acceptability of interventions would be to engage intervention users to help inform them on possible refinements. The literature has suggested that acceptability can be assessed through older adult’s perceptions (McGowan et al., 2018; Sekhon et al., 2017), beliefs (McGowan et al., 2018), attitudes (McGowan et al., 2018; Sekhon et al., 2017), perceived barriers (McGowan et al., 2018; Sekhon et al., 2017), perceived facilitators (McGowan et al., 2018; Sekhon et al., 2017), experiences (Sekhon et al., 2017), satisfaction (Giné-Garriga, Dall, et al., 2020; Sekhon et al., 2017),



and through behavioral assessments like dropout rates, discontinuation rates, and uptake rates (Sekhon et al., 2017). Most studies focused on measuring acceptance through behavioral assessments and ignored the value of participant-reported evaluations of acceptability (Sekhon et al., 2017). Overall, approaches are needed that include users' cognitive and emotional responses towards the intervention to generate knowledge on how to successfully implement interventions that are effective to overall contribute to health research (Sekhon et al., 2017; Skivington et al., 2021).

### ***Incorporating Long-Term Care Residents in Research***

Since long-term care institutions are complex organizational settings, residents require specific consideration when trying to involve them in research (Backhouse et al., 2016). For example, Backhouse et al. (2016) conducted a systematic review aimed to determine how long-term care residents can be involved in research. They suggested that meetings should be held in familiar sections of the long-term care institutions and the communication and interpersonal skills of the research staff were shown to be crucial to fostering good relationships with the residents while providing encouragement and support. Overall, residents living with dementia might impact how they are involved in research and how their voices can be heard (Vaismoradi et al., 2016). However, self-reported assessments and interviews were suggested to be feasible for people with mild to moderate dementia after Trigg et al. (2007) found that it was feasible for older adults diagnosed with dementia to complete self-reported quality of life assessments. Therefore, it should be feasible to research resident's acceptability of an intervention.

### ***Long-Term Care Resident's Acceptability of Physical Activity Interventions***

While some residents may accept long-term care settings and take advantage of its opportunities, others may not bother participating in activities offered in their institution if they feel dissatisfied with their quality of care, worthless, and without an identity (Vaismoradi et al., 2016). Furthermore, the resident's motivation to participate in an activity and overall pleasure can be increased when taking into account the resident's desires, preferences, beliefs, and attitudes (de Souto Barreto et al., 2016) which overall reflects acceptability.

Overall, the majority of the literature on individuals' acceptability focused on examining residents' perceived motivators and barriers to physical activities in long-term care institutions. Residents reported barriers to physical activity such as poor health, physical status (Benjamin et al., 2014; Chen, 2010; Giné-Garriga et al., 2019), ageist attitudes (Benjamin et al., 2014; Giné-Garriga et al., 2019), anxiety and agitation (Benjamin et al., 2014), a history of sedentary lifestyles (Benjamin et al., 2014; Chen, 2010), and a fear of falling and/or injury (Benjamin et al., 2014; Chen, 2010; Giné-Garriga et al., 2019). Despite these perceived barriers, most residents acknowledged the importance of physical activity and reducing sedentary behavior (Giné-Garriga et al., 2019) aside from Chen (2010), who concluded that insufficient understanding about physical activity was a barrier for residents. Residents in the study by Chen (2010) expressed that they worked hard in the past, so it was time to rest since they felt good and/or accepted the aging process. These researchers used various methods. Giné-Garriga et al. (2019) recruited 22 residents (mean age 83.2 years) to participate in workshops following participatory action research, Benjamin et al. (2014) conducted a review of literature on studies that used focus groups and interviews on residents, and Chen (2010)

used a qualitative exploratory design and conducted interviews with 90 residents (mean age was  $78.5 \pm 6.2$ ) with no known cognitive impairment.

Tak et al. (2015) conducted a study with 37 residents with a mean age of 84.6 (range 72-97) specifically with dementia living in long-term care institutions to describe how they perceived different types of activity engagement. This was a unique study since residents with dementia in long-term care institutions were usually excluded from studies (Tak et al., 2015). Their sample had an average Mini-Mental State Examination score of 16.4 (range 10-26) living in a long-term care institution for at least two months. Tak et al. (2015) conducted both short and in-depth open-ended interviews with residents and found they primarily depended on activities organized by the institution like bingo while walking individually. Motivators to participate in activities included being able to feel rested at night, having a purpose, social interactions, and boredom while barriers included limited activity choices, impairment in physical function, and lack of accommodation in schedule, resources, and transportation.

Institutionalization is usually a criterion of exclusion in studies (Rolland et al., 2009). Therefore, activities, programs, and interventions are often planned without considering how residents accept them (Benjamin et al., 2014; McGowan et al., 2019; Morley et al., 2014; Rolland et al., 2009; Tak et al., 2015). McGowan et al. (2019) conducted a qualitative study on the views of 22 community-dwelling adults 65 years and over on the acceptability of reducing their sedentary time. They found that availability, accessibility, and promotion of services and resources along with social support, physical environment, perceived limitations of aging, and motivations as an older adult were the common themes identified. Participants highlighted the importance of “employing a

stepped approach to reducing sedentary behavior” and attempting too much can have negative impacts (McGowan et al., 2019, p. 648). Additionally, participants were more motivated by short-term factors, social opportunities, enjoyable experiences, and a sense of achievement. However, these findings may differ for adults living in long-term care settings.

The GET READY study by Giné-Garriga et al. (2020; 2019) was found to be the only study to date that co-created sedentary interventions with long-term care residents by examining how they perceived sedentary behavior and movement. They found that residents wanted autonomy, independence, improved wellbeing, and were influenced by significant others. Residents were reported as being frustrated since staff and relatives were overprotective and worried about the resident’s safety despite the resident wanting to do more than sitting. For example, a resident said “[H]e says not to do it, because it’s dangerous (...). And now I’m so angry and disappointed because they do not let me do so much, and I can, I know I can” (p.6). Another resident said, “I don’t want to see myself sitting in a wheelchair and being totally dependent on others” (p.6). Vaismoradi et al. (2016) and Lehto et al. (2017) supported these findings by reporting that although residents are dependent, they still strive to remain as independent as they can and taking control of their situation helped allow them to participate in their own care and retain meaning in life. However, physical limitations were a huge barrier for residents, so there needs to be a balance of safe, achievable, and challenging sedentary interventions. Residents suggested to start involving end-users like themselves in the co-creation process of programs and to have frequent reminders and encouragement to move more

(Giné-Garriga et al., 2019). Having a social and safety aspect to strategies that encourage residents to sit less was also recommended by the residents (Giné-Garriga et al., 2019).

In long-term care settings, most program evaluation has been dominated by quantitative research since 1995 without considering the situational and behavioral context of participants (Stake, 1995). More research is needed on sedentary interventions that are simple and orientate around the needs of the residents in long-term care institutions (de Souto Barreto et al., 2016). Therefore, using a framework to provide a lens to explore the acceptability of standing among residents will help to plan, implement, and evaluate sedentary behavior interventions in long-term care institutions.

### **Gap in Knowledge**

Overall, the population is aging and more older adults are experiencing physical and cognitive limitations that require them to have support services to help complete activities of daily living and enhance their quality of life. It is becoming a priority for long-term care institutions to provide proper care by providing residents with meaningful and accepted daily activities that yield benefits. The fact that the existing knowledge base on residents with various abilities in a long-term care setting is limited is problematic since research is not focusing on how to meet these priorities. Reducing sedentary behavior among residents of various degrees of cognitive and physical limitations helps reach these long-term care setting priorities since sedentary behavior is associated with adverse health consequences like a decrease in physical function and an increase in frailty. However, there is a lack of research on sedentary behavior interventions in long-term care institutions especially those that assess acceptability.

The majority of the sedentary behavior interventions are generally focused on community-dwelling, healthy, active, and younger adults. Some sedentary behavior interventions did not yield improvements in sedentary time since they might be most effective for less active older adults with a decrease in physical function. Literature has suggested that focusing on the lower level of the spectrum of physical activity by promoting standing among older adults in long-term care institutions might be an effective, simple, and safe approach to reduce sedentary behavior. However, there is limited research on this type of intervention in long-term care institutions. One study did show that standing was a safe and accepted sedentary behavior intervention; however, it was a short intervention, the attendance was low, and they did not measure the baseline cognitive level of participants like many other interventions in long-term care institutions. Additionally, they only deemed standing as acceptable by assessing the attendance and general comments throughout the intervention; therefore, there was no context to the study. Having a longer intervention that specifically explores the acceptability of a standing intervention for residents following the theoretical framework of acceptance is adding to the literature on how to successfully implement effective interventions that reduce sedentary behavior in long-term care institutions.

It is important to let the voices of residents of long-term care settings be heard since they have a say in the type of care that they receive. Although these adults are dependent individuals, they still strive to maintain their physical function and complete activities that enhance their quality of life. Many interventions in long-term care settings do not consider how residents accept them which causes programs to be developed that do not meet the interests and needs of residents. It is important to examine how

participants respond to standing to know if this activity will be sustainable and effective in this population/setting. Overall, this study help fill the gap in knowledge on the acceptability of standing being implemented as a sedentary behavior intervention in long-term care settings. To our knowledge, this study is the first study looking at the acceptability of a standing intervention for long-term residents guided by the theoretical framework. Therefore, this study contributes knowledge on the framework itself and how it is useful in long-term care settings.

### **Theoretical Framework of Acceptability**

The Theoretical Framework of Acceptability is a new framework used to assess interventions' acceptability. Sekhon et al. (2017) conducted inductive and deductive methods based on their definition of acceptability to produce the first systematic approach to assessing if interventions are acceptable by creating the theoretical framework of acceptability. The framework of acceptability consisted of seven constructs with definitions that can be used to assess prospective acceptability, concurrent acceptability, and retrospective acceptability. The constructs included: affective attitude, burden, ethicality, intervention coherence, opportunity costs, perceived effectiveness, and self-efficacy. The framework can be used as a guide to assess the acceptability of either the people who deliver the intervention or the ones who receive the intervention (Table 1). Although the framework of acceptability is fairly new, Sekhon et al. (2018) argued that there are main benefits of using this framework. Firstly, a multi-component framework helps allow a specific problem within acceptability to be identified to make suitable refinements. Secondly, following a theoretical framework and a definition will

allow for acceptability to be monitored over time, be compared between alternative interventions, and be enhanced.



**Table 1***The Constructs of the Framework of Acceptability Explained and Applied*

<b>Constructs (Sekhon et al., 2017)</b>	<b>Definition of constructs (Sekhon et al., 2017)</b>	<b>Applying the Framework of Acceptability to a standing intervention</b>
<b>Affective Attitude</b>	“How an individual feels about the intervention” (Sekhon et al., 2017, p. 8).	Individuals may feel happy and relieved to stand
<b>Burden</b>	“The perceived amount of effort that is required to participate in the intervention” (Sekhon et al., 2017, p. 8).	Individuals may feel that standing required too much time
<b>Ethicality</b>	“The extent to which the intervention has good fit with an individual’s value system” (Sekhon et al., 2017, p. 8).	Individuals might have participated in the standing intervention since they value physical activity
<b>Intervention Coherence</b>	“The extent to which the participant understands the intervention and how it works” (Sekhon et al., 2017, p. 8).	Individuals may understand that they are standing throughout the week to help increase their physical function
<b>Opportunity Costs</b>	“The extent to which benefits, profits or values must be given up to engage in the intervention” (Sekhon et al., 2017, p. 8).	Individuals might have to miss bingo to engage in standing
<b>Perceived Effectiveness</b>	“The extent to which the intervention is perceived as likely to achieve its purpose” (Sekhon et al., 2017, p. 8).	Individuals might perceive that standing helped make their legs stronger
<b>Self-efficacy</b>	“The participant’s confidence that they can perform the behavior(s) required to participate in the intervention” (Champion & Skinner, 2008, p. 48).	Individuals may be confident in their ability to stand over the set amount of time

The review conducted by Sekhon et al. (2017) indicated that there were no reviews on acceptability published from 2000 to 2016 that referred to a theory on acceptability. Therefore, monitoring and evaluating the acceptability of various components of health interventions has been lacking. After Sekhon et al. (2017) developed the Theoretical Framework, it was used to assess the acceptability of a variety of different interventions/programs in areas like cardiovascular disease prevention (Ndejjo et al., 2020), physical activity promotion (Renko et al., 2020), decreasing burnout and increasing retention (Brook et al., 2021), biomedical HIV prevention approaches (Sekhon & van der Straten, 2021), postnatal walking groups (Pavlova et al., 2020), yoga (Dhungana et al., 2021), preventing and reducing self-harm (Keyworth et al., 2021), perturbation-based balance training (Gerards et al., 2021), and home-based exercise programs (Liang et al., 2021). The above studies looked at a variety of age groups; however, only two studies conducted by Liang et al. (2021) and Gerards et al. (2021) focused primarily on older adults.

Focus groups (Dhungana et al., 2021; Ndejjo et al., 2020; Sekhon & van der Straten, 2021), questionnaires (Brook et al., 2021; Keyworth et al., 2021; Renko et al., 2020), surveys (Liang et al., 2021), and semi-structured interviews (Dhungana et al., 2021; Gerards et al., 2021; Pavlova et al., 2020) were used to collect data guided and analyzed by the theoretical framework. Renko et al. (2020) assessed both anticipated and experienced acceptability through the acceptability framework and found that high intervention acceptability indicated a strong chance that implementation of the intervention would be successful.

### Chapter 3 - Bibliography

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## Chapter 4 - Article

A CASE STUDY ON THE ACCEPTABILITY OF A STANDING INTERVENTION  
AMONG RESIDENTS IN LONG-TERM CARE SETTINGS

**TO BE SUBMITTED AT: THE JOURNAL OF FRAILTY & AGING**

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## **Abstract**

**Background:** Older adults spend most of their time sedentary and even more if living in long-term care settings. Standing has been recommended, but there is limited research on if standing interventions are deemed acceptable among residents in long-term care institutions.

**Objectives:** Understand how residents living in a long-term care institution accept a standing intervention called ‘Stand If You Can’ and why or why not did residents accept the standing intervention according to an acceptability framework.

**Design:** A single intrinsic case study design.

**Setting:** Long-term care institutions offering 24-hour supervision.

**Participants:** Long-term care residents who participated in the intervention.

**Intervention:** Residents tried to engage in supervised standing sessions 100 minutes per week for five months.

**Measurements:** Total standing time was measured using a stopwatch and participants’ characteristics that included age, transfer status, frailty status (Clinical Frailty Scale), and cognition level (Mini-Mental State Examination Questionnaire). Thematic analysis of the post-intervention interviews was done deductively and inductively using the lens of the acceptability framework.

**Results:** The 10 residents in this study (age between 73 and 102) seemed to accept the intervention since they positively reported overall having an affective attitude, limited burden, good ethicality, intervention coherence, no opportunity costs, perceived effectiveness, and self-efficacy which aligned with the acceptability framework. During

the intervention, participants stood a median of 53% of the intervention offered time (range 20% to 94%).

**Conclusion:** Standing is a novel intervention to decrease sedentary time and seems to be accepted among long-term care residents. Considering participants' acceptability should be promoted in similar settings, especially if proven to be associated with health benefits.

**Keywords:** Frailty, Sedentary Behavior Intervention, Inactivity, Nursing Home

## **Introduction**

As the proportion of older adults increases worldwide (United Nations Department of Economic and Social Affairs, Population Division, 2019), more people are living longer lives associated with geriatric syndromes like frailty (Copeland et al., 2017). Aging normally brings forth life transitions resulting in relocating to more supportive environments like long-term care institutions to meet specific needs (de Meijer et al., 2012). Threats to the quality of care have been reported in long-term care settings due to services not being built around residents' needs (Kehyayan et al., 2015; Tobis et al., 2021; Vaismoradi et al., 2016; Wang et al., 2016). For example, residents are spending up to 90% of their day in a sitting or lying position (Lee, Sénéchal, Hrubeniuk, et al., 2020) even if it was recommended to limit sedentary activities to 8 hours per day while awake and to break up sitting time (Canadian Society for Exercise Physiology, 2021).

Standing has been recommended to be the first step to increasing physical activity among inactive individuals (Dogra et al., 2021; Ross et al., 2020). However, there is limited research on sedentary behavior interventions in long-term care settings (Petrusevski et al., 2020) since residents with declines in physical and mental function are usually excluded from studies. Additionally, the acceptability of any intervention is important to consider when having effective long-term implementation. To our knowledge, not much is known about the acceptability of a standing intervention specifically in the area of sedentary behavior in long-term care settings. Although Giné-Garriga, Dall, et al. (2020) deemed that prompted resident-led movement goals was a highly acceptable sedentary behavior intervention in long-term care settings, standing was not the main focus. A pilot study from our group reported that a standing



intervention consisting of ten-minute standing sessions, three times a day, four days per week, were attended more during the mornings and weekdays in long-term care settings (Lee, Sénéchal, Read, et al., 2020). Using the Theoretical Framework of Acceptability would help allow residents' voices to be heard, give insight into the different components of acceptability, and overall help determine if standing interventions are acceptable in long-term care settings (Sekhon et al., 2017; Skivington et al., 2021). The framework consisted of affective attitude, burden, intervention coherence, opportunity costs, perceived effectiveness, and self-efficacy (Sekhon et al., 2017).

In 2019, the Stand If You Can randomized control trial registered at the 'ClinicalTrials.gov' (NCT03796039) was conducted to improve the physical function of ninety-six adults living in long-term care institutions. Participants (also referred to residents) were randomized to the intervention group to try to stand 100 minutes per week or to the control group with no standing. Both groups received the same exposure to the social aspect of the intervention with university students entertaining them. No significant differences in physical function in the intervention group were found when compared to the control group (Bouchard et al., 2021) and the risk of falls was not lower in the intervention group 12 months post-intervention (University of New Brunswick, n.d.). However, staff reported that residents had a positive attitude towards the standing intervention and wanted the program to continue. Therefore, permission was received to do a secondary analysis on the conducted interviews since they were not yet analyzed.

Exploring the perspectives of older adults with various cognitive and physical limitations living in long-term care institutions would be novel since the perspectives of this population are usually not considered in interventions (Tak et al., 2014; Vaismoradi

et al., 2016). Therefore, the purpose of this case study was to explore the acceptability of the standing intervention called “Stand If You Can” among older adults living in long-term care with the guidance of the Theoretical Framework of Acceptability. This was a secondary analysis of the data collected from the intervention group of the Stand If You Can trial. This research study addressed the following questions: How was a standing intervention accepted among older adults living in long-term care institutions?; Why or why not did older adults accept the standing intervention according to the Theoretical Framework of Acceptability?

### **Methodology**

A qualitative approach was taken to explore the voices of participants participating in the Stand if You Can intervention to help contribute to knowledge on addressing the complex problem of increased sedentary time in long-term care institutions. This study applied the general characteristics of qualitative research outlined by Creswell and Poth (2017) that included collecting data in a natural setting, considering participants’ multiple perspectives inductively and deductively, and being context-specific.

To address the research questions, an intrinsic case study design methodology was applied. This design is a popular approach used qualitatively in science and health sciences (Creswell & Poth, 2017). The case in the current study was a standing intervention that was bounded since the intervention only had residents in long-term care institutions participate in standing sessions specific times a week (Creswell & Poth, 2017; Stake, 1995; Yin, 2018). There was limited research on the acceptability of a standing intervention from the resident’s point of view and exploring the nature of causality

(Benjamin et al., 2014; Lee, Sénéchal, Read, et al., 2020; Tak et al., 2015). Therefore, this was a single case study design that was classified as “intrinsic” since the focus was placed on the case itself because the standing intervention was unique in long-term care institutions and generated unusual interest (Creswell & Poth, 2017; Stake, 1995). This case study addressed the “how” and “why” questions to explore residents’ acceptability of the standing intervention (Stake, 1995; Yin, 2018). Table 2 shows information features of case studies and how they correspond to this study.

**(INSERT TABLE 2)**

## **Methods**

### ***Recruitment and Participants***

Participants were recruited when randomized in the intervention arm of the Stand If You Can trial by using purposeful and convenience sampling. To be eligible for this secondary study, the inclusion criteria included participating in the Stand If You Can intervention, providing consent or assent from the power of attorney, being open to participate when asked, and having a score of 18 and over on the Mini-Mental State Examination questionnaire (Kurlowicz & Wallace, 1999; Tobis et al., 2021; Trivedi, 2017) or having authorization from staff. Out of 41 participants in the intervention arm of the Stand If You Can trial, a total of 10 participants met the inclusion criteria and were included in this study. Participants were included in the Stand If You Can intervention if they were a resident in the participating long-term institution offering 24-hour care, able to walk 10 meters with or without a walking aid, and able to provide consent or assent from the power of attorney. Residents were excluded if the institution’s staff thought it would be unsafe for them to participate because of the extreme risk of falls.

### ***Stand If You Can Intervention***

A team of researchers that included DRB (primary investigator), LC (primary interviewer), and JEM (research assistant) worked on the Stand If You Can Intervention. Participants in the intervention were encouraged to attend supervised standing sessions Monday to Friday with the goal of standing 20 minutes per day in 10-minute bouts, 100 minutes per week, for five months. Participants had the option to stand with or without an assistive device on their own or with peers. Research assistants would do activities like puzzles and songs while standing.

### ***Data Collection***

#### **Attendance.**

Total standing time was collected during the intervention to gather participants' attendance. Research assistants who stood with the participants recorded the time spent standing with an Adanac 3000 Digital Stopwatch Timer (Marathon Watch Company Ltd., Ontario, Canada). Participants were permitted to take up to five breaks per session of undefined length. Transfer (sit to stand movement) and sitting time was not included in standing time. A standing session was terminated if the participant reached 20 minutes.

#### **Participant Baseline Characteristics.**

Participants' baseline demographics including sex, age, and transfer status (independent, need assistance, and dependent) were collected from the participant's charts at baseline. Cognition level was assessed using the validated and widely used Mini-Mental State Examination questionnaire (Kurlowicz & Wallace, 1999; Trivedi, 2017). Frailty status was assessed by the institution's staff by using the Clinical Frailty

Scale (0-9 with higher score equal more frailty) that has been widely used among older adults (Church et al., 2020).

### **Post-Intervention Interviews.**

Face-to-face post-intervention interviews were conducted to obtain insight into residents' experience of the Stand If You Can intervention. Interviews were conducted shortly after the intervention to decrease the likelihood of confusion and gathering inaccurate data (McDuff & Phinney, 2015) in participants' rooms. Participants were informed that the interview could be discontinued at any time and consent was obtained before the interview. In-depth interviews were conducted by LC who was an experienced qualitative researcher (Halpenny & Caissie, 2003). Open-ended questions were asked to allow the participants to freely express themselves.

Interviews were semi-structured, as done in other case study designs (Mitchell et al., 2015), to allow for the natural flow of conversation between the participant and interviewer (DiCicco-Bloom & Crabtree, 2006). These interviews resembled guided conversations by following an interview guide that helped ensure that the questions asked were open-ended, non-threatening, and relevant to determine participants' feedback regarding the intervention (Yin, 2018). The interviewer asked questions on participants' reasons to why they participated, likes and dislikes, feelings, and thoughts on continuing in the intervention that aligned with the goal of determining participants' experience (Roberts, 2020). These questions were also guided by literature on older adults and physical activity to further enhance reliability (Roberts, 2020).

The interview guide started with an orienting question, followed by seven main questions regarding the intervention, and ended with a closing question for participants to

add additional information as suggested by Roberts (2020). The interview guide is reported in Appendix A. The interviews lasted around 20 minutes. Participants' identity was protected by assigning them identification numbers from 1 to 10 (Creswell & Poth, 2017). Interviews were recorded by the interviewer for those that provided consent (Yin, 2018) and manually transcribed to reproduce all spoken words.

### ***Data Analysis***

The data was analyzed deductively and inductively by using the thematic framework analysis to allow themes regarding participants' acceptability outside of the framework to be identified as recommended by Creswell and Poth (2017). The thematic framework analysis has been used in other case studies (Mitchell et al., 2015) and is a comprehensive and systematic analysis process (Edwards & Skinner, 2009). Data analysis consisted of the following five stages (Edwards & Skinner, 2009; Miles & Huberman, 1994): Familiarization, Thematic framework, Indexing, Charting, and Interpretation.

- 1) Familiarization. Researchers immersed themselves in the data by reviewing the recorded and written interviews several times. Notes were taken throughout the process to help read actively, analytically, and critically.
- 2) Identifying a thematic framework. The thematic framework used for the initial analysis of data was the Theoretical Framework of Acceptability (Sekhon et al., 2017) where the themes were guided by the framework. Case studies benefit from prior developments of theoretical frameworks as a means of elaborating on complex patterns of expected results (Yin, 2018). The Theoretical Framework of Acceptability was shown to be a suitable framework to guide the analysis of

physical activity interventions among older adults (Gerards et al., 2021; Liang et al., 2021).

- 3) Indexing. The data was then manually analyzed inductively to develop codes. The codes were then assigned to the corresponding themes if applicable and the codes leftover would create new themes outside of the Theoretical Framework of Acceptability (Gioia et al., 2013).
- 4) Charting. Data was organized and charted through a computer software called NVivo since it was used to store and organize codes, quotes, and notes all in one secure location (Creswell & Poth, 2017; Mitchell et al., 2015). Therefore, a codebook that includes codes, themes, and quotes was generated. Codes were then confirmed through a computer software called Leximancer (Chiu et al., 2017). Leximancer generated codes that were commonly reported throughout the interviews and were compared with the manually developed codes to help verify that the interviews were accurately and completely represented.
- 5) Interpretive stage. The data was presented in a matrix for interpretation and was reviewed to make connections with codes and themes according to the Theoretical Framework of Acceptability. Matrices “involve the crossing of two or more main dimensions or variables to see how they interact” (Miles & Huberman, 1994, p. 239).

### **Trustworthiness**

To enhance trustworthiness, triangulation and debriefing sessions were used (Creswell & Poth, 2017). Triangulation was used since deductively and inductively analyzed data from the interviews along with attendance and participant’s characteristics

was used to provide corroborating findings and interpretations (Lincoln & Guba, 1995; Stake, 1995; Yin, 2018). Frequent debriefing sessions between JEM and DRB were the other strategy used. JEM performed the analysis and consulted DRB who was an experienced researcher familiar with the intervention (Creswell & Poth, 2017; Lincoln & Guba, 1995). This strategy challenged the investigator's assumptions/interpretations to help adequately represent different perspectives (Yin, 2018) since DRB discussed alternative approaches, drew attention to potential flaws, and acted as a sounding board to test and/or develop ideas (Lincoln & Guba, 1995). DRB also helped with analyzing the data and reviewing the written report (Yin, 2018).

## **Results**

Out of a total of 10 participants, the majority were female with a median cognition score of 26 (range 8 to 29) out of 30 and a median frailty score of 6 out of 9. Their age ranged from 73 to 102 with most needing assistance to transfer from sitting to standing. These characteristics add context to help understand how and why participants accept the intervention. See Table 3 for more information on participants' characteristics.

### **(INSERT TABLE 3)**

Out of a total of 2200 minutes, participants stood a median of 53% of the intervention time (range 20% to 94%). The median standing time during the intervention for each participant is shown in Figure 1 below.

### **(INSERT FIGURE 1)**

The interviews were then analyzed and resulted in forming seven main codes with additional sub-codes that represented how and why participants accepted the standing intervention. Table 4 presents more information on the interview codes explained below.



**(INSERT TABLE 4)**

***Intervention Attractiveness***

The first code identified was intervention attractiveness with the sub-codes consisting of intervention staff, social engagement activities, standing, and the overall program. Participants felt staff positively contributed to their experience by commenting on their personality, actions, and meaningful interactions. All of the study participants enjoyed talking with the staff and some reported creating friendships. In addition, some participants had a preference in staff by expressing, "...some were more interesting than others. There was just one student that was mostly silent..." (Participant 3). Participants acknowledged the role of staff helping them stand by saying comments like, "They got me up out of the chair..." (Participant 9), while also reporting feeling more safe standing with staff. Participant 10 said, "they were always nearby or by your side or keeping an eye on you..." and Participant 1 said that it "felt very safe, they watched you closely never would let you fall."

Social engagement activities (bingo, singing, puzzles) with the staff were perceived as enjoyable and seemed to enhance participants' experience of standing and reduce boredom. Comments included, "If you are happy, standing doesn't seem to take so long. We'd stand and we made a good time out of it...it wasn't boring..." (Participant 2). Staff were also perceived as motivational since Participant 10 said, "I'm going to show them I can do it..." Overall, staff were deemed an important component as Participant 7 explained that "If they had someone to encourage them, it would do them good."

Standing itself was perceived as an enjoyable activity that got participants out of their room for those who could stand. For example, Participant 4 said, "It's just nice to be

able to get up once in a while and do things like getting more exercise” and Participant 10 said, “I enjoyed the fact I was up off my backside.” Most participants enjoyed the challenge of trying to stand for 10 minutes since it brought a feeling of accomplishment. However, Participant 3 said, “I’m aiming to get to ten minutes and never did it, that disappointed me.” Participant 10 also expressed that although standing was a good starting point, they wanted to progress to walking.

Overall, everyone enjoyed the program and thought it was interesting and fun. Everyone expressed wanting to continue if they physically were able to. For example, Participant 10 said, “I hope they are going to continue it.”

### ***Intervention Challenges***

Intervention challenges was the next code found with limitations and perceived effort as the sub-codes. There were a few participants who expressed standing was hard especially for 10 minutes at first due to perceived effort by saying things like “standing was kind of hard” (Participant 1) and “standing ten was quite a while” (Participant 2). Participant 7, however, expressed that standing was not possible by saying, “I found that standing up, I just couldn’t do. I did it so long and then I thought why put a 91-year-old woman through this agony and that is why I gave up.” Some other participants experienced limitations that made it harder to stand like colds and bad knees and hips. For example, Participant 6 said, “I had to quit early because of my bad knee” or otherwise they would have continued. Therefore, some participants expressed that the intervention was challenging due to either their physical limitations or the amount of effort that standing took.

### ***Participant’s Values***

The next code identified was participant's values that had sub-codes that included physical activity, health, entertainment, and others. Being active, gaining health benefits, boredom, the influence of others, and entertainment were values that motivated the residents to participate in the standing intervention. Participants expressed that they are inactive living in the institution by saying "when I'm here, don't get out around to do a lot of exercise" (Participant 2) and "I don't think anybody has time to stop and let him stand..." (Participant 7). Therefore, participants deemed the intervention as "an opportunity to be active" (Participant 10). Half of the participants thought participating would lead to health benefits mainly focused on increasing physical function like mobility (Participants 3, 4, and 10) and strength (Participant 5) while another participant thought it would make them taller (Participant 5).

Many study residents also participated because they were told to by others. For example, Participant 1 said, "because they asked me to and I said yes" and Participant 5 said, "I don't know, I just did what they want". Participants also wanted entertainment since they expressed reasons that included wanting to try something different (Participants 8, 9, and 10) and fill in the time (Participants 1, 3, 6, and 7).

### ***Intervention Comprehension***

Intervention comprehension was the next code identified with tasks and purpose being the sub-codes. Participants had a good understanding of the intervention's tasks. For example, Participant 3 said, "At first, it was ten minutes twice a day and then it got to be twenty minutes with rest stops." Although many acknowledged that they had to stand, participants did not clearly state the purpose of the intervention itself. As discussed above, residents participated to stand more and gain health benefits like an increase in

physical function. However, Participant 5 fully believed that the purpose of the standing intervention was to get taller by saying, “They are trying to make me taller.” Participant 7 also wondered what the active pal was on their leg.

### ***Competing Activities***

Competing activities was the next code identified with games, reading, sleep, projects, friends, walks, and physiotherapy being the sub-codes. The majority of participants clearly expressed that they had other commitments which created a schedule that they followed closely. Participants did bingo, played cards, engaged with a physiotherapist, and slept specific times during the day. For example, participants made comments like: “we play crib at quarter after two very afternoon” (Participant 7) and “I have bingo at 2:30 PM” (Participant 1). Participants also engaged in hobbies like reading, walks, socializing with friends, projects, and computer games. For example, “I walk now with the physiotherapist” (Participant 3).

### ***Intervention Impact***

The next code was intervention impact with health, physical function, and social engagement being the sub-codes. Many participants thought the intervention was helpful and felt improvements in their general health. Some even made the connection that standing ten minutes lead to health benefits. For example, “Standing for ten minutes, it all helps” (Participant 2). Participant 2 also gained awareness of their sedentary behavior by saying that standing “gave us a better view on what we were doing with ourselves instead of sitting all the time.” One participant even thought that they lost 40 pounds (Participant 9). The majority of the participants thought their physical function improved by mentioning improvements in their strength, balance, and mobility.

Additionally, participants reported that they could transition from sitting to standing easier and that their standing improved. For example, Participant 6 said, “I noticed that my standing improved, my legs got stronger, and my upper body also became stronger.” Participant 9 commented that they increased their standing time by 4 minutes during the intervention, but they still felt disappointed with not standing 10 minutes. However, others felt accomplished with their standing progress and some reached the goal of standing for 10 minutes. For example, Participant 2 said, “At first I thought standing ten was quite a while but it grew right into us like we were used to it after a day or so...you get really into it and it didn't bother me anymore anyway.” Participant 7 was the only one who did not report improvements in physical function. Lastly, participants felt they were able to socially interact with staff and their peers and overall build relationships as discussed above.

### ***Participants' Confidence***

Participant's confidence was the last code found with sub-codes that included fearless and fear. Many of the participants did not have a fear of falling in the intervention and also felt independent. For example, Participant 10 said, “I feel very comfortable with myself...” and Participant 3 said, “transfer has never been a problem” and both commented that they had no fear of falling despite their history. However, participants 7 and 9 expressed that they had some fear of falling.

Some participants increased their confidence in their abilities during the intervention. For example, Participant 3 said, “I gave a student a warning I was going to do squats and did...” Participant 6 said, “I was able to accomplish something which made me feel good, helped build my confidence.” Lastly, Participant 10 said, “when you

reached the stage you have both hands on your walker and then reach down without thinking about it...and looking around at the same time, that said a lot for my stability.”

## **Discussion**

Residents seemed to accept the intervention retrospectively since all of the codes positively indexed the themes derived from the constructs of the Theoretical Framework of Acceptability (see Figure 2 for more information). Intervention attractiveness (affective attitude), intervention challenges (burden), participant’s values (ethicality), intervention comprehension (intervention coherence), competing activities (opportunity costs), intervention impact (perceived effectiveness), and participants’ confidence (self-efficacy) was found (Sekhon et al., 2017). Therefore, the Stand If You Can intervention seemed to be acceptable among the study participants that experienced little perceived burden.

### **(INSERT FIGURE 2)**

Intervention attractiveness made up the affective attitude construct. The intervention’s research staff were deemed as “nice”, “encouraging”, “wonderful”, “helpful”, and “entertaining” by the participants. These findings were supported by previous literature since staff were found to be an important intervention component that generated a positive attitude from the residents in long-term care settings. For example, staff helped create opportunities for residents to interact (Cooney, 2012), create friendships (Cooney et al., 2009), assist residents in need (Phillips & Flesner, 2013; Tak et al., 2015), motivate residents (Phillips & Flesner, 2013), and overall enhance residents’ activity experiences (Phillips & Flesner, 2013; Tak et al., 2015). The way staff interacts

with residents (how they behave) also was found to have a crucial influence on residents' experiences as shown by the study participants and literature (Bollig et al., 2016).

Overall, having university students assist the study participants to stand could build a sense of safety, community, and belonging for all. This may be due to how important residents felt inter-generational contacts and community links were (Cooney et al., 2009; McGowan et al., 2019) or possibly the limited support offered to residents in their institution when engaging in non-sedentary activities (McGowan et al., 2019). Additionally, staff were seen as helpful possibly since most study participants needed assistance to transfer from sitting to standing despite striving to be independent. Studies found that residents try as much as possible to cope on their own to not burden the staff, so having intervention staff could possibly alleviate that pressure (Giné-Garriga et al. 2019; Lehto et al., 2017).

The social engagement and standing activities were also positively mentioned since they gave an opportunity for residents to socialize especially for those desiring companionship and support (Phillips & Flesner, 2013). Social interactions were found to be a key motivator for older adults to engage in physical activity (McGowan et al., 2018) and a main dimension of well-being in residents' perspectives (Bollig et al., 2016). Boredom is a common barrier to physical activity (Phillips & Flesner, 2013); however, many of the study residents referenced standing as "enjoyable", "happy standing", "good time", and "wasn't boring" possibly due to the distraction of engaging in social activities. Tak et al. (2015) found that residents valued the spirit of competition which supported the finding that study participants enjoyed the challenge of standing ten minutes and saw it as competition amongst themselves. Study participants expressed that standing was a good

first step to being active as supported by other studies (McGowan et al., 2019). However, having one participant “disappointed” in not reaching the standing goal, despite standing 83% of the intervention time, while having another participant wanting more progression could indicate the need for individualized standing goals (Giné-Garriga, Dall, et al., 2020; Phillips & Flesner, 2013; Tak et al., 2015). Overall, the intervention was deemed enjoyable, which has been found to be a huge motivator for the continuation of participation (McGowan et al., 2019).

Participants’ values that made up the ethicality construct supported the literature that residents participate in activities that aligned with their values of passing the time (Cooney, 2012; Tak et al., 2015), maintaining active behaviors (Phillips & Flesner, 2013; Tak et al., 2015), regaining or maintaining physical abilities (Cooney et al., 2009), and fulfilling the desire to do something (Giné-Garriga et al., 2019; Tak et al., 2015). Some study residents participated since they felt there were limited physical activity opportunities possibly due to limited activities of interest (Tak et al., 2015) or limited activity resources at their institution (Phillips & Flesner, 2013). Additionally, this study found that residents’ participation was hugely influenced by others as found by Giné-Garriga et al. (2019). This could be due to residents seeking the acceptance of significant others like staff and family members (Giné-Garriga et al., 2019).

Although there has not been literature on how residents perceive standing and of its effectiveness, studies found that physical activity was perceived by residents to maximize physical function and wellbeing (Cooney et al., 2009; Giné-Garriga et al., 2019; Phillips & Flesner, 2013) while being able to reduce sedentary time (Giné-Garriga et al., 2019). Participants in the standing intervention reported similar benefits; therefore,



possibly implying that standing was perceived just as beneficial as other forms of physical activity. Even though participants only reached a total median standing time of 53% (20% to 94%) and measured functional benefits were not observed, almost everyone perceived health benefits from the program and wanted to continue. Although this standing percentage seems low, it was 15% higher than other standing interventions (Lee, Sénéchal, Read, et al., 2020) and some participants participated 90% of the time. Therefore, the study findings supported the perceived effectiveness construct. Only one participant was upset with the intervention's effectiveness since they had unrealistic expectations that the program would make them taller. However, everyone else seemed to have good intervention comprehension which supported the intervention coherence construct.

Overall, there were minimal intervention challenges reported by the study participants which reflected the burden construct. Despite a few residents expressing that standing was “kind of hard” initially, only two participants found that the burden was perceived as too high to complete the whole intervention. These participants either were living with extreme frailty and expressing that standing was too much effort or saying that standing was too difficult due to physical limitations. Supportive literature found that physical limitations and activities that were too demanding/tiring possibly due to laziness hindered long-term participation (Giné-Garriga et al., 2019; Phillips & Flesner, 2013; Tak et al., 2015). Additionally, some older adults accept that the consequences of aging are inevitable and increase their sedentary time (McGowan et al., 2019). Therefore, it was not surprising that the participants that expressed the most burden were amongst those that stood the least during the intervention. Additionally, one participant who did not

express any burden was also among the participants who stood the least. This might be due to being the oldest participant living with moderate frailty and severe dementia.

Although participants did not report any issues giving up competing activities to participate in the intervention, competing activities could reflect the opportunity costs construct since there was a possibility that other activities interfered with participants' total standing time. While some study residents felt there were limited activities offered at their institution, others engaged in several different activities throughout the week (E.g. bingo). Tak et al. (2015) concluded that most residents depended on activities organized by the institution in addition to self-directed activities which created a fixed routine. Therefore, competing demands may create opportunity costs for residents (Phillips & Flesner, 2013) if they had to adjust their schedule to have time and energy to attend the standing sessions (Lee, Sénéchal, Read, et al., 2020).

Although two participants reported a fear of falling, which was a reported barrier to physical activity (Giné-Garriga et al., 2019; Lees et al., 2022; Phillips & Flesner, 2013), the majority of participants referred to having confidence in their abilities to stand by saying that they either were mobile or that they had no fear in falling. Therefore, participants' confidence in participating in the intervention reflected the self-efficacy construct. Study residents tried to construct themselves as independent individuals by demonstrating their ability to do things, as supported by Lehto et al. (2017), possibly due to their desire for autonomy despite their physical limitations (McGowan et al., 2018). Additionally, study residents have reported an increase in self-confidence in their abilities throughout the intervention. Therefore, standing might be an activity that residents are comfortable in doing to improve their physical function, confidence, and feelings of

autonomy (McGowan et al., 2018). However, the influence of staff assistance and peers completing the same standing goals may also impact participants' confidence (McGowan et al., 2018).

There were limitations to using secondary data since the research questions had to be created after the data was collected and the Theoretical Framework of Acceptability could only provide guidance for the analysis. JEM was not able to observe the actual phenomenon in person which could limit their understanding (Stake, 1995). However, JEM immersed themselves into the data by listening to the audio recordings of the interviews and took notes to acknowledge the biases of their own experiences with older adults and knowledge gained from literature. Having an outsider status was also beneficial to code the data using a fresh perspective to help interpret the actual phenomenon without being clouded by the experiences of the participants (Dwyer & Buckle, 2009). There are possible drawbacks with the selection of participants since only residents with a certain cognition score or who were perceived likely to have a conversation were included in the study like other studies (Bollig et al., 2016). Lastly, this sample was mainly composed of females and only represents a small section of residents in long-term care institutions.

In summary, the study residents living in long-term care institutions seemed to accept the Stand If You Can intervention. Participants seemed to accept the intervention since they positively reported overall having an affective attitude, limited burden, good ethicality, intervention coherence, no opportunity costs, perceived effectiveness, and self-efficacy which aligned with the Theoretical Framework of Acceptability. Standing with staff to offer support and entertainment was deemed as overall acceptable since residents

reported enjoying the activities, wanting to continue the intervention, confidence, physical and health benefits, and having values that motivated them to stand. Having students assist was an important intervention component that yielded feelings of security, encouragement, and gratitude while also increasing residents' social interactions. Although most participants seemed to enjoy standing for ten minutes, this goal may not be suited for everyone if the burden is perceived as too high. It is also important to note that some others reported fear of falling, disappointment of not achieving the standing goal, and not meeting expectations. Therefore, this could explain the variance in total standing time. This study addressed the gap in the literature on accepted sedentary behavior interventions among long-term care residents and added new and novel knowledge regarding standing and the use of the Theoretical Framework of Acceptability in a long-term care setting.

Future research should assess acceptability prior, during, and after an intervention to involve end-users throughout the process and highlight required modifications to increase the acceptance, and thus participation (Giné-Garriga et al., 2019; Sekhon et al., 2017). Informational data could be gained when the interview guide is developed using the lens of the framework. Additionally, conducting a standing program that had customizable standing goals or levels according to the needs and interests of the participants would be interesting to see if it enhances individuals' acceptability and participant rates. Lastly, it would be interesting to conduct a mixed-methods study and compare participants' acceptability with their functional outcomes.

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## Tables and Figures

**Table 2**

*An Example of a Case Study Design Used for This Current Research*

<b>Features of a Case Study</b>	<b>Connection to Study</b>
Identifies a specific case (e.g., individual, event).	The case is a standing intervention called “Stand If You Can”.
Case identification requires boundaries which means that it can be defined or described within certain parameters (time and location).	The intervention was implemented in a long-term care institution setting encouraging residents to stand every day for 10-minute bouts for a total of 100 minutes/week at the same time over 5 months.
Focuses on the procedures for the particular type of the case study.	This is a single intrinsic case since getting residents in long-term care institutions to stand to reduce sedentary time is unique. The majority of residents are sedentary. So, this case generates unusual interest and describes and detailed.
Presents an in-depth understanding of the case by relying on multiple sources of evidence	The collected qualitative data (interviews) and quantitative data (attendance) is integrated to develop an in-depth understanding.

(Creswell & Poth, 2017, pp. 97–98)

**Table 3***Study Participants Characteristics*

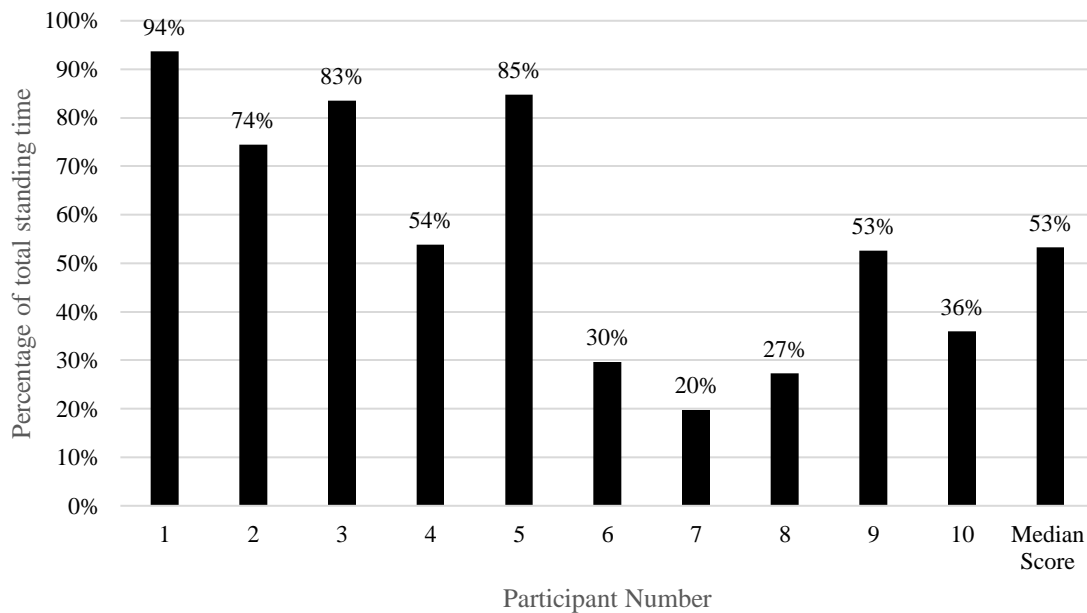
<b>Participant number</b>	<b>Sex</b>	<b>Age</b>	<b>Transfer status*</b>	<b>Frailty status (1-9)</b>	<b>Cognitive level (0-30)</b>
1	Male	73	DEP-1	7	27
2	Female	81	IND	2	18
3	Male	90	DEP-1	7	27
4	Male	82	DEP-1	3	26
5	Female	86	DEP-1	4	17
6	Female	73	IND	6	29
7	Female	91	DEP-1	7	26
8	Female	102	DEP-1	6	8
9	Female	77	DEP-1	6	22
10	Female	94	DEP-2	6	27
Median		84		6	26

\*Transfer status from sitting to standing is identified by three different levels. IND= independent where the participants does not need assistance to transfer, DEP-1= participant needs assistance from 1 person to transfer, DEP-2 participant is dependent and needs the assistance of 2 people to transfer.

**Table 4***Interview Codes and Quotes*

<b>Codes</b>	<b>Definition of Codes</b>	<b>Sub-Codes</b>	<b>Quotes (Examples)</b>
Intervention Attractiveness	Study participants thoughts towards the intervention and its various components	Intervention Staff Social Engagement Activities Standing Overall Program	<ul style="list-style-type: none"> <li>• “I felt very comfortable and safe with the students” (Participant 6)</li> <li>• “There was happy times and we’d sing once in a while some little thing and it was a great time getting our standing done” (Participant 2)</li> <li>• “I thoroughly enjoyed the fact that I was not just moving around and walking up and down the hall but I was standing and getting up” (Participant 10)</li> <li>• “I hope they are going to continue it...” (Participant 10)</li> </ul>
Intervention Challenges	The amount of difficulty study participants expressed participating in the intervention	Limitations Perceived Effort	<ul style="list-style-type: none"> <li>• “One of the things I was always finding during the standing my left hip would start to freeze up and it would bother me” (Participant 3)</li> <li>• “I found the standing up I just couldn't do I did it so long and then I thought why put a 91 years old woman through this agony and that's why I gave that up” (Participant 7)</li> </ul>
Participants’ Values	Factors that motivated study participants to be in the intervention	Physical activity Health Entertainment Others	<ul style="list-style-type: none"> <li>• “It's an opportunity to be active and to try your strength out and if you find you can stand a little longer each time then it is just much better for your whole physique I think your legs as well...” (Participant 10).</li> <li>• “The girl came in and ask and I thought I would try it” (Participant 7).</li> <li>• “I felt it would fill-in-time” (Participant 6)</li> </ul>
Intervention Comprehension	How the study participants expressed their understanding of the intervention	Tasks Purpose	<ul style="list-style-type: none"> <li>• “They got us up standing for ten minutes” (Participant 2)</li> <li>• “They are trying to make be taller” (Participant 5)</li> </ul>
Competing Activities	Activities that study participants committed to prior to the intervention	Games Reading Sleep Projects Friends Walks Physiotherapy	<ul style="list-style-type: none"> <li>• “I have friends here...to play cards...we bowl a little bit and ummm play bingo once a week with the staff once a week with ourselves” (Participant 1)</li> <li>• “I get up around 2 o'clock” (Participant 4)</li> <li>• “I walk now with the physiotherapist. I walk oh I don't know, the distance from the second entrance of the dining hall” (Participant 3)</li> </ul>

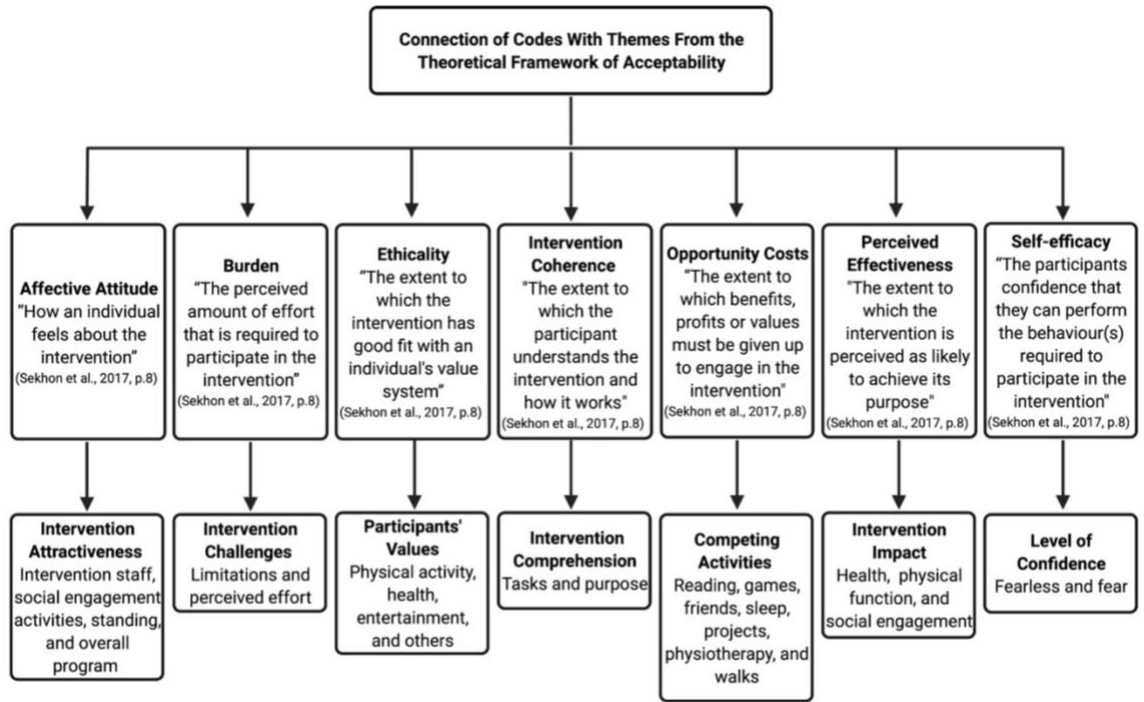
Intervention Impact	Any benefits that study participations felt from the intervention	Health Physical Function Social Engagement	<ul style="list-style-type: none"> <li>• “We made friendships with the students and the people there” (Participant 1)</li> <li>• “Help lose weight I use to be 180 pounds now I'm 140” (Participant 9)</li> <li>• “I noticed that my standing improved, my legs got stronger, and my upper body also became stronger” (Participant 6)</li> </ul>
Level of Confidence	How confident study participants felt during the intervention	Fearless Fear	<ul style="list-style-type: none"> <li>• “I was able to accomplish something which made me feel good about myself...it helped build my confidence” (Participant 6)</li> <li>• “Scared of falling” (Participant 9)</li> </ul>



**Figure 1**

*Total Standing Time During the Intervention*





**Figure 2**

*Connection of Codes with Themes from the Theoretical Framework of Acceptability*

## **Appendix A**

### *Interview Guide for the Stand If You Can Intervention*

Can you tell me a bit about yourself?

1. Why did you accept to participate?
  2. What did you like and dislike from the program?
  3. Did you feel safe when standing with the research staff?
  4. Did you enjoy the activities planned? (i.e jokes and discussions)?
  5. If this program returned would you join again?
  6. Do you feel most participants were more comfortable walking short distances, transferring from a seated position or more balanced?
  7. Are you afraid of falling? Did this program reduced or increased your fear of falling?
- Are there any other thoughts about the program you would like to share?

## Curriculum Vitae

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### Publications:

Lees, M. A., Edwards, J., McCain, J. E., & Bouchard, D. R. (2022). Potential value of home square-stepping exercises for inactive older adults: An exploratory case study. *BMC Geriatrics*, 22(1), 14. <https://doi.org/10.1186/s12877-021-02712-x>

### Conference Presentations:

The Experience of Long-Term Care Residents Participating in a Standing Intervention: Mixed-Study Design, APES and Kinesiology Research Day, 2021

The Experience of Long-Term Care Residents Participating in a Standing Intervention: Mixed-Study Design, Graduate Research Conference, 2021

Potential Benefits of a Novel Home-Based Exercise Program for Inactive Older Adults, International Society for Physical Activity Congress, 2021

Usage of Outdoor Gyms For Older Adults 65 Years and Older Living in New Brunswick  
New Brunswick Health Research Conference, 2021