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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/11683

DOI URL: <http://dx.doi.org/10.21474/IJAR01/11683>



RESEARCH ARTICLE

EFFECTIVENESS OF FORWARD WALKING VERSUS BACKWARD WALKING ON CARDIOVASCULAR FITNESS IN OVERWEIGHT MIDDLE AGE PEOPLE

Dr. Heena Rathwa¹, Dr. Advita Neville Deepak² and Dr. Nikita Patel¹

1. MPT Scholar, Parul Institute of Physiotherapy, Parul University, Vadodara.
2. Associate Professor, Parul Institute of Physiotherapy, Parul University, Vadodara.

Manuscript Info

Manuscript History

Received: 10 July 2020

Final Accepted: 14 August 2020

Published: September 2020

Key words:-

Forward Walking, Backward Walking, 6 Minute Walk Test (6MWT), Rating Perceived Exertion (RPE)

Abstract

Background: Overweight and obesity are defined as an abnormal or excessive fat accumulation that may impair health and also decrease endurance.

Methodology: Samples of Eighty (n=80) indoor overweight middle aged people between the age of 40-60 years were included in the study. The subject who met the inclusion criteria was included in the study. An informed written consent from the subjects was taken. Subjects were divided into 40 in each group. The study is carried out for the duration of 6 months. Treatment was given 30 minutes for 6 days per week for 6 weeks. Outcome measures were taken on the 0 day and on the last day of the treatment with the use of 6 MINUTES WALK TEST.

Conclusion: Therefore we concluded that forward walking and backward walking both were effective but backward walking shows more effectiveness than forward walking in improving cardio-vascular fitness in overweight middle age people.

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Introduction:-

Sedentary life style habits tend to be usually obese or overweight, from last few years physical therapy play important role in cardiovascular fitness by using different training like aerobics, anaerobic and walking different intervention are used to maintain healthy weight, muscle strength, joint mobility, strengthening the immune system and cardiovascular system. So just 30 minute every day walking improves cardio vascular fitness¹. According to American heart association proved that more health risk in overweight and obese middle aged 40 to 60 years adults². Many physiotherapy researches proved that walking is great way to improve maintain health³.

Methodology:-

This experimental study is to evaluate the effectiveness of forward walking versus backward walking on cardiovascular fitness in overweight middle age people. This study was conducted in Parul Sevashram hospital, Limda, Vadodara. Samples of Eighty (n=80) indoor overweight middle aged people between the age of 40-60 years were included in the study. The subject who met the inclusion criteria was included in the study. An informed written consent from the subject was taken. Initial cardio-respiratory assessment is done and subjects were divided into 40 in each group by the study is carried out for the duration of 6 months. The study was approved and conducted between 2018 and 2020 in accordance to the guidelines of the Parul University Institutional Ethics Committee for Human Research (PU – IECHR). Duration of treatment 30 minutes for 6 days per week for 6

Corresponding Author:- Dr. Heena Rathwa

Address:- MPT Scholar, Parul Institute of Physiotherapy, Parul University, Vadodara.

weeks. Outcome measures were taken on the 0 day and on the last day of the treatment with the use of 6 MINUTES WALKTEST.

Inclusion Criteria:

Both genders included, patient who is able to understand and follow simple verbal instruction, age between 40-60 years, patient who signed the informed consent form and Overweight people (BMI above 25.0 to 29.9) ($26\text{kg}/\text{meter}^2$)

Exclusion Criteria:

History of cardiac and / or chronic pulmonary diseases with severe cardio pulmonary diseases, significant perceptual, cognitive, or communication impairments. Aphasia and history of thoracic and abdominal surgery, presence of a severe visual disability and visual field defects and the participants receiving any cardiopulmonary fitness training.

Outcome Measure:

6 minute walk test (6MWT) Before start assessing 6 minute walk test first of all we should check subjects HR (heart rate), SPO2 (oxygen saturation), BP (blood pressure), RPE (rating perceived exertion).

Procedure

Samples of 80 middle aged overweight people between the ages of 40- 60 years was taken for the study. These subjects who met the inclusion criteria were included in the study. An informed & written consent was taken from the subjects. Initial assessment was done and subjects were divided in two groups, 40 subjects in each group by using chit method. Both the groups were receive 5 minutes warm up exercise at the beginning and 5 minutes cool down exercise at the end of the treatment period for relaxation.

WARM-UP ACTIVITY-start slowly, do a few warm-up exercise (neck stretch, biceps stretch forearm (flexion, extension) stretch, pectoralis stretch, back side stretch, wrist roll, elbow flexion, shoulder girdle, ankle toe, side to side step) and General stretches first. In COOL DOWN –ask subject to walk for 5 minutes at lower pace

GROUP A: FORWARD WALKING GROUP B: BACKWARD WALKING

GROUP A: FORWARD WALKING

Total treatment time: 30 minutes (5 minutes warm up, 20 minutes forward walking, 5 minutes cool down)

Before starting forward walking all the subject was examined by six minute walk test. After doing warm up exercises ask the subject was asked to start forward brisk walking and instructed to continue for 20 minutes. Instruct the subject that stop walking whenever feels fatigue or any other problem and take rest.

Group B: Backward Walking

Total treatment time: 30 minutes (5 minutes warm up, 20 minutes backward walking, 5 minutes cool down)

Backward Walking-

Backward walking at the dryland first demonstrated by the therapist. After doing warm up exercises ask the subject was asked to start Backward walking and instruct to continue for 20 minutes.

Instructed the subject that stop walking whenever he feels fatigue or any other problem and take rest.

Statistical analysis

Statistical methods

Descriptive statistical analysis was carried out in the present study. Outcome measurements were measured using 6 MWT presented as mean \pm SD. significance was assessed at 5% level of significance $p < 0.005$ (2-tailed hypothesis test considered).

Statistical tests

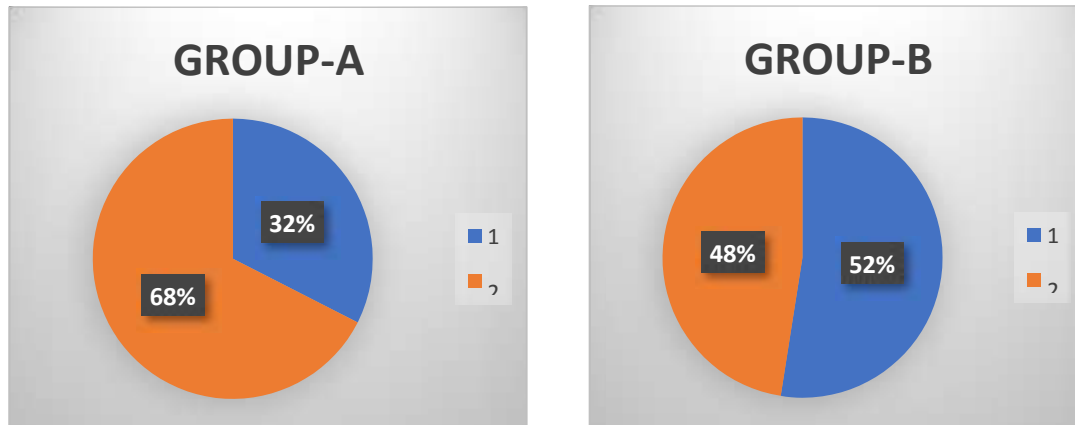
Paired 't' test as a parametric had been used for analysis of 6 MWT within the group A and group B with calculation of percentage of change.

Independent 't' test as a parametric had been used to compare the means of 6 MWT between the groups with calculation of percentage of difference between the means.

Statistical software:

The statistical software namely SPSS 2.1.0.1 will be used for the analysis of the data and Microsoft word and excel had been used to generate graphs, tables etc.

Represent The Ratio Of Male And Female In Group A And Group B



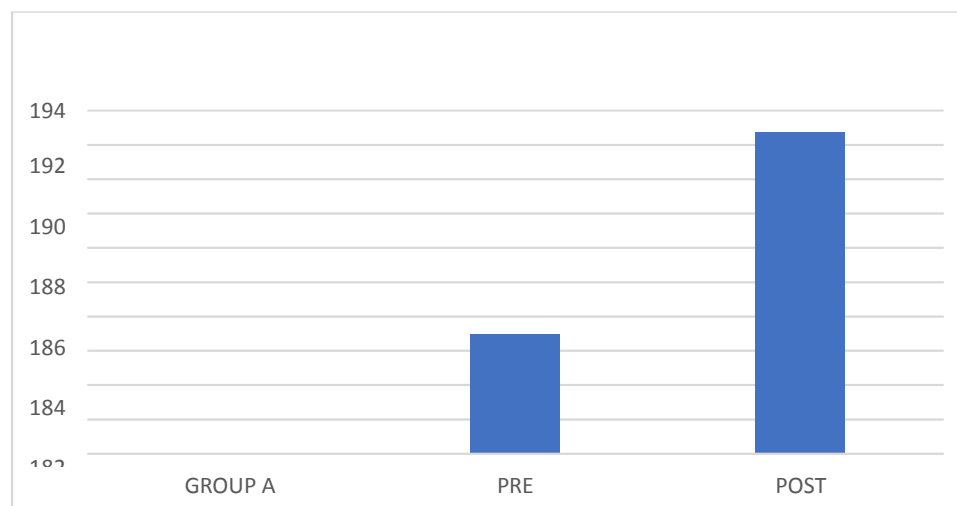
Represent Intra Group Comparison For 6 Mwt Group-A

GROUP	OUTCOME	PRE	POST	T-VALUE	P-VALUE
		MEAN/SD	MEAN/SD		
GROUP-A	6MWT	181.0000 ±12.56777	192.7500±14.13987	-9.945	0.001

Intragroup analysis:

The above table shows the intragroup comparison of 6MWT score for functional assessment in Group A. The comparison was done through paired t-test. The p-value of Group A comparing pre and post treatment score of 6MWT is 0.001. The p-value is <0.001 which shows that Group A is significant in improving 6MWT score.

So, Null hypothesis is H₀ is rejected and alternate hypothesis H₁ is accepted.



1) 6MWT: PRE POST COMPARISON (GROUP A)

represent inter group comparison for 6 mwt group-B

GROUP	OUTCOME	PRE	POST	T-VALUE	P-VALUE
		MEAN/SD	MEAN/SD		
GROUP-B	6MWT	181.0000 ±8.77058	191.50000 ±9.21259	-17.046	0.001

Inter group analysis:

The above table shows the intra group comparison of 6 MWT score for functional assessment in Group B. the comparison was done through paired t test. The p value of Group A comparing pre and post treatment score of 6MWT is 0.001. The p value is <0.001 which Group B significant in improving 6MWT scores.

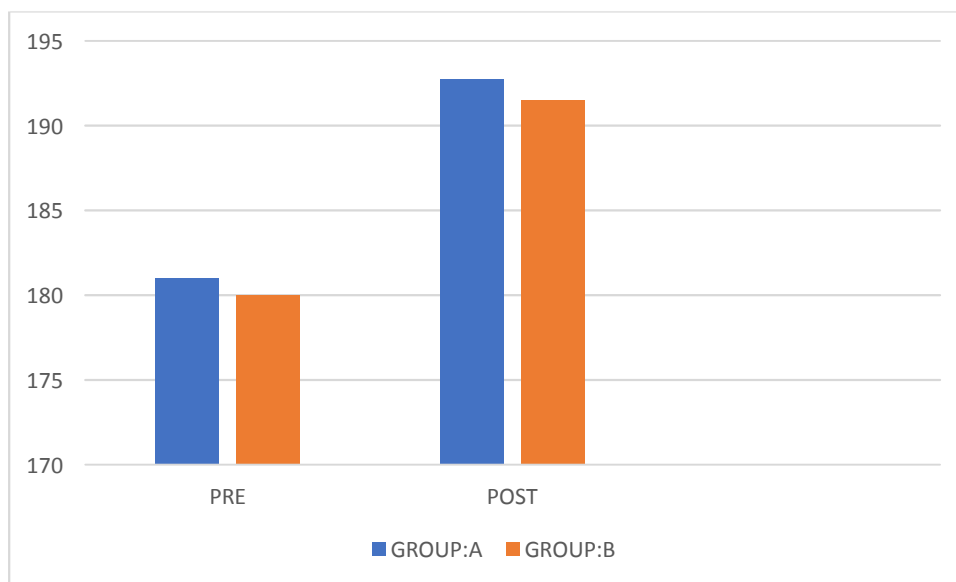
So, Null hypothesis is H₀ is rejected and alternate hypothesis H₁ is accepted.

6 MWT: PRE POST COMPARISON (GROUP B)

Represents Inter Group Comparison For 6MWT

	GROUP	MEAN/SD	T-VALUE	P-VALUE
6 MWT	GROUP-A	-12.000± 6.07644	-426	0.671
	GROUP-B	-11.5000 ±4.26675		

The above table shows inter-group comparison of post treatment 6MWT scores for functional assessment of group A and B. the analysis was carried out by At baseline, the p value is <0.001. It shows that there is significant difference between the post-treatment scores of both groups. The value comparing the post treatment score for Group A and Group B is 0.671 which is suggestive of significant improvement both groups.

**Discussion:-**

Cardio-vascular fitness reduces in overweight middle people, so our study was focus on how to increase cardio-vascular fitness in overweight people. For that my treatment protocol was forward walking and backward walking in overweight middle age people, so it helps in improving cardio-vascular fitness.

Statistically, intra group analysis: the comparison of pre and post treatment scores for cardio-vascular fitness shows that P-value is <0.001 for 6 minute walk test (6MWT) in both groups.

Statistically, intergroup analysis: the comparison of post treatment score for cardio-vascular fitness shows that P-value is <0.001 for 6 minute walk test (6MWT). Group-B backward walking more significant rather than Group-A forward walking according to mean of 6MWT.

Overweight is an increasing body weight as a result of excess accumulation of fat and is a result when calorie value of food intake exceeds energy output. The prevalence of overweight is increasing and is associated with numerous chronic conditions therefore it is important to implement effective interventions for treatment of excess body weight.

Walking is a rhythmic, dynamic, aerobic activity of large skeletal muscles that confers the multifarious benefits with minimal adverse effects.

Forward walking is probably one of the most common modes of aerobic conditioning and numerous studies have shown the benefits of different kinds of forward walking training.

Backward walking is a training technique often used in team sports to increase co-ordination and endurance, however, the effect of backward walking training program on the aerobic fitness of healthy individuals has not been qualified before. The results of this study provide for the first time, evidence that backward walking can improve cardio-vascular fitness in overweight middle age people.

In the order to develop and maintain cardio-vascular fitness it is recommended that both men and women exercise of intensity that correspond to 65-90% of maximal heart rate or 50-85% of Vo_{2max} . The most important and novel finding of this study was that the people following the 6 week training significantly improve cardio-vascular fitness.

Although it has been suggested that backward walking training increase quadriceps power and strength, similar effects were not found in this study.

Mackie et al, (2018) trained their subject for three months. On a treadmill and showed that the power of the subjects legs increased significantly, while the strength of the knee flexors and extensors decreased in most subjects.

The mechanism for that improvement in quadriceps strength is probably related to the isometric and concentric nature of the muscle actions during backward walking, as well as that fact that the leg muscles are active for a longer sustained period during backward walking compared to forward walking.

In our current study we used an exercise group that initiated the treatment which prescribed for 6 days for week for 6 week.

As the results outcome measures 6 MWT the Group-A forward walking as well as Group-B backward walking indicated better improvement in cardio-vascular fitness but on inter-group comparison more improvement seen in Group -B as compared to Group-A we therefore speculate that possible reason for this could be Group-B backward walking results in increased metabolic cost and cardiovascular demand.

The increased metabolic cost during backward locomotion is due to novel activity which requires increasingly greater motor unit recruitment in order to complete the task. Backward walking consumes more energy and thus helps in improving aerobic capacity and cardio vascular fitness. So, Group-B helps increased cardio-vascular fitness more than Group-A.

According to hypothesis it is proven that backward walking is more effective in increasing cardio-vascular fitness in overweight middle age people.

Conclusion: This research demonstrated that backward walking showing improvement in cardiovascular fitness. These findings indicate that backward walking could be used to improve cardio vascular fitness with overweight middle age people.

Conflict of Interest:

None

Source of Funding:

Self

Ethical Clearance:

Parul University Institutional Ethics Committee for Human Research (PU – IECHR)

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