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Fall Prevention Program for Adults with Intellectual Disabilities

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Fall Prevention Program for Adults with Intellectual Disabilities

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Abstract

**Background and Review of Literature:** Adults with intellectual disabilities are vulnerable to falls. Proper intervention results in enhanced health outcomes. Implementing Otago Exercise Program (OEP), an evidence-based exercise intervention, has been shown to reduce fall rates among adults with ID.

**Purpose:** To use evidence-based preventive measures for reducing falls among intellectually disabled mental health facility residents over the age of 55.

**Methods:** An OEP was provided to adults with Intellectual Disabilities aged 50 and above at a chronic mental health facility for eight weeks. The implementation involved four phases. Phase one included organizing meetings with stakeholders and gathering pre-intervention data. In phase two, staff were trained through pamphlets and educational sessions. Phase three involved the implementation of the project interventions. The intervention involved exercise and a walking program administered by the Doctor of Nursing Practice (DNP) student and physical therapists and direct care staff.

**Results:** The paired $t$-test demonstrated that there was a significant difference in Mores Fall Scale (MFS) scores before and after the implementation of OEP ($Paired \ t = -2.96, \ p = .005$). After OEP implementation, the MFS mean score was decreased from 11.22 (2.31) to 8.12 (2.19). Next, there was a fall rate reduction from 60% before implementation to 32% after implementation. Again, the self-report questionnaire results show significant improvement in staff’s knowledge of fall prevention practices. Finally, the Otago Exercise Program was well received by the nurses with almost all the nurses participating in the program from start to the end recording a 90% attendance.

**Implications/Conclusion:** The project's findings are likely to demonstrate the implementation of exercise and walking programs in reducing fall rates among adults with ID. The project may also have policy implications. Overall, the OEP portrayed a positive trend in improving staff
knowledge and engagement of falls prevention practices. This project has shown the OEP is one of the preventive measures to help reduce falls among older people with ID.

*Keywords*: Otago Exercise Program, walking, intellectual disability, fall, exercise, adults

**Fall Prevention Program for Adults with Intellectual Disabilities**

**Introduction**

Adults with intellectual disabilities are vulnerable to falls (Pope et al., 2020). Falls, among adults with intellectual disabilities, are a significant health issue, potentially leading to reduced quality of life (Ho et al., 2019). Balance exercise can help reduce the risk of falls among adults with intellectual disability (ID), resulting in improved health outcomes and quality of life (Hale et al., 2016). Reducing fall risk in the adult population with varying intellectual disabilities means creating a healthier society for the future.

**Background**

Falls are a significant public health issue worldwide. Falls-related injuries are the second leading cause of unintentional injury and mortality globally (World Health Organization, 2021). It is estimated that 684,000 persons die from falls worldwide annually (World Health Organization, 2021). Over 37.3 million falls are severe, requiring medical attention (World Health Organization, 2021). In the United States (US), approximately 36 million adults fall annually, leading to over 32,000 deaths, especially among adults aged 65 and older (Centers for Disease Control and Prevention [CDC], 2020). More than three million older adults are treated for fall-related injuries in emergency departments, while about 300,000 adults are hospitalized mostly for hip fractures per year. Other common injuries sustained include head and broken bones (CDC, 2020). However, the prevalence of falls involving persons with intellectual disabilities (ID) is higher than in the general population (Ho et al., 2019; Pope et al., 2020). Falls amongst adults with ID on many occasions result in physical injury, adversely affecting their
quality of life (Ho et al., 2019). The vulnerable and marginalized population of adults with ID is rapidly increasing within America (Renfro et al., 2016), and so is the fall risk. This population shows the earlier onset of chronic diseases, which exacerbates fall risk. Adults with ID also experience barriers to health promotion programs and healthcare services. This is primarily attributed to insufficient preparation of health providers to meet their unique needs and failure to include persons with ID in prevention measures (Renfro et al., 2016).

Ambulatory adults who have ID are at higher risk for accidental falls than the general population (Choi et al., 2020). Falls, among ambulatory adults with ID are a serious health problem that potentially leads to injuries, fractures, premature residential placement, reduced quality of life, and even death. About 25–46% of ambulatory adults with ID experience fall every year (Choi et al., 2020). Indeed, falls are the key cause of death resulting from unintentional injuries among this population (Choi et al., 2020). Additionally, adults with ID tend to experience falls at a much younger age when compared to the general population (Choi et al., 2020). Adults with ID also have decreased physical activity levels and physical performance, which increases their risk of falls.

Unintentional falls among adults are associated with a significant economic burden on America's health care system. The estimated healthcare cost linked with all falls was approximately $498.2 million in 2009, which is further expected to increase up to $1.4 billion by the year 2051 (Pope et al., 2020). Fall among adults is costly and preventable. Annually, approximately $50 billion is spent on medical-related expenses to non-fatal injuries, while $754 million is spent on falls (Florence et al., 2018). As many Americans continues to age, it is projected that the number of fall-related injuries and the cost of treating these injuries will rise (Florence et al., 2018).

The rates of falls in adults with ID are like that in older adults. Adults with ID are twice likely to experience severe fall-related injuries as the general population (Petropoulou et al., 2017; Pope et al., 2020). Moreover, about one-third of falls reported among adults with ID result
injury (Petropoulou et al., 2017). Fall risk among adults with ID has also been shown to increase with age. Axmon et al. (2018) reported that the risk of falls increased to 6.6% from 3.5% for persons with ID over 55 years in comparison with 3.2% from 1.7% in the general population. When falling, individuals with ID are likely to injure their legs and head, leading to unplanned inpatient care (Axmon et al., 2018). This population is further expected to require specialist care after a fall compared with the general population (Axmon et al., 2018). This highlights the importance of taking preventive measures to address the fall issue among adults with ID. Choi et al. (2020) noted that adults with ID who experience falls are likely to require more support with various daily life activities than their counterparts with ID who do not experience fall. Thus, it is necessary for caregivers and health providers to closely monitor risk factors for falls among persons with ID.

Falling among adults with ID is associated with adverse outcomes. Finlayson (2018) revealed that falling might cause loss of confidence, death, and injury for persons with ID. It may also lead to fear of falling and reduced participation in different physical activities. Falling is recognized as the leading contributor to injuries experienced by this unique population. Skorpen et al. (2016) indicated that fall-related injuries are the primary cause of hospitalization. Finlayson (2018) revealed that it is common for persons with ID to be considered 'older adults' from 50 years and onwards because of early onset of weakness. Interestingly, Foran et al. (2016) reported that persons with ID within 50-64 age brackets were twice as likely to experience falls compared to those aged 64 and older in the general population.

Hale et al. (2019) argue that causes of frequent falls in adults with ID are multi-factorial, including mobility issues, such as poor balance and gait. Walking is the main activity reported when falling among persons with ID occurs (Hale et al., 2019). While some of the risk factors for falls are challenging to modify, mobility-related impairments may be addressed. Preliminary evidence demonstrates that intervention targeting balance and gait in persons with ID is effective (Hale et al., 2019). Available evidence further indicates such prevention measures reduce falls by
addressing modifiable factors such as mobility and medications (Hale et al., 2019). Hale et al. (2016), who developed prevention falls for adults with ID, which used education, limb strength, and balance exercise found the intervention is feasible and beneficial for balance.

Fall prevention measures are important for ambulatory adults with ID as their life expectancy increases, leading to more age-related issues such as decreased mobility linked with falls. Approximately 60-80% of all reported falls occur in people with cognitive decline (Kovačič et al., 2020). Unfortunately, the primary treatments used to treat intellectual disabilities, including anticonvulsant medications, may increase the risk of falls (Kovačič et al., 2020). Due to the high prevalence of falls, and fall-related injuries in ambulatory adults with ID, falls prevention measures are needed in this population. As most falls are preventable, translation of research evidence for multifactorial fall prevention among this population is necessary. Ho et al. (2019) recommended developing measures and guidelines for preventing falls among adults with ID. Renfro et al. (2016) added that evidence-based fall prevention (EBFB) measures had been shown to reduce fall risk and fall-associated injuries considerably. The increasing population of persons with ID and fall risk reflects the urgent need to implement prevention measures tailored to meet the needs of this population. According to the CDC (2021), the rising number of falls in adults could be addressed by intervening to address risk factors such as poor balance and strength. Given the burden associated with falls in adults with ID, it is necessary to integrate fall prevention measures targeting modifiable fall risk factors, such as balance. Additionally, increasing population size, barriers to access preventive programs, and higher fall risks among adults with ID indicate an urgent need to integrate validated prevention measures. Therefore, the purpose of the current project is to use evidence-based preventive measures for reducing falls among chronic mental health facility residents over the age of fifty-five with ID.

**Problem Statement**

Adults aged 55 and older with ID are at a higher risk of experiencing unintentional fall-related to their health conditions and the used for management. Failure to implement prevention
programs to address risk factors reduces wellness and quality of life among adults with ID. This quality improvement (QI) project implemented the Otago Exercise Program, an evidence-based program for adults aged 55 and above at a chronic care facility in Massachusetts.

**Organizational “Gap” Analysis of Project Site**

The project was carried out at a chronic care facility in Massachusetts. The facility reports a significant problem of falls among residents. Pre-implementation, the facility lacked the resources and application of fall prevention measures, mainly due to the lack of staff engagement, collaboration, communication, and medication reviews. The facility was not able to incorporate recommended strategies for fall prevention to date (Table 1) despite reporting an average of 5-10 falls a month among adults with ID during the month of October 2021. Among the 10 falls, seven were non-fatal, while three were fatal requiring immediate medical attention, increasing the costs incurred treating persons with ID at the project site. Despite frequent cases of fall among adults with ID, the facility lacked the resources and application of fall prevention measures. In addition, WDC is a long-term care facility in Massachusetts serving adults ages 55 and above where the current QI was implemented had no history of routinely using evidence-based programs for preventing falls in adults with ID. Consequently, falls at the facility have become a severe health concern over the years. The overall desired outcome of this project was to implement an evidence-based program at the long-term care facility located in Massachusetts.

where The Otago Exercise program was implemented to reduce the number of falls among ambulatory adults with ID. The project was carried out to close the practice gap. To close the identified gap, insights from past studies and evidence-based recommendations were applied.

**Table 1**

*How the Facility Differs*

<table>
<thead>
<tr>
<th>Best Practices</th>
<th>How Mental Health Facility Differs</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td>Assessing staff knowledge about fall prevention.</td>
<td>Staff Knowledge on fall prevention is not assessed.</td>
</tr>
<tr>
<td>Assessing risk factors</td>
<td>Failure of assessing risk factors related to fall prevention</td>
</tr>
<tr>
<td>Educating staff on fall prevention</td>
<td>Failure to educate staff on fall prevention</td>
</tr>
<tr>
<td>Decrease falls at the mental health facility by addressing risk factors</td>
<td>Failure of addressing factors that lead to falls</td>
</tr>
<tr>
<td>Addressing medications side effects linked with falls</td>
<td>Failure to review medications for possible side effects</td>
</tr>
</tbody>
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**Literature Review**

An electronic search was carried out using various databases. Databases of ProQuest and CINAHL were searched for relevant research publications. Other electronic databases included Nursing Journals, Medline, PubMed, Cochrane Library, and Ovid Plus. The terms used for the literature search included “fall prevention,” “intellectual disability,” “adults,” “ambulatory adults,” “risk factors,” “physical activities,” “safety measures,” “medication reviews,” “education,” and “collaboration.” Boolean operators including AND, NOT, and OR were used to facilitate an advanced search for relevant studies.

Inclusion and exclusion criteria were then used to get relevant and valid articles. Ambulatory adults with intellectual disabilities were included, while adults who use wheelchairs were excluded. The literature search strategy only considered studies published in the last five years, those published in English, articles that discussed fall in adults with ID and prevention with abstracts, and full text. Articles published beyond 2016 and that did not mention fall in persons with ID, were excluded. The initial search yielded a total of 350 articles from different electronic databases. Backward and forward citation techniques facilitated the retrieval of additional studies, yielding 50 more studies to make a total of 400 articles. Abstracts of the retrieved studies were reviewed, and duplicates removed \((n = 60)\). In addition, irrelevant studies \((n = 180)\) were removed. The remaining studies \((n = 160)\) were further scrutinized. Additional studies \((n = 135)\) were excluded since full copies were inaccessible. After a full review of the
remaining studies, twenty-five \((n = 25)\) were included in the literature review. The included studies were selected based on the inclusion criteria. Only studies published in English and within the last five years were included. Only studies with complete copies accessible were included in this review.

**Risk Factors**

The risk factors associated with falls among ambulatory people with ID include non-use of supportive equipment, previous falls, decreasing physical ability, incontinence, paretic conditions, epilepsy, and impulsiveness. These factors were mainly associated with protective, person, situation, and ongoing factors, suggesting implications for caregiver education, prevention policies, risk awareness education, communication best practices, and relevant research (Pope et al., 2020). Therapists conducting screening of adults with ID should also remain aware of key fall risk factors. Some instances of these non-modifiable risk factors include increased age, impaired sensation, history of falls, and low cognition, while modifiable risk factors include weakness, poor balance, physical inactivity, impaired walking skills, medication issues, low vitamin D, anemias, orthostatic hypotension, fear of falling, social isolation, and poor self-efficacy (Maring et al., 2017).

The fall rate involving adults with ID remains high due to varying contributing risk factors. Pope et al. (2020) reviewed risk factors that make adults with ID prone to fall. The review identified numerous factors, including reduced physical capability, paretic conditions, epilepsy, past falls, impulsiveness, failure to use assistive equipment, and incontinence. Moreover, Axmon et al. (2018) identified that adults with ID are at risk of falling if involved in eating, personal care, and toileting. Ho et al. (2019) reported that age and medical history, including stroke, fracture history, and several comorbidities, are major fall risk factors in adults with ID. Other identified risk factors influencing falls in this population include the number and kind of medications, fall history, and history of visual impairments. However, Pope et al. (2020) acknowledged that risk factors contributing to falling among persons with ID are dynamic as
well as multifactorial. The evidence of these studies highlights that different falls risks factors may inform health providers when implementing an intervention to reduce falls incidences. Ho et al. (2019) argued that identification of fall risk factors in persons with ID is critical when developing strategies for fall prevention. The authors recommended evidence-based fall prevention approaches. Due to the multifactorial nature of falls, interventions should focus on addressing individual characteristics, such as fall history and health conditions.

**Physical Activity Programs**

While the authors in the previous studies focused on risk factors that contribute to an increased rate of falls among ambulatory people with ID, physical activity programs for fall reduction among adults with ID are also important. Kovačič et al. (2020) focused on evaluating the efficacy of three different physical activity programs on fall reduction among adults with ID. The authors used a randomized controlled trial with 150 participants to assess the effectiveness of multicomponent balance-specific exercise programs, multicomponent wellness programs, and Special Olympics athletic training. The results highlighted that a multicomponent balance-specific exercise program is especially useful for intellectually disabled adults having an elevated risk of falls and poor balance (Kovačič et al., 2020). The balance alteration among adults with ID is among the key issues for increasing fall risk. For this reason, a vestibular rehabilitation program could be beneficial for improving balance and reducing the fall risk among adults with ID (Cortés-Amador et al., 2019).

Past studies have shown that physical activity programs are effective in reducing falls in persons with ID. A randomized clinical trial by Lee et al. (2016) revealed that it examined the impact of balance training on functional strength, gait, and postural balance among persons with ID. Participants underwent balance training for 8-weeks (40 minutes per day, twice a week). The results revealed significant functional strength and postural balance improvements in the experimental group (p < 0.05) compared to the control group. Similarly, an exploratory study by Kachouri et al. (2016) reported improvements in postural balance and muscle strength among
persons with ID after the physical training program, preventing fall risk. Participants in the experimental group who attended the physical training program had higher postural balance compared to their counterparts in the control group.

The findings of Lee et al. (2016) and Kachouri et al. (2016) aligns with a study by Hale et al. (2016), who also established that physical fitness and balance are significant critical factors in fall prevention. Specifically, Hale et al. (2016) reported that appropriate physical activity and exercise significantly ($p = 0.04$) improved balance for adults with ID. Evidence presented in past studies supports the need for physical activities or exercises among adults with ID to reduce fall risk. According to Finlayson (2018), gait and balance issues in persons with ID have been shown to cause falls. Individuals with ID aged 50 and older have been shown to have balance abilities to those of older adults in the general population. Exercise to enhance or maintain balance and strength has been revealed to be central when developing effective fall prevention for persons with ID. Exercises provided within physiotherapy-led falls have been shown to significantly improve gait and balance and minimize the number of falls recorded. Additionally, the results provide evidence supporting the benefit and feasibility of physical activity programs in reducing fall risk among adults with ID (Lee et al., 2016; Hale et al., 2016; Kachouri et al., 2016).

**Characteristics of Adults with ID**

Some characteristics make ambulatory adults with ID more susceptible to falls. Those who fall have lower physical performance, moderate physical activity, lower mobility, walking problem, arthritis or rheumatism, increased age, and need for support for performing activities of daily living (ADLs) (Choi et al., 2020). Indeed, requiring support for performing ADLs is the critical predictor of falls among this population (Choi et al., 2020). Therefore, the staff in mental health facilities should offer support for ADLs to patients with ID, while caregivers need to closely observe their support needs to decrease the fall rate (Choi et al., 2020). Adults with ID need a slow introduction to fall prevention activities, consistent support, and familiar carers and environments to set optimum goals and self-monitor their actions. Therefore, support staff should
provide consistent engagement, input, and support and should provide equipment to decrease falls (Bainbridge et al., 2017).

Adults with ID share similar risk characteristics for falls to those of older persons. People with ID have attributes, such as diminished muscle strength and reduced balance. Other characteristics are impaired mobility status and cognitive impairment, which have been shown to influence the risk of falls (Ho et al., 2017). Moreover, adults with ID heavily depend on professional care and family support to address different health issues, such as one associated with falls. Adults with ID have also been shown to exhibit signs of aging earlier, further putting them at risk of fall (Ho et al., 2019). This could because adults with ID share characteristics with older persons, such as the use of walking aid, impaired mobility, and behavioral challenges. Thus, caregivers should consider the characteristics of adults with ID when considering which evidence-based program or intervention to implement.

**Education and Collaboration**

It is important to note that educating support workers, staff, and adults with ID about the significance of regular exercise is vital for fall prevention. Interventions like the ‘Otago Exercise Program’ and ‘Prevention of Falls for Adults with ID’ are incredibly helpful for reducing falls but require elevated levels of prioritization and support to ensure safe application (Hale et al., 2019). Practitioners should promote and use fall prevention measures for adults with ID to reduce the fall rate among this population since this population tends to experience it at an earlier age. To successfully implement fall prevention measures, the staff should collaborate and communicate with each other promptly. Raising awareness amongst physicians who work in ID services is essential to ensure adults with ID can equitably and reasonably access these services (Finlayson, 2018).

A multi-disciplinary approach that entails working closely with health practitioners, such as occupational therapists and physiotherapists, is critical in accomplishing successful fall prevention among adults with ID (Finlayson, 2018). Moreover, practitioners need to identify
how they may improve caregivers and family awareness on approaches to enhance fall prevention. Caregivers and families are an essential source of information, especially when a person with ID has difficulties in expressing himself or herself. Therefore, practitioners should investigate ways to educate and collaborate with caregivers and family members. For instance, this could entail education or training on assistive equipment and risk awareness education (Pope et al., 2020). The literature demonstrates the need to ensure effective collaboration between different stakeholders towards the reduction of fall rates in adults with ID.

**Safety Measures**

Safety measures that can be used to prevent falls among ambulatory adults with ID are also needed. Research supports the benefit of surveillance sensors, including and sensors for lighting, entertainment, and posture. These sensors are also extremely easy to use and cost-effective in clinical practice (Woensdregt et al., 2020). Safety skill training should be provided to adults with ID, while instituting few safety measures is also essential, such as railings, alarms, body belts descent devices, energy absorbers, fall arrest systems, protective socks, anti-slip flooring, and other assistive devices (Park, 2020). Finlayson (2018) added that environmental modification, prescription of assistive mobility equipment, education about safe mobility, and involvement in exercise or physical activity are essential when developing and implementing fall prevention interventions for adults with ID. Other safety measures involve regular checks by health practitioners to make sure assistive mobility equipment is being utilized and deployed correctly. Checkups of persons with ID are further recommended to enhance their overall health and reduce risk factors that could contribute to or cause falls. Bakker-van Gijssel et al. (2017) emphasized that using health check assessment tools that consider fall risk and prevalence would be critical when implementing interventions that contribute towards fall prevention for adults with ID. Health assessment tools may help in revealing the health needs of persons with ID.
Medication Reviews

As adverse medication side effects play a significant role in falls among this population, it is important to include regular medication reviews to prevent falls among intellectually disabled adults. Falls and the mortality, or impairment that may occur, are associated with polypharmacy and inappropriate prescribing (O’Dwyer et al., 2018). Intellectually disabled adults are at increased risk of frailty and are more vulnerable to adverse medication reactions. Most of them cannot self-report their medication side effects due to restricted communication skills and have physical comorbidities like swallowing difficulties that complicate the medical treatment. They are also more likely to have brain pathology that increases the risk of neuropsychiatric adverse effects. Thus, conducting multidisciplinary medication reviews, using ID-sensitive scales, and reviewing patient’s symptoms are essential to prevent medication-related harm in fall-susceptible intellectually disabled adults (O’Dwyer et al., 2018).

According to Axmon et al. (2018), intellectually disabled adults are more likely to be prescribed at least one fall-risk-increasing drug, such as antipsychotics, antidepressants, anticonvulsants, anxiolytics, hypnotics, sedatives, and opioids. The authors also highlighted that previously acceptable medicines can now pose considerable risks as individuals age because of age-related changes in pharmacodynamics and pharmacokinetics. Thus, the practitioners need to remain aware of possible side effects and review the medications that may further increase the fall risk among intellectually disabled ambulatory adults (Axmon et al., 2018).

Efficacy of Otago Exercise Program

The Otago exercise program (OEP), as a home-based exercise, is effective in reducing fall incidences among adults with ID (Hale et al., 2019; Renfro et al., 2016). A multiple case study of adults with ID by Hale et al. (2019) examined the acceptability and feasibility of the Otago exercise program and fall preventions among adults with ID. A total of seven adults with different ID levels participated. Hale et al. (2019) reported that OEP is acceptable due to its supportive, social, and safe environment. The results further indicated that OEP increased the
strength and confidence of adults with ID. Moreover, Renfro et al. (2016) implemented a modified version of OEP at a project site accommodating adults with ID in Montana. Participants were tested pre-and post-intervention utilizing CDC Stopping Elderly Accidents, Deaths, and Injuries (STEADI) tool kit. The actual intervention involved exercise classes and home programs for over seven weeks. Like Hale et al. (2019), Renfro et al. (2016) found that implementation of OEP among adults with ID resulted in reduced falls. The study's results revealed that OEP could be successfully implemented amongst adults with ID to reduce fall rates cost-effectively.

Otago exercise program has further been shown to effectively reduce fall risk among elderly persons from the general population. Finlayson (2018) argued that adults with ID are referred to as 'older adults' from the age of 50 and above due to the early onset of weaknesses. Thus, the efficacy of OEP is likely to reduce fall risk in adults with ID who share similarities with older persons from the general population. A systematic review conducted by Martins et al. (2018) revealed that fall risk interventions based on OEP improved balance and reduced falls in older adults. Besides, the study reported improvements in the functional ability of elderly persons after the implementation of OEP. Similarly, Tuvemo et al. (2020) revealed that OEP reduced fall risk in older participants. The authors applied a randomized controlled trial where participants were randomized into three groups of OEP, OEP with motivational interviewing, and a control group. Participants in the two experimental groups demonstrated improved physical activity, physical performance, and fall-related efficacy, reduced fall injury rate, and enhanced balance.

In another study, Albornos-Muñoz et al. (2018) compared how falls could be decreased in older adults aged 65 and older by providing individual or group exercise sessions following OEP. The authors revealed that OEP-based exercise interventions improved dynamic and static balance and walking quality among the participants. Similarly, Benavent-Caballer et al. (2016) reported that OEP might significantly enhance general levels of mobility and functional balance.
The results showed that OEP in older persons has significant improvements and hence beneficial for fall risk reduction. These studies support that OEP is an effective intervention for reducing falls in elderly persons. In addition, more studies, including randomized control trials, meta-analysis, and systematic reviews, recognize the OEP as practical exercise preventive strategy benefits such as improved physical functioning and fall reductions (Dadgari et al., 2016; Sherrington et al., 2017; Shier et al., 2016). The studies indicate that OEP is a suitable evidence-based intervention for fall prevention among persons at a higher risk of falling.

**Summary of Findings**

Research suggests there are many risk factors associated with falls among ambulatory adults with ID (See Appendix A). There is also considerable research to support measures intended to prevent falls (See Appendix B). Health care staff may offer support to patients, ensure consistent engagement, collaboration, and input, remove possible barriers, and closely observe patients decrease fall rates. Medication reviews may also be important to prevent falls since falls are associated with polypharmacy, potentially inappropriate prescribing, and fall-risk-increasing drugs. Therefore, the research evidence supporting the proposed clinical project signifies the importance of staff engagement, collaboration, communication, and medication reviews, which are key to decreasing fall rates among mental health facility residents with intellectual disabilities. More importantly, the available evidence supports the proposed implementation of OEP in reducing fall risk and rate. The findings demonstrated that OEP improves physical activity, physical performance, reduces fall-related risks, reduces fall injury rate, and improves balance. The result further showed that implementation of OEP enhances general levels of mobility and confidence. The review of existing literature established that OEP can be successfully used amongst adults with ID to reduce fall rates cost-effectively.

**Theoretical Framework**

Lewin's 3-step change theory was guiding the current QI project. The theory encompasses three central tenets (Lewin, 1951). Lewin referred to these tenets as stages or
phases of unfreezing, change, and refreezing stage (Appendix C). These tenets focus on understanding and structure of change and approach to enhance behavior throughout the change process. The theory is founded on the assumption that change initiatives are influenced by both opposing and driving forces. Lewin argued that the tension between restraining and driving forces maintains equilibrium and that changing the status quo necessitates an organization to achieve planned change activities utilizing a three-step model (Lewin, 1951). In addition, the model assumes that changes are likely to be met with some resistance and hence allows change agents to prepare for foreseeable barriers. This allowed the project manager DNP student to recognize possible barriers before proceeding to implement the exercise program.

Unfreezing entails undoing the current situation (how things are done) and preparing the organization for the projected change. Unfreezing could be achieved through various techniques such as minimizing the restraining powers that might impede change, enhancing powers facilitating change, or a combination of the two approaches (Cummings et al., 2016). Lewin’s change theory suggests that an organization must unfreeze its current state into a natural position to facilitate unlearning of old behavior and adoption of new behavior to alter processes. Thus, unfreezing allows individuals to let go of old patterns undoing the present status quo. In the 'unfreezing' stage, the team focuses on letting go of customary practices of completing the task, recognizes the problem at hand which needs to change, and the required solution (Ancruee, 2017).

The second phase entails seeking alternatives, reducing forces that adversely affect change, and demonstrating the benefits of the intended change. This step is attained through collaboration with different stakeholders. During this phase, an organization embraces new organizational systems, processes, approaches, and behaviors. The change phase involves training, coaching, brainstorming, and role modeling innovative approaches (Wojciechowski et al., 2016). Training should be offered to equip relevant stakeholders with an appropriate level of competencies and knowledge. Moreover, time and communication play a significant role during
the change phase. For instance, stakeholders need time to understand and absorb the changes. Communication ensures that stakeholders are sufficiently involved throughout the change process (Wojciechowski et al., 2016).

The final phase involves refreezing. Under this phase, the organizations aim to integrate and stabilize the new equilibrium into the existing system for it to become a habit. Refreezing step ensures that the change becomes permanent and prevents reverting to the old norm. The phase is primarily attained by adopting new organizational norms, practices, culture, and values. Moreover, refreezing may be achieved through the development of new processes, policies, formal structures, as well as systems to make sure that the implemented changes become a practice norm (Deborah, 2018).

Lewin's change theory is applicable in this QI project. In this project, unfreezing was achieved by highlighting the fall rate among adults with ID and the need to adopt measures to reduce falls in this unique population. The DNP student discussed the need for change with stakeholders and be provided with information about best practices. The need to prevent and reduce falls among adults with ID was the main driving force for this project, while the significant restraining force barrier is likely to resistance to change among staff. The DNP student outlined the benefits of fall prevention measures backed by available evidence. For example, the staff was made aware of the need for change and motivated to forgo their status quo. In return, this reduced resistance to change among the stakeholders. Moreover, yearly meeting with stakeholders for feedback and discussing the possible benefits of change during the moving/change phase helped maintain the momentum of implementing the exercise program and prevent reversion of change.

The change phase entailed coaching the team composing health providers and other staff. According to Ancruee (2017), in the change stage, the implementation of the action plan is done while coaching the team. For example, the staff was required to follow specific care standards or best practices. Additionally, the change phase involved designing the Otago Exercise Program,
where health providers were taught about the importance of exercise in preventing falls. The program was then be implemented among adults with ID at the facility by the DNP student in collaboration with the selected project team.

Under the refreezing phase, the project team’s focus will retain and stabilize the practice change to ensure its permanent integration. Ancruue (2017) emphasized that in refreezing stage, the project team focuses on retaining and stabilizing the change to make it permanent (Ancruue, 2017). In the current project, this was achieved by developing policies concerning the long-term roles and duties of the staff in ensuring the Otago Exercise Program is always practiced. Therefore, a policy was developed to ensure nurses and other health practitioners enroll adults with ID into exercise programs to reduce falls.

**Methods**

**Goals, Objectives & Outcomes**

The overall goal of this project was to implement evidence-based preventive measures for reducing falls among intellectually disabled mental health facility residents over the age of 55. To accomplish this goal, the following measurable objectives and expected outcomes were proposed (Table 2).

Table 2

*The overall goal, measurable objectives, and expected outcomes*

<table>
<thead>
<tr>
<th>Overall Goal</th>
<th>Measurable Objective</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>The overall goal of the project is to implement evidence-based preventive measures for reducing falls among intellectually disabled mental health facility residents, over the age of 55.</td>
<td>To assess fall risks among ID mental health facility residents using Falls Risk Assessment Tool (FRAT) three months after implementation</td>
<td>A fall risk assessment would be completed on 80% of residents.</td>
</tr>
<tr>
<td></td>
<td>To reduce fall rate among ID mental health facility residents after three months of instituting fall prevention measures.</td>
<td>Fall rates will be reduced by 15% following institution of fall prevention methods.</td>
</tr>
<tr>
<td></td>
<td>To promote staff knowledge of fall prevention measures</td>
<td></td>
</tr>
</tbody>
</table>
### Project Design

The QI Project included an educational intervention and health record reviews to decrease fall rates among mental health facility residents. Initial assessment of the current rate of falls were compared to post-intervention fall rates. The project was expected to reduce fall risks and fall rates at the facility.

### Project Site and Population

The current quality improvement project was carried out at a chronic mental health facility in Massachusetts. The facility serves adults with ID and has a capacity of 180 beds and approximately 14 nurses every shift (13:1 nurse-patient ratio). In the year beginning January 2020 to December 2020 the facility recorded an average of 10 falls per day. The adults with ID at the facility are aged between 35 and 90. Of the 180 residents, 60% are female, and 40% are male. The primary race of adults with ID at the facility is White, followed by 2% African American, 90 % the residents are diagnosed with various levels of ID, including profound, severe, moderate, and mild. 70% of adults with ID at the facility are diagnosed with fragile X syndrome, Down syndrome, and Prader-Willi Syndrome.

The key target population of this project was ambulatory residents with ID, aged 55 and above. Participants were drawn from this group. A convenience sample was obtained from the population of adults with ID. The inclusion criteria were 1) adults with ID aged 55 and older, 2) persons not using a wheelchair, 3) adults not bedridden, and 4) adults able to understand English. A sample of 27 adults with ID was drawn from the patient population.
The key stakeholders of the change process included mental health facility administration, physicians, nurses, therapists, and pharmacists, who would ensure adequate resources for successful change management, and the fall prevention measures were being taken. One physician (female), three nurses (all females), two therapists (two females), and one pharmacist (Female) age 30 and older were involved in educational sessions, the age range is 30 and older. The sessions with staff were conducted to make them aware of the importance of fall risk assessment and intervention and to increase their engagement and collaboration for implementing fall prevention measures.

**Setting**

The meetings took place in an auditorium with enough space to accommodate stakeholders at the facility. The main facilitating factor for this project was a motivated and passionate QI team and stakeholders at the facility. The second facilitator was the facility's management's willingness to allocate resources towards the completion of this project. The next facilitating factor was the presence of a supportive culture among the facility's management. Lastly, staff participation in all implementation phases of this QI project will serve as a key facilitator.

**Intervention**

The current QI project included an educational intervention of the Otago Exercise Program (OEP) to reduce falls among intellectually disabled adults (Hale et al., 2019; Renfro et al., 2016). OEP is mainly a home-based program that includes a personalized walking plan and balance training and strengthening exercises according to patients’ needs. The program is effective for ambulatory adults who can exercise on their own safely and who can understand the exercise instructions. It can be used with people with a history of falls, poor balance, strength, or frailty. The program is practical, safe, effective, and cost-effective for fall prevention (Hale et al., 2019). The exercises are mainly performed for 30 minutes, three times a week, for at least three months. OEP is reported to improve functional ability and balance among adults with ID, thereby
reducing fall risk (Hale et al., 2019). Therefore, this exercise program was most suitable to include in the facility’s quality improvement project.

**Implementation Plan**

**Phase One**

The DNP student worked with members of the facility to organize meetings at the site during which implementation strategies will be discussed. This phase occurred before implementing fall prevention interventions and comprised gathering the related pre-intervention falls data and sharing this data with the staff.

**Phase Two**

Training was provided to the staff through pamphlets and educational sessions. Staff at the health facility were required to attend a mandatory in-service training about the fall prevention program and best practices. The training took place during a weekly meeting with practitioners (physicians, nurses, therapists, and pharmacists). The DNP student facilitated the training, and practitioners were provided with educational materials concerning OEP. An email was sent to the practitioners summarizing the planned QI project and other resources relevant to the project. The DNP student followed up with each practitioner to carry out brief training and offer clarifications where necessary.

**Phase Three**

The QI project ran for 8-weeks. First, 27 residents in one unit at the facility were assessed for fall risk except those wheelchair-bound or bedridden. In collaboration with a physical therapist and social worker, the DNP student discussed general information and goals of the intervention with persons with ID and collect any relevant clinical history. A group approach was adopted whereby adults with ID were grouped into two groups of at least five members. Grouping participants made it easier for the project team to administer the sessions and save time. There were three exercise sessions a week.
The program involved two main activities. After an initial assessment of balance and strength was conducted during baseline, followed by an exercise and a walking program was administered by the DNP student in collaboration with caregivers. The intervention included a total of five strengthening exercises and 12 balance exercises. The Otago exercise was added to the daily activities for each participant three times a week and reinforced by caregivers. The walking program consisted of 30 minutes walking sessions. The sessions were broken down into two 15-minute blocks.

**Phase Four**

A new policy for fall prevention was created by the DNP student and facility leaders to make sure that the fall prevention efforts are maintained and that the staff remains compliant to sustain the program after the initial intervention. The policy required practitioners at the mental health facility to regularly administer exercise and a walking program to reduce fall risks in adults with ID. The aim was to integrate OEP into the practice.

**Instruments and Data Collection Methods**

The Morse Fall Scale (MFS) was used to assess fall risks in the study (See Appendix D). The DNP student collected the following data: monthly incident reports, fall data, the daily bed occupancy rate, total number of patient bed days per month. Pre-test and post-test fall rates before and after the fall prevention measures at the facility were calculated. The total number of falls was then divided by the number of patient bed days in a month, which was then divided by 180 to check the fall rate. The fall rate was measured both before and after the institution of fall prevention measures to check if fall rates decreased by 15%. In addition, participants were provided with self-report questionnaires to assess change in knowledge levels and understanding of fall prevention practices to enhance patient outcomes through falls prevention and reduction. Knowledge on patient falls was measured using a modified questionnaire that was used by James and al. (2020) who conducted a study to determine knowledge, attitudes on fall and awareness of hospitalized patient’s fall risk factors among the nurses working in tertiary care hospitals. The
instrument had 15 questions related to fall risk factors. The MFS was developed in 1997 and includes six variables: history of fall, secondary diagnoses, use of ambulation aid, intravenous therapy or heparin lock, gait, and mental status (Morse, 2009). The MFS can be scored by direct visualization/assessment of the patient and by chart audits. The MFS is fast and simple to administer. According to Morse (2009) a large majority of nurses stated that the scale is quick and easy to use, ultimately taking less than three minutes to assess and rate the patient. According to Morse (2009) assessment of a patient’s fall risk should be completed at least once per day, as a patient’s risk is not considered stable.

**Data Collection Procedures**

Data was gathered by the DNP student and a nurse involved in this QI project using MFS. The data was de-identified and did not include participant identifiers. The data consisted of participants' age, race, and ethnicity. The pre-intervention data was collected before project implementation, while post-intervention data was gathered at the end of the project. All the obtained data was recorded in Microsoft Excel spreadsheet.

**Data Analysis**

Data analysis determined if the expected outcomes per each objective were achieved. The obtained data was reviewed for possible inconsistencies, errors, and outliers. Then, the data was exported to the Statistical Package for Social Services (SPSS) software version 24. Descriptive statistics, including frequency and percentage, were used to assess if the rate of falls decreased by 15% after instituting the fall prevention measures. Descriptive statistics were also used to capture participants' demographic characteristics including age and gender. The project further used inferential statistics to determine the effect of the OEP on strength and balance. Particularly, a paired t-test was used to compare the means of MFS scores between the two dependent groups, pre-and post-OEP groups (Gerald, 2018) and examine if the difference was statistically significant.
Cost-Benefit Analysis

Costs for the fall prevention program were absorbed by the facility. Supplies, brochures etc., were available in the storeroom. The expected costs for the fall prevention program were estimated to be lower than the cost of caring for patients who sustained injuries related to falls. Implementing a cost effective, evidence-based fall program would save healthcare dollars. Heinrich et al. (2010) and other studies were explored to determine the economic burden of falls, it can cost up to $42,840 per fall to care for a patient who sustained a fall, depending on the injury. Therefore, it was expected that the facility would save money by instituting a fall prevention program, which justified the implementation of the QI project.

Timeline

In the pre-training phase, which took one month, the facility reviewed all the resources needed for the fall prevention program. The facility completed the fall risk assessment and calculated the current fall rate to get the current statistics on falls. The facility in this phase would also schedule training sessions for the staff. In the training and pre-implementation phase, which took around one month, training was conducted with staff, and they were provided educational sessions on fall prevention measures. Weekly check-ins were conducted to gather the baseline data, and an action plan was developed.

Moreover, the staff were engaged in the implementation checklist. In the implementation phase, which took around two months, interventions were put into practice, bi-weekly check-ins will be conducted, data was analyzed, and an action plan was updated if required. Lastly, the sustainment phase was ongoing, in which data was analyzed regularly to check the success of the intervention and conduct the meetings. This phase will continue until the fall prevention measures are permanently yielding positive outcomes for the patient population (See Appendix F).
Ethical Considerations

The personnel at the facility carefully conducted this QI project following the Standards of Care. Particularly, the project data was handled in line with the requirements of the Health Insurance Portability and Accountability Act (HIPAA). The Act requires patient authorization for disclosure of identifiable health information. Further, Act emphasizes the need for Institutional Review Board (IRB) approval before collection of patient data (Cohen & Mello, 2018). In this regard, permission to implement the project at the facility was acquired from the facility’s management. The DNP student sought approval from the University of Massachusetts’ IRB before project implementation (Appendix G). Further, all the information collected as part of assessing the impact of the intervention was aggregated data from the patient EHRs and did not include any patient identifiers. There are no risks for patients concerning fall prevention measures. There were no conflicts of interest.

Results

Demographics

Most of the practitioners (60%) were aged more than 30 years, followed by those aged between 26-30 years (20%) and between 21 and 25 (20%). There were more female practitioners (60%) than male (40%). Half of those who took part (50%) had a bachelor’s degree as the highest level of education while 30% had a diploma and 20% had postgraduate qualification. Most of the practitioners (55%) had worked for six to 10 years at the facility. The results showed that all (100%) of the practitioners had previous experience managing patient falls and they had received some form of fall prevention education (table 3).

Table 3

Summary of Demographics

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20 years</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>21–25 years</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>26–30 years</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>&gt; 30 years</td>
<td>12</td>
<td>60%</td>
</tr>
</tbody>
</table>
Morse Falls Risk Scores (MFS) After Intervention

The first objective was to assess fall risks among ID mental health facility residents using Morse Falls Scale (MFS) after three months. The expected outcome was to completely screen 80% of residents. In this project, data was collected from 27 participants of which 25 were screened for patient falls using Morse Fall Score, representing a 92% screening rate.

The paired $t$-test results indicate that in the pre-intervention phase each participant has an average of 11.22 (SD=2.31) counts of fall which reduced to 8.12 (SD=2.19) after the OEP intervention and that this decrease was statistically significant ($t$=-2.96, $p$=.005) as demonstrated in Table 4. This shows that this objective was achieved.

Table 4

<table>
<thead>
<tr>
<th>Paired $t$-test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>MFS Score</td>
</tr>
</tbody>
</table>
Fall Rates Among ID Mental Health Facility Residents After Intervention

The second objective was to reduce fall rate among ID mental health facility residents after three months of instituting fall prevention measures. The expected outcome was a 15% fall reduction rate following institution of fall prevention methods. Before implementation, the facility registered a 60% fall rate and falls were decreased to 32% after OEP. The expected outcomes which were to achieve a 15% decrease fall rate following institution of fall prevention methods was met.

Change in Staff Knowledge Levels

The third objective was to improve staff knowledge of fall prevention measures. The self-report questionnaire results show significant improvement in staff’s knowledge of fall prevention practices. The expected outcome was to improve staff knowledge of fall prevention by 70% post-education. The findings in Table 5 show the nurse’s knowledge on fall prevention. This objective has been met.

Table 5
Change in Nurses’ Knowledge

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Staff</td>
<td>Percentage</td>
</tr>
<tr>
<td>Recurrence rate is high among anyone who has already</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>experienced a fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falls occur most frequently among safety incidents</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>Elderly hip fractures occur by falls</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>Sliding is not falling</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>The more medicine you take, the higher your fall risk</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>Depression is not related to falls</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>Someone who has a visual impairment has a higher risk for</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>falls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being numb in the limbs is not related to falls</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>Dysuria is a risk factor for falls</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Taking medicine for diabetes is not related to falls</td>
<td>14</td>
<td>70%</td>
</tr>
<tr>
<td>Taking medicine for blood pressure is not related to falls</td>
<td>11</td>
<td>55%</td>
</tr>
</tbody>
</table>
Hearing impaired is not related to falls 12 60% 17 85% 25%
Falls occur more when getting up from and down on beds 15 75% 18 90% 15%
IV therapy or IV access has a risk for fall 8 40% 17 85% 45%
Average 60% 89% 29%

**Staff Engagement in Fall Prevention**

The OEP program was well received by the nurses with almost all the nurses participating in the program from start to the end. The researcher anticipated about 80% attendance, which was exceeded as more than 90% of the nurses attended the program from the beginning to the end. This objective was met.

**Discussion**

The findings showed that the implementation of the evidence-based preventive measures lead to a reduction of number of falls after implementation. These finding are in line with past studies. For instance, Renfro et al. (2016) noted that implementation of Evidence-Based Fall Prevention measures had been shown to reduce fall risk and fall-associated injuries by 40%.

The effect of the evidence-base practice implemented in this project can be explained by the fact that it increased knowledge of practitioners on patient fall risk factors, hence they can take requisite prevention measures. This supports Maring et al., (2017) who noted that practitioners attending to patients with ID should be aware of fall risk factors. The knowledge is important given that each patient has one or more risk factors, creating different probabilities of falling. As such there is a need to develop preventive measures which address common and unique risk factors. For instance, if practitioners are aware of the non-modifiable risk factors such as age, impaired sensation, history of falls, and low cognition, they can utilize standard and common prevention measures that were already established with these risk factors. Further modifiable risk factors include weakness, poor balance, physical inactivity, impaired walking skills, medication issues, low vitamin D, anemia, orthostatic hypotension, fear of falling, social isolation, and poor self-efficacy. These risk factors vary from one patient to another. For instance, different patients have varied fears of falling, walking ability, use different medications,
among others. As such the practitioners were informed how they can design preventive measures which address the various levels of modifiable risk factors leading to a significant reduction in patient falls.

Generally, persons with ID have different capabilities and health care needs which increases fall risk. chances of falling. People with ID have diminished muscle strength and reduced balance, impaired mobility status and cognitive impairment, which have been shown to influence the risk of falls (Ho et al., 2017). In this regard persons with ID require a slow and moderated introduction to fall prevention activities, consistent support, and familiar care givers and environments to set optimum goals and self-monitor their actions. As such it is important that health practitioners understand the importance of requisite attention to persons with ID. Implementation of the EBP enables practitioners to provide required support to meet the unique needs of persons with ID.

The EBP highlighted the role of practitioners from various disciplines. In this project the practitioners who completed the OEP were educated on the health care challenge of patients falls and how they can effectively implement prevention measures. Past findings which have shown that when practitioners collaborate and work as a team there is increased effectiveness in successful fall prevention among adults with ID (Finlayson, 2018). Collaboration is effective when practitioners understand their role a health challenge and their role in addressing it. This project supports findings that practitioner education and collaboration improves outcomes in patients with ID.

The OEP intervention led to a reduction in patient falls because it addressed the risk factors which affect patient falls. For instance, OEP individualized walking plans and balance training and walking plan and balance exercises according to patients’ needs. Patients with ID have variation in walking and muscle strength. The implementation of OEP addressed this challenge through strengthening exercises, which reduces fall risk.
The OEP program was also effective because it could be implemented by patients on their own after comprehending the exercise instructions. It is practical and does not require significant energy nor resources to be implemented. The OEP could be performed for 30 minutes, three times a week, for at least three months.

The program was designed such that it could be applied by patients with varied needs and with several risk factors. For instance, it addressed the risk of falls among patients with poor balance, strength, or frailty and those with history of falls.

One facilitator of this project was that the organization had a culture which encouraged staff participation and involvement. The facility managers were receptive to a training program which helps them address a real health care challenge. As such they provide required resources to implement the project. Also, the practitioners were receptive to current information and attended the training given there was a supportive culture.

The project faced some challenges, one barrier to implementation and evaluating the project was that there were non-modifiable risk factors which affected efficacy of the evidence-based preventive measures. The primary challenge was the pandemic regulations such as lockdowns and restricted movements at the facility which delayed part of the implementation of the project. Another barrier was the implementation of evidence-based preventive measures increased workload for the practitioners and staff, potentially leading to staff resistance to change.

To overcome these barriers, the DNP student emphasized the significance of engaging adults with ID in strength, balance exercises, and walking programs in reducing fall risk at the facility. Secondly, additional time needed to facilitate OEP activities was a significant challenge during the project implementation. The care givers spent extra time engaging adults with ID in physical activities, such as balance exercises and walking. The DNP student addressed this barrier by collaborating with the facility’s management to create a schedule plan to facilitate project implementation with few disruptions to the standard care operations.
Nursing Practice Implication

The findings demonstrated that implementation of evidence-based preventive measures leads to an increase in nurses’ knowledge if patient fall related information. In this regard, healthcare facilities should determine a knowledge gap on patient fall-related information and implement relevant evidence-based preventive measures. The evidence-based preventive measures should match the gaps to maximize their impact.

The project results showed that implementation of the evidence-based preventive measures had a reduction of 32% in number of patient falls. Evidence-based preventive measures address prevalence of patient falls and should be supported by health facility managers. The managers and the institutions should offer requisite resources to effectively implement the evidence-based preventive measures.

The project did not explore possible confounding factors that influence the effect of implementing OEP on patient falls. In this regard, a future project should be conducted to determine possible confounding factors. Also attitudes and perspectives of medical practitioners is important in the implementation of evidence-based interventions. In this regard, a future project should be conducted to determine attitudes of nurses towards implementation of OEP.

Conclusion

The purpose of this project was to implement evidence-based preventive measures Otago Exercise Program for reducing falls among persons with Intellectual Disabilities in a mental health facility in Massachusetts. An OEP was provided to adults with ID aged 55 and older for 8 weeks. Effectiveness of the evidence-based preventive measures utilized, the Morse Fall Scale tool fall risk assessment tool to compare pre-and post-intervention data. All project objectives were met.
References


Centers for Disease Control and Prevention. (2020). *Keep on your feet—preventing older adult falls*. https://www.cdc.gov/injury/features/older-adult-falls/index.html#:~:text=One%20out%20of%20four%20older,particularly%20among%20the%20aging%20population.&text=About%2036%20million%20older%20adults,in%20more%20than%2032%20000%20deaths


## Appendix A

**Risk Factors Associated with Fall among Ambulatory Adults with ID**

<table>
<thead>
<tr>
<th>Risk Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-use of supportive equipment (Pope et al., 2020).</td>
</tr>
<tr>
<td>History of falls (Pope et al., 2020).</td>
</tr>
<tr>
<td>Decreased physical ability (Pope et al., 2020).</td>
</tr>
<tr>
<td>Incontinence (Pope et al., 2020).</td>
</tr>
<tr>
<td>Paretic conditions (Pope et al., 2020).</td>
</tr>
<tr>
<td>Epilepsy (Pope et al., 2020).</td>
</tr>
<tr>
<td>Impulsiveness (Pope et al., 2020).</td>
</tr>
<tr>
<td>Increased age (Maring et al., 2017).</td>
</tr>
<tr>
<td>Impaired sensation (Maring et al., 2017).</td>
</tr>
<tr>
<td>Low cognition (Maring et al., 2017).</td>
</tr>
<tr>
<td>Poor balance (Maring et al., 2017).</td>
</tr>
<tr>
<td>Medication issues (Maring et al., 2017).</td>
</tr>
<tr>
<td>Anemias (Maring et al., 2017).</td>
</tr>
<tr>
<td>Orthostatic hypotension (Maring et al., 2017).</td>
</tr>
<tr>
<td>Fear of falling (Maring et al., 2017).</td>
</tr>
<tr>
<td>Social isolation (Maring et al., 2017).</td>
</tr>
<tr>
<td>Poor self-efficacy (Maring et al., 2017).</td>
</tr>
</tbody>
</table>
## Appendix B

### Fall Prevention Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicomponent balance-specific exercise program</td>
<td>Kovačič et al., 2020.</td>
</tr>
<tr>
<td>Vestibular rehabilitation program</td>
<td>Cortés-Amador et al., 2019.</td>
</tr>
<tr>
<td>Otago Exercise Program</td>
<td>Hale et al., 2019.</td>
</tr>
<tr>
<td>Prevention of Falls for Adults with ID</td>
<td>Hale et al., 2019.</td>
</tr>
<tr>
<td>Surveillance sensors</td>
<td>Woensdregt et al., 2020.</td>
</tr>
</tbody>
</table>
Appendix C

Lewin’s Change Model

Unfreezing
- Create problem awareness
- Education
- Attempting to change the status quo
- Ensures that all employees are ready to the proposed change

Change
- Implement the change
- Decrease the forces that affect change negativity.
- Coaching
- Training

Refreezing
- Stabilizing the new system so that it becomes a habit for the staff and the norm.
- Retraining when needed
- Celebrating success

# Appendix D

## Morse Fall Assessment Tool

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Scale</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of Falls</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Secondary Diagnosis</td>
<td>Yes</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Ambulatory Aid</td>
<td>Furniture</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Crutches / Cane / Walker</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>None / Bed Rest / Wheelchair / Nurse</td>
<td>0</td>
</tr>
<tr>
<td>IV / Heparin Lock</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Gait / Transferring</td>
<td>Impaired</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Normal / Bed Rest / Immobile</td>
<td>0</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Forgets Limitations</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Oriented to Own Ability</td>
<td>0</td>
</tr>
</tbody>
</table>

### Morse Fall Score*

- **High Risk**: 45 and higher
- **Moderate Risk**: 25 - 44
- **Low Risk**: 0 - 24
Appendix E

Cost-Benefit Analysis
Appendix F

Timeline

Pre-training

1 Month
- Review resources for fall prevention
- Complete pre-training assessment
- Schedule training sessions.

Training

1 Month
- Conduct training sessions with staff
- View training webinars
- Conduct weekly check-ins
- Gather and review baseline

Pre-implementation

1 Month
- Develop action plan
- Transition to bi-weekly check-ins
- Complete implementation checklist

Implementation

3 Months
- Biweekly meetings
- Collect and analyze data
- Update action plans

Sustainment

Ongoing
- Continue with meetings
- Regularly analyze data
Appendix G

Human Subject Approval Form

Memorandum – Not Human Subjects Research Determination

Date: September 28, 2021

To: Marie Ambroise

College of Nursing Project Title: Fall Prevention Program for Adults with Intellectual Disabilities in a mental health facility using Lewin’s theory

HRPO Determination Number: 21-182

The Human Research Protection Office (HRPO) has evaluated the above-named project and has made the following determination based on the information provided to our office:

The proposed project does not involve research that obtains information about living individuals [45 CFR 46.102(f)].

The proposed project does not involve intervention or interaction with individuals OR does not use identifiable confidential information [45 CFR 46.102(f)(1), (2)].

The proposed project does not meet the definition of human subject research under federal regulations [45 CFR 46.102(d)].

Submission of an Application to UMass Amherst IRB is not required.

Note: This determination applies only to the activities described in the submission. If there are
changes to the activities described in this submission, please submit a new determination form to
the HRPO prior to initiating any changes. Researchers should NOT include contact information
for the UMass Amherst IRB on any project materials.

A project determined as “Not Human Subjects Research,” must still be conducted ethically. The
UMass Amherst HRPO strongly expects project personnel to: - treat participants with respect at
all times - ensure project participation is voluntary and confidentiality is maintained (when
applicable) - minimize any risks associated with participation in the project - conduct the project
in compliance with all applicable federal, state, and local regulations as well as UMass Amherst
Policies and procedures which may include obtaining approval of your activities from other
institutions or entities.

Please do not hesitate to call us at 413-545-3428

or email humansubjects@ora.umass.edu if you have any questions.

Iris L. Jenkins, Assistant Director Human Research Protection Office Mass Venture Center 100
Venture Way, Suite 116 Hadley, MA 01035 Telephone: 413-545-3428
A Thank You Note to My Professors,

Looking back when I started the project, I faced multiple challenges, I had to change the topic because my first mentor resigned from the facility, and the Covid 19 pandemic has made things worse. I was nervous and frustrated because I was falling behind. With perseverance and with the help from my chair Dr. Julia Ronconi and Dr. Choi who encouraged me and also had faith in me, the project has been successfully completed I would like to extend my sincere gratitude to them. To my other professors who helped me along the way, I am thankful.