Original Article

Effectiveness of Climbing UP and Down Stairs Exercise on Frailty among Geriatric Population: Quasi Experimental Study

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Abstract

Background: This study was developed to determine the effectiveness of climbing up and down exercise on frailty among geriatric population.

Purpose: To find the effectiveness of climbing up and down stairs exercise on frailty among geriatric population.

Materials and Methods: This research is the Quasi experimental study. The subjects were collected from Jeevan Jothi Home for Aged and Destitute, Kanyakumari.There are 54 subjects were selected based on inclusion and exclusion criteria. All the subjects were assessed with Edmonton frail scale as pre test and the same test was performed for post test at the end of 4 weeks from May 2023 to July 2023. 5 days per week 11 steps* 3 repetition* 3 sets. Each set 5 min rest is given. Pre test and post test values were calculated and tabulated.

Results: The collected data was statistically analyzed using the paired t-test. Statistical analysis of Edmonton frail scale examination post value revealed the constantly significant differences, with the p value of <0.0001.

Conclusion: According to the study, climbing up and down exercise is effective for reducing frailty among geriatric population.

Key Word: Frailty, Edmonton frail scale, climbing up and down exercise, elderly patients

Introduction

Globally, population ageing is a common phenomenon. The percentage of adults 65 and older is expected to increase from 15% in 2015 to 24% in 2060, according to the U.S. Census Bureau.[1] The sentence emphasizes the significance of frailty as a prominent indicator of population aging. Frailty is a clinical condition that arises due to the natural decline of various physiological systems associated with aging. This decline renders individuals more susceptible to experiencing sudden changes in health when exposed to relatively minor stressors. It is estimated that frailty affects around 25% to 50% of people who are 85 years old and above. Furthermore, individuals experiencing frailty face significantly elevated risks of mortality, requiring long-term care, developing disabilities, and experiencing falls. [2,3]

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The concept of frailty as a stage of vulnerability that is commonly associated with the process of aging. It explains that frailty is considered a biological condition that occurs prior to the onset of disability. In other words, it suggests that as individuals age, they may experience a period of frailty characterized by increased susceptibility to health problems and a decline in physical and functional capabilities. This phase of frailty is seen as a precursor to the development of disabilities or other age-related health issues.[4]

The existence of at least three particular criteria constitutes the frailty syndrome's fundamental idea. These requirements include low levels of physical activity, slow energy, poor endurance, and frailty. A healthcare condition known as frailty syndrome is marked by reduction in physical capability and an increased susceptibility to unfavourable health outcomes.[5] Chronic illnesses that affect older people's bodies over time, like diabetes, osteoarthritis, and heart conditions, can leave them vulnerable and feeble.[6]

Physical, psychological, and social aspects are all included in the concept of fragility, which is seen as a multidimensional phenomenon.[7] Multiple functioning areas, including locomotion and mobility, equilibrium, muscular strength, aerobic capacity, and motor processing are all significantly impacted by frailty.[8]

A geriatric syndrome known as falls is linked to both extrinsic and intrinsic variables. Rugs, staircases, and inadequate lighting are just a few examples of the extrinsic reasons that are typically connected to the inside of the home. while the underlying factors include postural hypotension, chronic disease, muscle weakness, diminished visual acuity, cognitive deficiencies, changes in balance or gait, and the use of psychoactive drugs. [9]

Multi-component exercises (i.e., endurance, simultaneous strength, and balance training), Tai Chi, and resistance training have all had positive benefits on a number of functional indices in fragile, older participants. However, due to the fact that resistance training stimulates a number of physical health factors, including strength, cardiorespiratory fitness, and balance, multi-component exercise programmes that include it appear to produce larger overall improvements.[10]

The following elements can help prevent or lessen frailty: nutritional assistance emphasizing calorie consumption and vitamin intake; high blood pressure management; atherosclerosis prevention; isolation evasion through social interaction; pain management; depression treatment; and a range of exercises to increase equilibrium, dexterity, strength, and power.[11]

There is growing proof that fitness training can lessen physical weakness. Recent research, for instance, has demonstrated that exercise training can significantly enhance balance, strength, range of motion, and tasks like getting up off the ground and stepping out of the chair in frail older people.[12] Exercise appears to be helpful in enhancing physical abilities in older persons, including sit-to-stand performance, balance, agility, and ambulation. [13,14]

In comparison to clinical impression of the geriatric specialists following their thorough evaluation, the Edmonton Frail Scale (EFS) was a reliable indicator of frailty. The EFS demonstrated adequate internal consistency, good reliability, and good construct validity. The interview has ten sections since fragility is presented in many different ways. A scale called Edmonton Frail Scale (EFS) is used to quantify changes in frailty. The EFS evaluates nine subscales, including cognition, general health status, functional independence, social support, medication use, diet, mood, continence, and functional performance. The maximum potential score is 17 points, which equates to the frailest state.[15] The aim of the study is to managing frailty among geriatric subjects from climbing up and down exercise.

Aim

To find the effectiveness of climbing up and down exercise on frailty among geriatric population.

Material and Methods

This research is quasi experimental study. The study was conducted with sample size of 54 participants. The participants were selected from Jeevan Jothi old age home, according to inclusion and exclusion criteria. Participants received an extensive

overview of the method and a informed consent form was acquired.

Materials required: Stairs with handrail support.

Selection criteria

Inclusion criteria:

- Age group of 65 years and above,
- Both the gender,
- Edmonton frail scale mild frailty (8-9), moderate (10,11).

Exclusion criteria:

- Unconscious patients,
- Patients with heart problems,
- Patients who refused to participate in research.

Outcome measures:

- Edmonton frail scale

An instrument for determining an older adult's level of frailty is the Edmonton Frail Scale (EFS). It is intended to assess senior people's functional and cognitive conditions, general health, and social support. The EFS aids healthcare providers in identifying frail people who may be more susceptible to negative health consequences or who need more care and support. The nine items that make up the Edmonton Frail Scale evaluate several aspects of frailty. Each item is given a value between 0 and 2, with higher scores signifying greater fragility. The nine domains are cognition, general health status, functional independence, social support, medication use, nutrition, mood, continence, functional performance.

Procedure

This study is a Quasi experimental study. The study involved a total of 54 subjects, with 33 females and 21 males, who were selected based on specific inclusion and exclusion criteria. Prior to the study, the patients were provided with a thorough explanation of the safety and simplicity of the procedure, and their informed consent was obtained.

All the subjects underwent an assessment using the Edmonton Frail Scale both before and after the intervention, which lasted for a duration of 4 weeks. The intervention involved climbing up and down stairs and was conducted five days per week. The specific exercise protocol consisted of climbing 11 steps, performing 3 repetitions, and completing 3 sets.

For the climbing up exercise, a sturdy staircase was chosen, and participants were instructed to use the handrail for support while climbing. They initially started with one step and gradually progressed to multiple steps. Patients were advised to maintain stability and support by holding the handrail, taking one step at a time, and ensuring their entire foot was placed on each step before proceeding to the next. This approach aimed to ensure safety by maintaining a steady and slow pace.

When performing the climbing down exercise, participants were instructed to face the steps while standing at the top of the staircase. They were advised to place one foot firmly on the first step, followed by bending the knee and hip, lowering the body, and transferring the weight to the foot on the step. The process was repeated for each subsequent step, with participants being reminded to control their descent and ensure both feet were firmly placed on each step before proceeding to the next. As with the climbing up exercise, participants were encouraged to use the handrail for stability and support.

Before initiating the exercise program, precautions were taken to ensure the safety of the participants. This included clearing the pathway of any obstacles or hazards that could cause slipping and ensuring that participants wore comfortable footwear with good traction to prevent falls. Participants were also encouraged to communicate any pain, aches, or nausea they experienced during or after the activity. Prompt attention and resolution of any issues were deemed essential for safeguarding the participants' well-being.

Data analysis

Using descriptive and inferential statistics, the acquired data was tabulated and evaluated. The mean and standard deviation (SD) were applied to all parameters. The significant differences between pre-test and post-test measures were analyzed using a paired t-test. The significance level of $p < 0.0001$ was judged statistically significant.

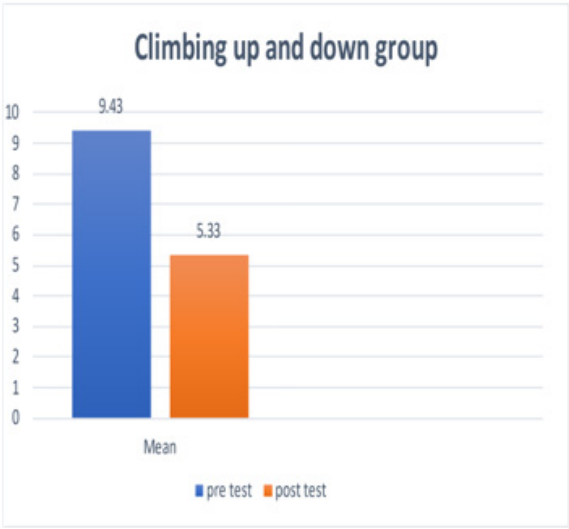

Fig 1: Comparison of pre-test and post-test values of climbing up and down exercise using Edmonton frail scale

Results

The process of data analysis and presents the findings related to the effectiveness of a specific exercise for frailty patients. The collected data was tabulated and analyzed using descriptive and inferential statistics. The data collected for the study was organized and examined using two types of statistical analysis: descriptive statistics and inferential statistics. The data necessary are statistically significant between pre-test and post-test, with a mean value of 9.43 in the pre-test and 5.33 in the post-test and a standard deviation of 1.13 in the pre-test and 1.08 in the post-test. This part indicates that a statistical analysis was performed to compare the data obtained from the pre-test and post-test measurements. The data is statistically significant, suggesting that the observed differences between the pre-test and post-test results are unlikely to occur by chance. The mean value of 9.43 in the pre-test and 5.33 in the post-test indicates the average scores for the participants in each test. Additionally, the standard deviation of 1.13 in the pre-test and 1.08 in the post-test represents the variability or spread of the scores around the mean in each test. As a result, climbing up and down exercise is effective for frail patients. This implies that the exercise has had a positive impact on the participants' conditions, possibly improving their frailty status.

Discussion

This study is to find out the effectiveness of climbing up and down exercise on frailty among geriatric population. Frailty is the common geriatric condition which is assessed by Edmonton frail scale which includes nine subscales, including cognition, general health status, functional independence, social support, medication use, diet, mood, continence, and functional performance. Total of 54 samples were selected using Edmonton frail scale scoring of mild (8-9) and moderate (10-11) based on inclusion and exclusion criteria. Patients were made to do climbing up and down exercise for 4 weeks 5 days per week 11 steps* 3 repetition* 3 sets. The pre- test and post -test values are calculated using Edmonton frail scale.

John E Morley et.al. (2020) concluded that the likelihood of having one or more geriatric symptoms of frailty, dementia and loss of weight among older adults across all care horizons was found to be high by the RGA, a reliable screening tool. Although these syndromes have a negative impact on mortality, functional status, and quality of life, they are frequently underdiagnosed and undertreated. To enable the adoption of multifaceted, tailored therapies to stop future morbidity and disability and encourage effective ageing in place, geriatric syndrome screening is done.[16]

Catarina LN Pereira et.al. (2008) concluded that to maximise the advantages of intervention, physical activity should be a component of an interdisciplinary approach to fall prevention and its effects. Although fall risk factors have been precisely identified, certain control techniques have been researched and, in some circumstances, applied, most approaches are inconsistent.[17]

Simone Perna et.al. (2017) concluded that assessing frailty using the EFS is a useful performance measure for classifying the level of fragility in a sample of institutionalised seniors. As a matter of fact, research has demonstrated that the EFS is linked to a number of geriatric problems, including independence, drug use, mood, mental function, and nutritional status.[18]

Maria Giné-Garriga et.al. (2014) concluded that elderly individuals who are frail can benefit from exercise, while it's unclear which exercise qualities

(kind, frequency, and duration) are most beneficial. Such studies should examine the long-term impacts of physical activity interventions, particularly task-oriented or functional practise programmes, while adding methods to improve adherence and gauging medium- and long-term performance results. Despite tremendous effort over the past ten years, the literature has failed to produce a clear consensus definition of frailty. A crucial issue that needs more study is whether or not disability should be viewed as a cause or effect of frailty. The study and practise suggestions for precisely defined, homogeneous groups will be guided by a consensus on what constitutes frailty and the standards to be used in clinical practise.[19]

Conclusion

The results of the study on the impact of climbing up and down stairs on frailty in the geriatric population before and after using the Edmonton Frail Scale to compare the data showed that p0.0001 in all parameters. This study demonstrates that the activity of climbing up and down stairs was more beneficial for post-treatment recovery.

Ethical clearance: The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number 03/026/2022/ISRB/SR/SCPT).

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