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Research Article

The Effectiveness of Home-Based Otago Exercise Program Versus Frenkel's Exercise in Preventing Falls in Elderly Adults

Abenle Tep[1], Trishna Saikia Baruah[2*], Mantu Paul[3], Niharika Dihidar[4] and Abhijit Dutta[5]

[1]*MPT Scholar, Faculty of Paramedical Sciences, Assam downtown University, India*

[2]*Assistant Prof. Physiotherapy Faculty of Paramedical Sciences, Assam downtown University, India*

[3]*Assistant Prof. Physiotherapy Faculty of Paramedical Sciences, Assam downtown University, India*

[4]*Assistant Prof. Physiotherapy Faculty of Paramedical Sciences, Assam downtown University, India*

[5]*Dean Faculty of Paramedical Sciences Assam down town University*

Abstract: Fall is the major concern for elderly adults, which can lead to chronic disability and dependency level increases. Impaired muscle strength and instability in balance are the most common causes of falls in older adults. This study aims to find the effectiveness of a home-based Otago exercise program versus Frenkel's exercise in preventing falls in the elderly. In addition, this study aims to compare the efficacy of a home-based Otago exercise program versus Frenkel's exercise for assessing fall risk and fear of falls. This was a comparative study with thirty subjects who perceived fear of falls, or a history of falls taken considering the inclusion criteria, where Group A received Otago exercise (strengthening and balance exercises) and Group B received Frenkel's exercise (in supine, sitting and standing positions) with 15 subjects in each group. Timed up and go (TUG) for assessing balance and fall efficacy scale (FES) for determining risk and fear of falls were used as outcome measures. The paired 't-test was used to compare both groups' pre and post-intervention results, and the independent 't'-test was used to compare groups. Group A mean TUG score improved from 16.200 to 11.066, FES 74.733 to 67.866 and Group B's mean TUG score was 16.000 to 11.733, FES 75.666 to 69.400. It was found that t = -1.711 is insignificant (p=.098 >0.05). Hence, the home-based Otago exercise program and Frenkel's exercise were equally effective in improving the balance of the patients. Compared to the risk and fear of falling, home-based Otago exercise was more effective than Frenkel's.

Keywords: Falls, OTAGO, Frenkel's, timed up & test Fall Efficacy Scale.

***Corresponding Author**

Trishna Saikia Baruah , Assistant Prof. Physiotherapy Faculty of Paramedical Sciences, Assam downtown University, India

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1. INTRODUCTION

In older persons, falls have been identified as a top concern[1]. As we age, our physical independence may decline, directly or indirectly increasing the risk of falling[2]. Adults 64 years and older frequently fall, resulting in wounds, fractures, physical incapacity, long-term disability and even death. Every year, almost one-third of people over 65 experience indoor falls, and half of this age group experience institutional falls. There are many causes of falls in older persons, but general muscle weakness, decreased strength and balance, and other environmental risks are the main culprits[3]. Elderly persons who fall frequently limit their activity to reduce the chance of falling, which increases fall risk by resulting in muscle loss, strength loss and functional ability to decrease, among other things. Falls appear to be common occurrences[4]. While some fall-related injuries may be mild, others may have adverse long-term effects. A fall could be the first indication of an undiagnosed illness[5]. Irreversible age is the primary risk factor for falls, which affects everyone. Several factors increase the risk of falling, and one- to two-thirds of falls happen at or near the patient's home. Falling is frequently caused by muscle weakness and abnormal gait[6]. Falls are also known to be caused by medical conditions such as vertigo, hypertension, stroke, vision impairment, substance use, sleep disorders, fever, dehydration, and other neurological conditions[7]. Use of an assistive device, difficulty performing everyday tasks, depression, cognitive impairment, being 80 years of age or older, and using two or more drugs have also been found to be strongly related to an increased risk of falling[8]. People over the age of 65 frequently fall. Falls reduction can lower healthcare costs. The risk variables for falls that are most easily changeable include strength, balance and flexibility. Numerous fall prevention strategies have been researched[9]. These interventions could involve a single intervention or a mix of two or more, such as gait and balance training combined with strength and resistance training etc.; a fall risk assessment in any form or with one or more specific risk factors may be a part of single or multiple interventions. Depending on the target population, intervention may vary.[10] The act of keeping the body's centre of gravity within the area supporting its weight is called balance[11]. Muscle strength, functional use, and personal preference can be used to identify the dominant limb, and these factors may affect balance[12]. Muscle movement and joint placement offer the continual adjustment it needs[13]. Concerning gait disturbances and degeneration in the elderly, many other pathologies usually cause postural instability. The need for maintaining mobility is crucial due to the ageing population. Balance disturbance, muscle weakness, spasticity and deformities result in abnormal gait pattern[14,15]. As people age, their numerous sensory systems gradually deteriorate, making it harder to maintain good posture. Balance is a person's capacity to absorb sensory and proprioceptive cues about their position in space and generate the proper motor responses to manage bodily movement. One of the significant contributors to falling is balance issues[16]. Balancing management involves intricate connections between numerous physical systems and entails various balance subtasks that diseases or ageing[17] may differently impact. A variety of balance skills, including the ability to repeatedly change the base of support or move the body's centre of gravity, are essential for functional independence. Numerous studies have shown that exercise improves balance, muscle strength, daily activities, flexibility, walking speed/pace and the ability to live independently. Physical activity can assist in maintaining a high functional capacity, especially for older adults[18]. For instance, encouraging elderly folks to exercise can help prevent falls. Lifestyle diseases can be halted by physical activity. It can be used to treat various critical illnesses while also reducing symptoms[19]. There are studies where Home-based Otago's exercises and Frenkel's exercises have been found to improve balance and strength and reduce falls in older adults; however, there is a lack of evidence to see the comparison. Hence, this study aims to check the effectiveness of a home-based Otago exercise program versus Frenkel's exercise in preventing falls in elderly adults.

2. MATERIALS AND METHODS

2.1. Study Design

The study was a comparative study conducted for a duration of 6 months, and only several thirty (30) subjects were taken for the study; both males and females of age between 65-80 years who perceived falls or had a history of falls were recruited for the study. Seventeen (17) female and thirteen (13) male subjects were present in this study. Participants were randomly assigned to Group A (Otago exercise) and Group B (Frenkel's exercise) after meeting the inclusion criteria.

2.2. Ethics

The proposal of this study was approved and supervised by the research committee and ethic committee of Assam Down-Town University, Guwahati, Assam. Each participant was explained about the research, and after receiving Informed Consent from each participant with Ethical approval received from Ethical Committee from Assam downtown University with Approval *(AdtU/Ethics/stdnt-lett/2022/38)*. Furthermore, they received guarantees that all information would be kept private and only disclosed anonymously when necessary for study. Although participants were free to opt-out at any time during the study, they were not permitted to switch between groups.

2.3. Inclusion criteria

- Men and women aged 65 years to 80 years who have experienced falls recently.
- History of falls in the previous 6 or 12 months.
- Perceiving fear of falling or having multiple falls with minor or no injury?
- Able to interact with the researcher.
- Ability to understand and follow therapist instructions and complete the training program (pre and post-protocol)

2.4. Exclusion criteria

The exclusion criteria were:

- Any neurological deficits could be self-limiting, such as parkinsonism, stroke etc.
- Disability in vision and auditory sensation.
- People with recent fractures or surgeries related to knee or hip joint replacement.

- Mental disorders and behaviour caused by the use of psychoactive substances, schizophrenia (Alzheimer's disease, dementia).
- Traumatic brain injury, epilepsy.
- Those unable to ambulate independently without walking assistance, cardiovascular disease or cerebrovascular disease, e.g. (unstable angina, arrhythmia).

3. PROCEDURE

The participants were randomly selected and divided into two different groups. In this study, 30 elderly individuals were assigned. All the subjects were residents of Assam, India, who were split into two groups randomly according to their age. The subject was assigned into groups- Group A (Otago exercise) & Group B (Frenkel's exercise), each containing 15 subjects. Pre and post-test were conducted on Group A and B by Timed Up and Go for assessing balance and Fall Efficacy Scale for evaluating risk and fear of falls. Individuals who fulfilled the inclusion criteria were excluded. Subjects in group A received an Otago exercise program which consisted of strengthening and balance exercises, and subjects in group B received Frenkel's exercise (In supine, sitting and standing positions). All the exercises were done in the client's home. The subjects in both groups received 120 therapy sessions every five days/week for 30-40 minutes for six months[24]. There were no dropouts.

3.1. Group A (Otago exercise)

In the Otago exercise program, the treatment consists of strengthening and balance exercises. 15 subjects received:

1. Strengthening exercise: The weight cuff was placed at the ankle for the three strength exercises and repeated ten times.

- Front knee strengthening (figure 1): The patient was made to sit with their back supported in the chair, and a weight cuff was placed on the ankle. The subject was made to lift the weighted leg slowly, straighten the knee, and then lower the foot with control. The exercise was repeated ten times on one leg and ten times on the other.
- Back knee strengthening: The ankle weight cuff was placed on the ankle with the Patient in a standing position and feet hip-width apart, holding support. The patient was asked to lift the weighted leg backwards off the floor towards the buttock and slowly lower the foot, bringing the leg back to the initial position. The exercise was done in the repetition of 10 times alternately.
- Side hip strengthening (figure 2). With the ankle weight cuff on and the patient in a standing position with feet hip-width apart holding support. The patient was made to Lift the leg sideways, slowly away from the other foot and bring it back to the initial position. The exercise was done in the repetition of 10 times and changed legs alternately. (The exercises ended with calf raises and toe raises as a remarkable down period)

2. *Balance Exercise*

1. Knee bends: A chair or table was used as a support, and the patient's position with Feet hip-width apart, toes facing forwards, holding support; the patient bent the knees as if going for a squat and pushed the bottom backwards as though going to sit down. Making sure the patient doesn't lift the heels. They then brought the body back up to the start position (figure 3).
2. Tandem standing: using the chair as support, the patient was made to stand straight, Placing one foot directly in front of the other so that the feet form a straight line. Then, look straight ahead and maintain the balance for 10 seconds. After 10 seconds, the patient returned to the initial position, placed the other foot in front, and repeated it for another 10 seconds.
3. One leg stand: the patient in standing position was asked to hold on to the chair with both hands lifting one leg off the ground slowly, balancing on one leg keeping the support knee soft and upright posture position for 10 seconds. They were then repeating it on the other leg.
4. Sit to stand: Sit toward the front edge of the chair without an armrest; the patient was asked to bend their knees and feet flat on the floor. They placed their hands lightly on each side of the seat, back, and neck straight and slowly got up from the chair, stand-pause and sat down slowly with a repetition of 10 times.
5. Toe walking: the patient was in a standing position, feet hip-width apart and lifting the heels off the floor, keeping the weight over the toes and walking 5-10 steps forward on toes repeating it ten times (figure 4).
6. Tandem walking: the patient begins by placing the heel of one foot in front of the other foot and standing heel-to-toe, looking forward and ahead, Walking heel-to-toe in a straight line for at least 5-10 steps forwards without looking down at the feet. As tandem walk improved, the distance was increased.
7. Heel walking: the subject in an upright standing position holding on to the chair as support. Toes point upwards, gently step on the heels, and walk for 5-10 steps with a repetition of 10 times.
8. Sideways walking: patient position; standing tall, looking ahead, holding support; the patient was made for walking sideways and taking a few steps and walking back sideways to the starting point, with a repetition of 10 times.
9. Backward walking: Stand tall, looking ahead and straight, holding on to the support; the patient was made for walking backwards, taking 5-10 steps with a repetition of 10 times.
10. Tandem walking backwards: the patient is standing, looking straight ahead and placing one foot directly behind the other, touching the toe against the heel and standing heel to toe in a straight line. With that position, the subject continues walking backwards for 5-10 steps with a repetition of 10 times.
11. Walk and turn (figure 8); in this, a pattern of eight '8' is marked on the floor with 6-8 feet width and 12-16 feet length from north to south. The subject started at the position marked '1' in the picture, continued in the sequence, and followed the '8' pattern at a usual pace.

All the balance exercises were done in 10 repetitions and progressed without support.

Fig 1: Front knee strengthening

Fig 2: Side hip strengthening

Fig 3: Knee bends

Fig 4: Toe walking

4. INTERVENTION

4.1. GROUP B: FRENKEL'S EXERCISE[26]:15 subjects received

A. Exercises in the supine position.

1. The patient in a supine position was made to flex and straighten the leg alternately in the hip and knee joint with a repetition of 10 times (hip and knee flexion and extension).
2. The patient is in the supine position, with legs pointing upwards and moving one leg from the midline out to the side as far as possible, bringing it back to the start position with a repetition of 10 times (hip abduction and adduction).
3. The patient is lying and placing the leg on a designated area marked by the therapist or touching the hands of the therapist with their foot.
4. The patient was made to lay flat on the back, flexing the hips and knees to 90* and imitating a bicycle's pedalling movements in the air (Fig 5).

B. Exercise in a sitting position

1. The patient is in a sitting position with the back supported in the chair. The subject was asked to lift the leg slowly, straighten the knee, and then Lower the foot with control. With a repetition of 10 times alternately.
2. The patient in the Sitting position was asked to touch certain marks on the floor and stretch one leg to slide the heel to a position indicated by an effect on the floor (fig 6).
3. In a sitting position with marks on the floor, the patient was asked to stretch the leg and lift the heel or toe on the specific effect (fig 6).
4. Sit to stand, sit toward the front edge of the chair without an armrest; the patient's knees should be bent and feet flat on the floor. Then, placing hands lightly on each side of the seat, back and neck straight and slowly getting up from the chair, stood, paused, and sat down slowly.

C. Exercise in a standing position

1. Stride standing, the patient is standing with an upright posture and transferring weight from foot to foot.
2. The patient is standing with marks on the floor; the patient is asked to walk sideways, placing their feet on impacts on the floor.
3. In standing, with marks on the floor in a straight line, the patient will walk, placing feet on the impact.
4. With marks on the floor in a 360* diagram, the patient will rotate left and right without lifting the feet off the ground.
5. Objects will be placed in certain areas as obstacles, and the patient will walk and change direction to avoid the barriers.
6. Patient in standing, moving one leg to the side or away as far out and bringing it back to the initial position (hip abduction and adduction) in smaller arcs alternately (Fig 7).
7. In a standing position with legs straight, knees locked, kick front and back in a minor arc (hip flexion and extension).
8. With marks on the floor in a straight line, the patient will walk in a straight line following the marked area (Fig 8). (All the exercises were given in relatively slow movements and progressed by increasing complexity).

Fig 5: Paddling movement

Fig 6: Placing feet in the marked area

Fig 7: Hip abduction and adduction

Fig 8: Walking in a straight line

5. OUTCOME MEASURES

Demographic characteristics of the subjects were collected. The outcome measures in the study included the Timed Up and Go (TUG)[2,18] and Fall Efficacy Scale (FES)[20,49]. All these outcome measures were examined before and after the intervention for both groups. The Timed up and go test[28,49] was used for assessing balance and risk of falls, and the Fall efficacy scale was used to evaluate fall risk and fear of falls.

5.1. Timed Up and Go Test

The TUG is a frequently used screening tool to assess basic mobility abilities and fall risk. To complete the TUG test, the patient is seated in a chair roughly 46 cm high[2]. The patient is instructed to rise from the chair, walk three meters away distance, turn around and walk back to the chair and sit down[18]. The stopwatch is started when the patient is instructed at the word "go" and stops as the subject sits back down. The task is completed comfortably, and the TUG time is measured in seconds[28]. Better functional performance is indicated by a shorter time of fewer than 12 seconds, and a score of fewer than 13.5 seconds is thought to identify community members who are more likely to fall [49].

5.2. Fall Efficacy Scale

FES is a questionnaire scale that assesses older persons' confidence in their ability to carry out various everyday tasks without falling [20]. The patient or Therapist can fill out this scale. There are ten elements on this scale, each receiving a score between 1 (extreme confidence) and 10 (not confidence at all). The item scores are added together to produce the overall score, which is determined by adding the item scores between 10- 100—a cumulative score of greater than 70 shows that a person fears fall[s48].

6. STATISTICAL ANALYSIS

Descriptive data were presented and compiled as mean ± standard deviation and number (percentage). The paired sample t-test and independent sample t-test were used to compare the results after four weeks in each group. Data analysis was performed using the SPSS software program, and the statistical significance level of this study was set at $p<0.05$.

Table 1: Baseline characteristics of the study sample (n=30)

Characteristics	Total n= 30
Age median (min-max)	65(65-80years)
Gender, % women	17
Gender, % men	13
Walking aid %	1
Previous fall, %	15
Perceiving falls, %	24
Mostly sedentary	3
Light physical effort	10

Table 1, the median age was 65-80 years, and half of the participants had a history of falls or were perceiving falls. Participants were only physically active, including walking and various housekeeping activities. Regarding adherence, 30 of 30 participants exercised five times per week for six months.

7. RESULTS

Baseline characteristics are presented in Table 1. The median age was 65 years, and half of the participants had a history of falls or perceived fear of falls. This was a six months structured study to compare the effectiveness of a home-

based Otago exercise program versus Frenkel's exercise in preventing falls in elderly adults. The result showed that all the interventions brought significant results in their groups, i.e. Group A (Otago exercise) and Group B (Frenkel's exercise). Both groups' subjects were assessed to find the TUG Score for assessing balance, risk of falls, and FES for assessing fear of falls. In addition, each outcome measure's pre-test and post-test scores were recorded. In comparison, Timed Up and Go tests were equally effective in groups, i.e. groups A and B. Still, Fall Efficacy Scale is more effective in the Otago exercise than Frenkel's exercise in decreasing the FES of the patients.

Table 2: To find out the effectiveness of the Otago exercise by using TUG and FES

Group A		Mean ± SD	N	t	df	p
TUG	Before treatment (pre-test)	16.200 ± 1.473	15	12.444	14	0.00*
	After treatment (post-test)	11.066± 1.032	15			
FES	Before treatment (pre-test)	74.733± 1.624	15	12.273	14	0.00*
	After treatment (post-test)	67.866± 1.846	15			

NS: Not Significant; *: Significant at 5%: **: significant at 1%

Table 2: is seen in TUG, it was found that t = 12.444, which is highly significant at a 1% probability level**.** In FES, it was found that t = 12.273, which is highly significant at a 1% probability level. TUG and FES decreased remarkably after treating the patients with home-based OTAGO exercise. Hence home-based OTAGO exercises are highly effective in improving the risk and fear of falls.

Table 3: To find out the Effectiveness of Frenkel's exercise by using TUG and FES

Group B		Mean ± SD	N	t	df	p
TUG	Before treatment (pre-test)	16.000± 1.099	15			
	After Treatment(post-test)	11.733± 1.069	15	14.210	14	0.00**
FES	Before treatment(pre-test)	75.666± 1.543	15			
	After Treatment(post-test)	69.400± 1.242	15	16.883	14	0.00**

NS: Not Significant; *: Significant at 5%: **: significant at 1%

In table 3: The TUG test found that t = 14.210 is highly significant at a 1% probability level, and in FES, t = 16.883, which is highly important at a 1% probability level. TUG and FES decreased remarkably after treating the patients with Frenkel's exercise. Hence Frenkel's training was highly effective in improving the risk and fear of falls.

Table 4: To compare the home-based OTAGO exercise program versus Frenkel's exercise in improving the TUG for balance and FES for risk and fear of falls.

SCALES	GROUP	N	Mean ± SD	t	df	p
TUG	Group A	15	11.066± 1.032			
	Group B	15	11.733± 1.099	-1.711	28	.098 NS
FES	Group A	15	67.866± 1.846			
	Group	15	69.400± 1.242	-2.669	28	.013*

NS: Not Significant; *: Significant at 5%: **: significant at 1%

The inter-group analysis found that t = -1.711, which is insignificant (p=.098 >0.05). It concluded that Timed Up and Go test were equally effective in preventing falls in elderly adults in both the groups, i.e. home-based Otago exercise program and Frenkel's exercise. With the remarkable decrease in TUG. On the other hand, it is seen that t = -2.669, which is not significant at the 5% probability level. Compared to Frenkel's exercise using the Fall Efficacy Scale for assessing fall risk and fear of falls, it concluded that the home-based OTAGO exercise program is more effective than Frenkel's exercise in decreasing the FES of the patients.

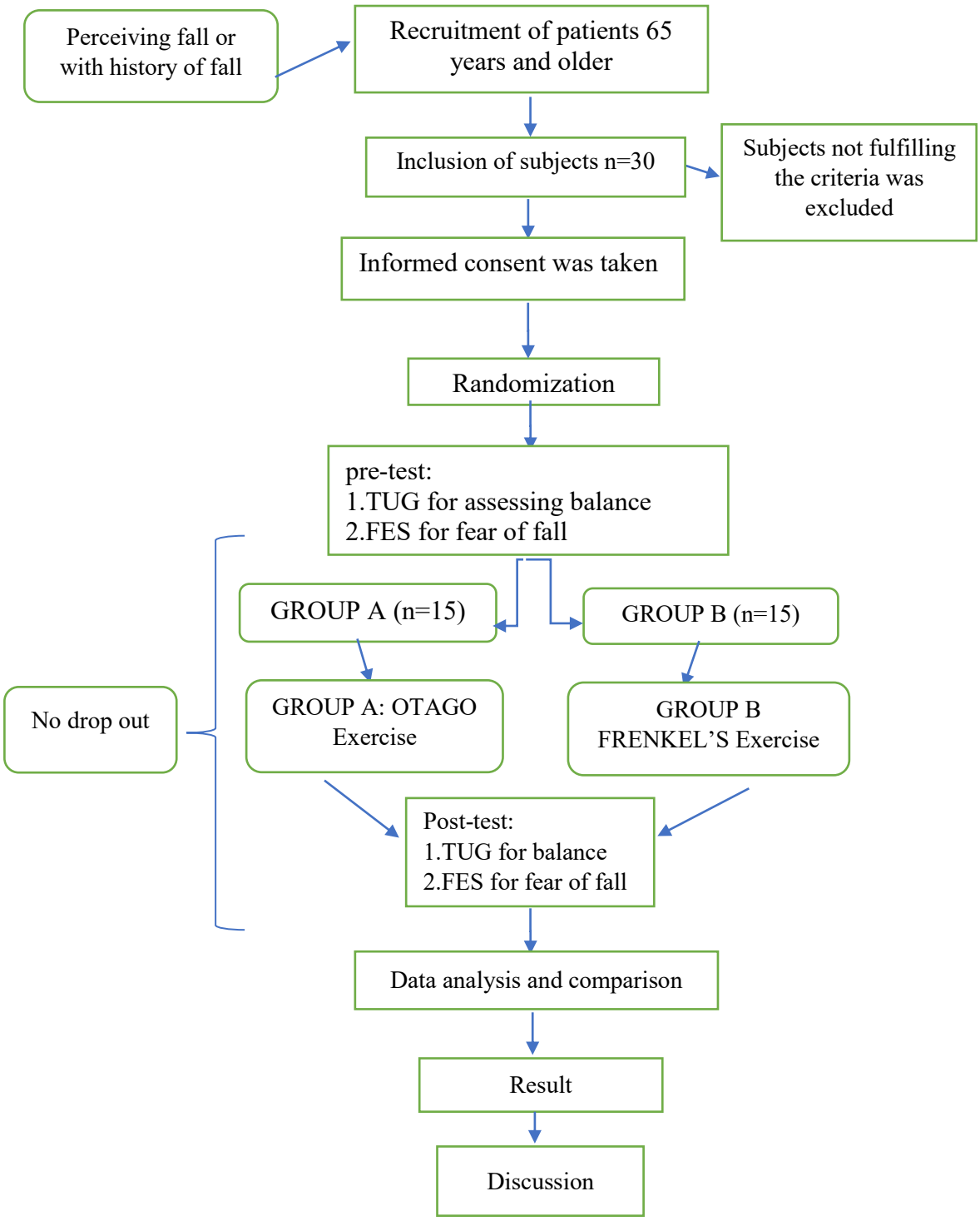

Fig 9: Flow chart of the study.

8. DISCUSSION

One of the most frequent problems for the elderly is falls. Falling often among adults 65 years and older can lead to injuries, fractures, physical incapacity, long-term disability and even death. Encouraging elderly folks to exercise can help prevent falls. Lifestyle diseases can be halted by physical activity. It can be used to treat various critical illnesses while also reducing symptoms[19]. There are studies where Home-based Otago's exercises and Frenkel's exercises have been found to improve balance and strength and reduce falls in older adults; however, there is a lack of evidence to see the comparison. Therefore, the purpose of this study was to compare the effectiveness of a home-based Otago exercise program versus Frenkel's exercise in preventing falls in elderly adults. Both interventions were carried out at the patient's home and in the physiotherapy department of OPD Assam Down Town University. Janelle M. Guirguis-Blake et al.,[21], in an updated report and systematic review of interventions to prevent Falls in Older Adults, also stated that nearly one-third of seniors over 65 fall indoors each year and half of this age group fall in institutions. Regarding the fall prevalence and risk factors of falls in older adults living in the community, a survey conducted by Yih-Jian Tsai et al.,2020, suggests fall prevention programs[23] and intervention of two or more can be conducted[24]. There are several reasons why older people fall, but the primary causes include generalized muscle weakness, diminished strength and balance and additional environmental dangers. In the study, Trishna Saikia Barauh et.al. (2016) stated that Balance disturbance, muscle weakness, spasticity and deformities resulting abnormal gait patterns, which may be difficult for

the elderly to perform daily activities, [15]. Elderly who trip and fall usually limit their activity to lessen the likelihood of falling, which raises the risk of falling by, among other things, leading to muscle loss, strength loss, and a drop in functional ability. The Otago exercise program was created and put through four clinical trials by professor John Campbell and his team at the University of Otago medical school in New Zealand to prevent falls. According to their studies, the overall exercise program successfully lowered the frequency of falls and the number of injuries associated with falls by 35%[24,25]. Exercises like Frenkel's that increase coordination can also speed up reactions and reduce the risk of falls in the elderly. Manisha Rathi et al. (2021) conducted a study. They showed Frenkel's exercises effectively improved balance and helped increase reaction time and improve gait speed in the elderly population, thereby preventing falls[26]. Ha-na Yoo et al.,2013 also concluded that this study suggests the feasibility and suitability of this augmented reality-based Otago exercise for older women, which is consistent with the study[27]. A meta-analysis of the effects of the Otago Exercise Programme on actual and perceived balance in older adults supports the study in improving balance and reducing the fear of falling(Huei-Ling Chiu et al.,2021)[19]. Mahsa Meimandi et al. also indicated that the Fall Efficacy Scale is a better tool for identifying Fear of Fall[28]. Mohammad Reza Vafaeenasab et al., 29 In support of the balancing exercise, 48 older men and women were randomly assigned to Frenkel's aerobic exercise for 10 to 15-minute sessions for five weeks. In agreement with the study (M Kranthi Kumar et al.,2019) 0tago exercise program not only helped in balancing old age but helped in acquiring fitness, strength and well-being[30]. In the pilot study of a six-month home-based exercise programme for pre-frail older adults, driven by a tablet application and mobility monitoring TUG was improved significantly (Hilde et.al.,2021)[31]. The result showed significant efficacy; hence, combining Otago exercise with other interventions may dramatically improve and reduce falls in elderly adults. A randomized clinical trial by Grzegorz Manko et al.,[32] involved 40 elderly patients who were divided into two groups of 20 people; this study concluded that both Frankel's exercises and training with the use of the stabilometric platform were effective in a rehabilitation program aimed at reducing the risk of falls among the elderly which is also consistent to the study. The interventions in this study were a home-based OTAGO exercise program (Group A) with leg strengthening and balance exercises. In group B, Frenkel's exercise with a series of treatment protocols was performed in different positions, i.e., supine, sitting and standing. Sixty-five years and over were recruited in this study. Thus, Improvements were seen in all the parameters of group A and group B in improving the balance of the patients. In contrast, home-based Otago exercise was more effective than Frenkel's exercise compared to the risk and fear of falls.

9. LIMITATION AND FUTURE SCOPE

Limitations of this study include that it consisted of a short duration, i.e. six months, a smaller sample size, and an equal number of genders were not taken. The future scope can include, the study can be done with a larger sample size with a longer duration of the study, an equal number of genders, specific conditions can be taken like stroke, and combined intervention can be taken into account.

10. CONCLUSION

All the interventions have brought about some improvement in each group post-treatment based on the mean score, but its significance varies. Therefore, based on the inter-group analysis, this study concluded that the Timed Up and test (TUG) intervention was equally effective in groups A and B. But Fall Efficacy Scale (FES) was found to be significant only in group A, out of which the mean score of FES decreased in group A post-treatment (Otago exercise program of strengthening and balance). Therefore, we can say that this procedure helped in preventing the risk and fear of falling in elderly adults, but not much of a difference was seen in Frenkel's exercise. Therefore, it concluded that the home-based Otago exercise program and Frenkel's exercise were equally effective in improving the balance of the patients. However, compared to the risk and fear of falling, home-based Otago exercise was more effective than Frenkel's.

11. AUTHORS CONTRIBUTION STATEMENT

Abenle Tep, the MPT scholar, carried out the data collection and literature review research and prepared the thesis as a part of the curriculum of the Master in physiotherapy. Dr Trishna Saikia Baruah (PT) (Corresponding Author), Assistant Professor, Assam downtown University guided as the primary supervisor in the whole study along with topic selection, literature reviews, methodology, results analysis and discussion of the study. Dr Mantu Paul(PT), Assistant Professor at Assam downtown University contributed to the study as a co-guide and guided in literature reviews, data collection, discussion and methodology. Dr Abhijit Dutta, Associate Prof., Associate Dean Faculty of Paramedical Sciences, Assam downtown University recommended in literature reviews and discussion part. Dr Niharika Dihidar (PT), Assistant Professor, Assam downtown University, suggested the literature reviews and discussion part.

12. CONFLICT OF INTEREST

Conflict of interest declared none.

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