Improving Dynamic Balance and Confidence of Balance Through Computerized Simulation in Old Age Population versus Conventional Exercises – A Comparative Study

Amit Kumar[1]*, Neelu Pawar[2], Shadma Siddiqui[3]

[1]PG, Department of Physiotherapy, SAM Global University, Raisen, Bhopal, India
[2]Associate Professor, SAM Global University, Raisen, Bhopal, India
[3]Dean, SAM Global University, Raisen, Bhopal, India

Abstract: *Background:* Elders are having balance issues with the increasing age, it become matter of concern to avoid injuries. Computerized simulation provides and assist elders for improving balance and developing confidence in elder's person. The Patients are taking conventional exercises in group and individual show difference too. In this study, we compare the effect of Computerized simulation with conventional exercise for improving balance and confidence of elder person. *Aim:* Comparison of Computerized simulation versus Conventional Exercises in Elder patient in order to Increase balance and Confidence. *Methodology:* From Aashirwad centre,60 Patients are selected for the study. *Inclusion Criteria*: Community dwelling person. Physical activity of 30 minutes and normal vision. Research design: Randomized Repeated Measure. Age:60-80 years age old person. *Exclusion Criteria*: 1. Circulatory Disorders, 2. Orthopedic Disorder, 3. Neurological Disorders. *Result*: In this study shows $p < 0.05$ means in Group A showing significant improvement after computerized simulation. *Conclusions*: Computerized simulation improves balance and confidence compare to conventional exercises in elder persons.

Keywords: computerized simulation, elders, rehabilitation, balance, dynamic.

1. Introduction

Balance issues and loss of confidence due to balance is become common problems among older adults and can significantly increase the risk of falls [1]. Computerized simulation through video games is the best way to increase the balance in elders' groups through fun, excitement, artificial world. Physiotherapist practitioners to create personalized and targeted rehabilitation programs for individual patients on the basis [2]. Physiotherapist can assess an older balance and mobility and design a personalized exercise program to address specific areas of weakness and improve overall balance and stability [3]. This study aims to compare the result of Computerized Simulation versus Conventional Exercises in elder Persons.

The immersive and interactive nature of these simulations can engage the body's proprioceptive system, which helps in maintaining balance and spatial awareness [4]. By regularly engaging in these types of simulation games, players can improve their balance control mechanisms through repeated practice and feedback [5]. This can be particularly beneficial for individuals looking to enhance their balance skills for sports performance, rehabilitation purposes, or simply for improving overall physical coordination and stability [6]. The dynamic nature of these simulations, combined with the feedback provided through visual, auditory, and sometimes haptic (touch) cues, creates an immersive experience that can effectively engage the proprioceptive system. This engagement not only enhances balance control and spatial awareness but also provides an enjoyable and motivating way to exercise and improve physical skills.

A. Objective

Improvement of Balance and confidence in Elders Person through Computerized simulation versus Conventional Exercises.

2. Methodology

60 patients are divided into two groups: the intervention group and the control group

Inclusion Criteria:
Community dwelling person.
Physical activity of 30 minutes and normal vision.
Research design: Randomized Repeated Measure.
Age:60-80 years age old person.

Exclusion Criteria:
1. Orthopedic Disorder.
2. Neurological Disorders.
3. Circulatory Disorders.

Procedures:
In this study, the Elderly people are divided into two groups Group 1 and Group 2. Group 1 Patient given intervention

*Corresponding author: dramitkdkumar86@gmail.com

Programme of 3 months. They have spare 30 minutes daily 5 times a week. During this period the elder person did many activities like fast walking, Lunges, Jogging, Running and hiking through Computerized simulation. The exercise is repeated every day. Before and after the competition every Parameters are monitor without any obstacles that is Blood pressure, Pulse, Respiratory rate. After completing 3 months further Berg balance test measure and Depression questionnaire are filled by the reading record from the elders.

While, Group 2 Patient are instructed for the normal daily activities. They are perceiving simple task work of daily activities. Normal active movements of the limbs, Normal walking of daily routine as they usually did. No extra activities are suggested. The Physiotherapist instruct and help old age person in performing Single Limb Stance, Walking Heel to Toe, Rock the Boat, Clock Reach, Back Leg Raises, Single Limb Stance with Arm, Side Leg Raise, Balancing Wand, Wall Pushups, Toe Lifts, Marching in Place, Hand and Finger Exercises and Calf Stretches. After completing 3 months further Berg balance test measure and Depression questionnaire are filled by the reading record from the elders.

3. Result

Fig. 1. Computerized simulation of various exercises in intervention group

Fig. 2. Computerized simulation of various exercises in intervention group

Table 2

	Mean Rank
Lunges	3.63
Jogging	2.25
Running	2.38
Hiking	3.63
Fast Walking	3.13

Chi²	df	p
5.6	2	.05

Here $p < 0.05$ means in Group A showing significant improvement after computerized simulation.
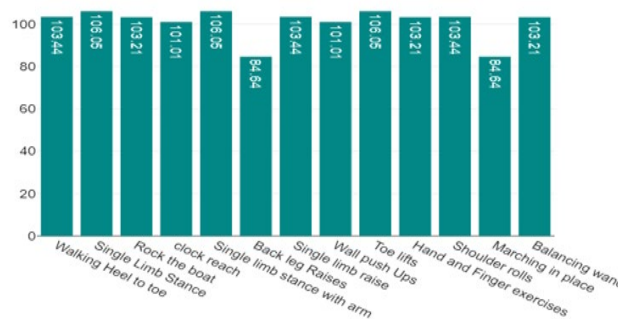
Fig. 3. Various exercises in control group

Table 1
Computerized simulation of various exercises in intervention group

	Jogging	Fast Walking	Running	Hiking	Lunges
Mean	138.87	131.88	140.53	147.13	153.13
Minimum	132	38	134	136	126.22
Maximum	147.28	156	147	174	166.32
Mean ± Std.	138.87 ± 5.71	131.88 ± 38.62	140.53 ± 5.7	147.13 ± 12.45	153.13 ± 16.14

Table 3
Various exercises in control group

	Walking Heel to toe	Single Limb Stance	Rock the boat	clock reach	Single limb stance with arm	Back leg Raises
Mean	103.44	106.05	103.21	101.01	106.05	84.64
Std. Deviation	53.95	57.64	54.27	55.25	57.64	47.96
Minimum	10.82	5.03	9.43	3.87	5.03	32
Maximum	147.23	144.42	145	136	144.42	138

Table 3 (Contd.)

Single limb raise	Wall push Ups	Toe lifts	Hand and Finger exercises	Shoulder rolls	Marching in place	Balancing wand
103.44	101.01	106.05	103.21	103.44	84.64	103.21
53.95	55.25	57.64	54.27	53.95	47.96	54.27
10.82	3.87	5.03	9.43	10.82	32	9.43
147.23	136	144.42	145	147.23	138	145

Table 4

	Type III Sum of Squares	df	Mean Squares	F	p	η²
Treatment	5790.97	12	482.58	2.19	.018	0.21
Error	21158.83	96	220.4			

Table 5

	Type III Sum of Squares	df	Mean Squares	F	p	η^2
Treatment	5790.97	12	482.58	2.19	1	0.21

Here p>1 means in Group B Showing no significant improvement after conventional exercise.
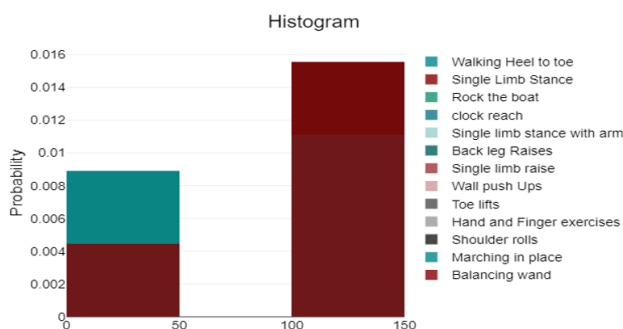

Fig. 4. Simulation of various exercise of that group

4. Discussion

In this study, both the computerized simulation and the control group showed a difference in balance. The Computerized Simulation game group showed increase in dynamic balance than the Control group, which reveals that dynamic balance exercise can also affect static balance abilities. In this regard, the effect of introducing Computerized simulation-based interventions is positive [7], because they can provide immediate visual and auditory feedback concerning the exercise results, thereby increasing the exercise learning effect. In this study, the Computerized simulation game group also revealing improved balance abilities. A study by Walker, in which traditional physical therapy and balance training using visual feedback training and verbal and tactile signals, proved the effects of visual perception feedback training by improving the Balance time. A study by Geiger, in which biofeedback/force plate training and existing balance improvement exercise were compared, also showed improvements in balance ability, since reduced after the intervention. In the present study, which compared functional balance factors before and after the experiment, the Computerized simulation game group showed significant differences between before and after the experiment, whereas no significant difference was found in the normal exercise group. The above comparison results between the two groups showed that the elderly individuals did not move within a predetermined movement boundary but rather moved into larger areas to perform.

5. Conclusion

Computerized Simulation system improves balance and Confidence as Compare to Conventional Exercises in elders. Improved confidence with functional activities was also reported.

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