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Effects Of An 8-Week Twin Exercise Program On Functional Fitness In 40 To 50 Year Old Women

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Abstract

Extensive investigation has indicated the advantageous effect of physical activity on physical fitness and activities of daily living in older adults, but none have delve into the effects on the health of the women who had all along their life been helping everyone to enjoy life. This exploration studied the effect of an exercise program on Body Mass Index, Flexibility and Agility in women of age ranging from 40 to 50 years. Ninety (mean age 42.5 ± 5.5 years) women were randomly assigned to two treatment groups (n = 30) and a control group (n = 30) group and were evaluated before and after training. The treatment group completed an 8-week walking and guided yoga programs. Assessments included body weight and height, Boomerang Run Test (Right) for measuring agility and Sit and Reach Test for measuring Agility. ANCOVA revealed significant differences between groups ($p < .001$) for all measurements. Post-hoc test revealed that walking program had a higher effect in all the three fitness measures than yogic program.

Keywords: Yoga, Agility, Body Mass Index, Boomerang Run Test, Sit & Reach, flexibility.

INTRODUCTION

Indian women are forming an integral and vital part in their family and society. But the awareness to be fit in the middle age after child birth is most evident among urban women. In the rural India, due to the necessity of earning the livelihood, women after child birth do not take much rest but attend their daily routine labor. Without their knowing, they keep themselves almost fit.

At the same time, the urban women, do not possess the knowledge and consequences of their sedentary life style after becoming a mother. They are more knowledgeable contrary to their rural counter parts how to take care of them during pregnancy. They follow the instructions and advice of their doctors about their prenatal and post natal cares. They consume food to feed the baby in the womb and after birth during breastfeeding. They do not take much attention and conscious about their food intake and the essential physical activities. They feel that their daily work in the kitchen or in their offices was sufficient.

It has become evident that almost 80% of urban women tend to become obese and their activity become less and restricted. They strain to bend forward to pickup something on the floor or to reach up high or to turn suddenly back to receive something. The rising of Body Mass Index, accumulation of fat around hips, back of the arms and buttocks restrict their normal necessary movements. They go to Physicians and they prescribe exercises as medicines. At this juncture, the author felt it necessary to devise an easy and realistic exercise procedure especially for obese women of 40 to 50 years of age.

RELATED WORKS

Gray & Smith [1] investigated correlations among physical fitness, dietary intakes, activity levels, and body mass index (BMI) for 155 urban Native American youth, ages 5 to 18 years. Heights, weights, skin fold measurements, activity level, balance times, and dietary intakes were assessed. Presidential Physical Fitness (PPF) testing was completed with 82 youth. Age groups were examined for differences in energy and macronutrient intake, sedentary activities, activity level, and PPF achievement. Pearson and Spearman ρ correlations were examined among dietary intakes, fitness, balance, and activity levels. The majority of youth (63%) were at risk for overweight or already overweight, and 59% were sedentary. BMI was correlated with age and PPF achievement for all youth, and with physical activity and frequency of television viewing for youth ages 9 to 18 years. No correlation had been found between dietary intake and activity level. They suggested that appropriate interventions for obesity should start early, focusing on decreasing sedentary activity and increasing opportunities for fitness.

To observe the cross-sectional nature of the effect of age, height, and body mass on motor performance during adolescence (13-18 years), Bale et al [2] measured 103 boy and 65 girl athletes for motor performance and anthropometric variables. Motor performances included tests of strength, muscular endurance, flexibility, aerobic capacity, anaerobic power, speed, and agility. Anthropometric determinations included height, body mass, lean body mass, %fat, and somatotype. Boys were

significantly different from girls in all measurements except endomorphy, while girls were significantly superior to boys only in flexibility. Physical maturation, as reflected by height and body mass, was found to be a major contributor to increases in motor performance. Somatotype had not differ greatly across the age groups. Boys were found significantly more mesomorphic than girls, while girls were found significantly more ectomorphic than boys. Higher %fat and more endomorphy were significantly related to poorer performance for relative aerobic capacity, 40-yd dash, and agility in boys but only for upper body muscular endurance in girls. Mesomorphy had higher relationships with performance variables among boys than among girls. Growth would appear to contribute significantly to enhanced motor performance with age, and its effect may be different in boys than in girls.

Rutt & Coleman [3] examined the relationships among built environment, physical activity, and body mass index (BMI) in a primarily Hispanic border community in El Paso, TX.. A total of 996 adults were surveyed by phone and 452 were successfully geocoded. The sample was 71% female, 79% Hispanic, 42 ± 17 years old, moderately acculturated, and had socioeconomic status (SES) levels of semi-skilled workers. Increasing BMI was related to less moderate intensity physical activity ($P = 0.05$), higher SES ($P = 0.0003$), worse overall health ($P = 0.0004$), and living in areas with greater land-use mix (less residential; $P = 0.03$). The relationship between overall health and BMI was in part mediated by higher numbers of barriers to physical activity in those with poor health, which lead to a decrease in moderate physical activity. These variables explained 20% of the variance in BMI. This is one of the first studies to find a positive relationship between land-use mix and BMI in a predominantly Hispanic, low-income community. The positive association between BMI and land-use mix might be due to the inclusion of individual SES as a controlling variable in the analyses, suggesting that SES might have a differential effect on how the built environment influenced BMI in low- to moderate-income minority communities.

Simons & Andel [4] assessed the effects of resistance training and walking exercise on measures of functional fitness. Sixty-four volunteers (average age 83.5 years) from an independent-living facility were randomly assigned to walking, resistance training, or control groups. Participants in the walking and resistance-training groups engaged in two exercise sessions per week for 16 weeks. Measures of functional fitness included upper and lower body strength, hip and shoulder flexibility, agility and balance, coordination, blood pressure, and resting heart rate. They had used repeated measures analysis of variance to examine pretest to posttest differences. Both exercise groups had shown significant improvements relative to control group in upper and lower body strength, shoulder flexibility, and agility and balance exercise. Findings demonstrated that exercise could lead to improvements in multiple domains of functional fitness even among very old, previously sedentary individuals, possibly making activities of daily living easier to perform. In conclusion, the findings of this study indicated that previously sedentary adults in advanced old age could improve their functional fitness by engaging in a supervised exercise program. Both resistance training and walking programs yielded improvements on multiple measures of functional fitness, suggesting that benefits of exercise in

advanced old age might be universal rather than specific to the type of exercise.

SELECTION OF SUBJECTS

For this purpose, the scholar chose 90 women in a park in Ambattur town in Chennai city limits. The women came there regularly and usually in the evening for strolling and to have a fresh breath. The author took a week to talk and explain to about 140 women of that age group the plan of exercises and convinced them to take part in the routine. They agreed to spend about one hour in the evening daily.

The selected women were asked to assemble in the enclosed arena of a school play grounds of a nearby school. The author explained completely about the different kind of activities they have to perform daily evening between 5.30 to 6.30 pm for 8 weeks. They were permitted to be off from the routine during their periods if they are uncomfortable and advised them to make up the lost days in the subsequent weeks.

The scholar divided them into three groups of 30 members each. One group was advised to be normal and abstain from doing any extra physical training programme either of their own or organized by any other agency. This group was named as Control Group. The next 30 members were named as experimental Group-A and they were asked to walk 15 laps in the 200 meters track within 45 minutes at their own pace for 5 days a week from Monday through Friday for 8 weeks. If they have any discomfort they were asked to stop walking and rest and then continue. All of them participated with keenness and zeal and at the end of 8 weeks, they felt light, active and liked the programme

The third Group with another 30 members was named as Experimental Group-B and they were advised that they had to attend a structured Yoga programme in the evening for 45 minutes. The scholar described the origin, history and the benefits of Yoga. They were provided with Yoga Mattress and the scholar, a yoga exponent himself, first demonstrated the asanas. The ladies were asked to wear a comfortable dress like churidhar or a track suit trouser. Daily they had to perform the six designed asanas in the designed order 3 times after sufficient rest in between. The ladies were very comfortable with the scholar and enjoyed all the sessions very much and participated with passion for 5 days a week from Monday through Friday for 8 weeks. All of them at the end of 8^{th} week felt more comfortable in their movements, flexible and light.

EXPERIMENTAL DESIGN

Body Mass Index

Before the commencement of the programme, the scholar measured the Height and Weight of al the 90 members of the experiment to calculate the Body Mass Index by using the following formula and recorded.

$$\textbf{BMI} = \textbf{(Weight in Kilograms/ (Height in Metres)}^2$$

Boomerang Run Test

By using the Boomerang Run (Right) test [5], the Agility of all the members was measured and recorded.

In Right-Boomerang Run test of agility, participants ran in the direction indicated by arrows. The orange circles are the cones with the cone numbers showing the order of running from the center station after completing right quarter turns, beginning from "Start" and finishing at "End." Fig.1 shows how Boomerang Test has to be conducted.

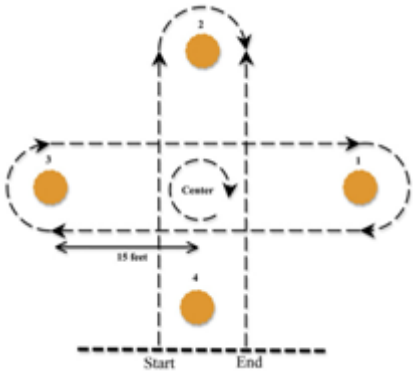

Fig. 1: Boomerang Run Test (Right)

Sit and Reach Test

By using the Sit and Reach equipment [6], the flexibility of all the three groups were measured and recorded in seconds.

The Sit and Reach Test was conducted as follows:

- The starting position is sitting on the floor with shoes removed, feet flat against the table, and legs straight
- Reach forward and push the fingers along the table as far as possible
- The distance from the finger tips to the edge of the table represents the score for that person
- As the 'sit and reach' table has an overhang of 15 cm, a person who reaches 10 cm past their toes scores 25 cm.

Fig. 2: Sit and Reach Test

Fig. 2 shows the method of doing Sit and Reach Test. It is important to have several warm-up attempts first, and to record the best score.

The Asana Routine

The following were the Asanas performed by the subjects for 8 weeks as described above. Yoga is an ancient practice followed and practiced by many around the globe. It has benefited everyone who has regularly practiced the age-old form of exercise. In today's fast paced age, people look up to yoga as a perfect exercise for a healthy body and stress-free life.

Practicing yoga on a daily basis has certainly helped many people in reducing and gaining weight. People often blame their genes for being overweight or underweight. But that is not the case every time. It's not always the genetic makeup that is responsible for weight gain. Our lifestyle and eating habits also play a negative role in weight gain. There is a lot more you can do to reduce weight naturally. Power yoga is a healthy and effective weight loss option. Yoga for weight loss for women is a popular choice these days [7].

Fig. 3 Bhekasana

Lie on your belly and reach back to grab your feet as in bow pose. Now through inhalation, lift up your chest and squeeze the shoulders towards each other. Fold your feet towards the hip region and let your hands hold the toes. Hold this pose for 5 breaths and then gradually release. Fig.3 shows the position for Bhekasana.

Fig. 4 Utkatasana (Chair Pose)

Stand in Tadasana position. Stretch your hands up in the air. Now bend your knees and try to keep your thighs parallel with the floor in the same manner in which you sit on a chair. Stay in this position for 30 seconds and release. This will help you in reducing fat from the arms and thighs. Fig. 4 shows how Utkatasana has to be done.

For doing Vakrasana, you have to sit in a comfortable cross-legged position. Now, keep your right hand on your left knee.

Fig. 5 Vakrasana

Try to twist your body in the left direction. Do not forget to keep your posture straight. Try doing this in the right direction too.

Fig. 6 Bhujangasana (Cobra Pose):

For doing Bhujangasana, you have to position yourself into a curved pose which resembles a snake. Sleep on the ground in such a way that your forehead touches the ground. Now place your palms under your shoulders in a manner that it gets tucked close to your body. Stretch your legs in a way that the top of your feet presses down into the mat. Now inhale & slowly press your hands to stretch your arms, sending your chest upwards. This pose looks like a snake & hence it is called the cobra pose or the snake pose. Fig. 6 shows how Bhujangasana is done.

Fig. 7 Paschimottanasana

Sit down on the floor with both legs extended forward in front of you. Stretch your arms and body forward and try to touch your toes. Do not bend your knees & try to reach your toes. This asana gives a good stretch to your hands, arms & your spine. Also, it reduces extra belly fat & keeps your healthy & free from diseases.

Each asana was performed one after the other with Savasan in between. This routine is to be repeated three times daily for 45 minutes.

RESULTS AND DISCUSSION

The data thus collected before the experimental administration of the programmes were recorded as Pre Test scores. After the experimental period of 8 weeks the measurements were made and recorded as the Pot-Test Scores.

The eating habits, the profession and the economic and socio-cultural factors of the participants were not taken into account during the process of the statistical process. The collected data were subjected to ANCOVA and the results are presented below:

Table 1: ANCOVA Summary for BMI

Source	SS	df	MS	F	P
adjusted means	79.43	2	39.72	12.67	<.0001
adjusted error	269.5	86	3.13		
adjusted total	348.9	88			

Table 2: Ordered Adjusted Body Mass Index Means and Differences between Means for Control and Experimental Groups

Control Group(A)	Walking Group (C)	Yoga Group (B)	Mean Difference	Scheffe's Post – hoc F - Ratio
31.4	29.5	--	1.9	8.8
31.4	--	29.2	2.2	11.8
--	29.5	29.2	0.3	0.21

Table 1 shows that the Body Mass Index is significant at .01 level of confidence and Table 2 shows the differences between adjusted Body Mass Index

means, Control Group has significantly higher mean than the means of Group C and Group B at .01 level while applying Scheffe's Test [8]. The difference between the means of groups B and C is not significant. It is inferred that the Yoga group had improved the BMI level than the walking group.

In the same way ANCOVA was applied on the performance of Walking and Yoga group for ascertaining the significant independent variable among the three groups and the obtained results have been presented in Table 3 and Table 4.

Table 3: ANCOVA Summary for Agility

Source	SS	df	MS	F	P
adjusted means	379.6	2	189.8	26.59	<.0001
adjusted error	613.9	86	7.14		
adjusted total	993.5	88			

Table 4: Ordered Adjusted Agility Means and Differences between Means for Control and Experimental Groups

Walking Group (C)	Yogic Group (B)	Control Group (A)	Mean Difference	Scheffe's Post – hoc F - Ratio
19.3		14.3	5.0	26.32
19.3	18.2		1.1	1.27
	18.2	14.3	3.9	16.01

Table 3 shows that the Agility is significant at .01 level of confidence and Table 4 shows the differences between adjusted Agility means, Control Group has significantly lower mean than the means of Group C and Group B at .01 level while applying Scheffe's Test. The difference between the means of groups B and C is not significant. It is inferred that the Walking group had improved the Agility level than the Yoga group.

Table 5: ANCOVA Summary for Flexibility

Source	SS	df	MS	F	P
adjusted means	501.6	2	250.8	38.28	<.0001
adjusted error	563.4	86	6.55		
adjusted total	1065	88			

Table 5 shows that the Flexibility is significant at .01 level of confidence and Table 6 shows the differences between adjusted Flexibility means, Control Group has significantly lower mean than the means of Group C and Group B at .01 level while applying Scheffe's Test.

Table 6: Ordered Adjusted Flexibility Means and Differences between Means for

Control and Experimental Groups

Walking Group (C)	Yogic Group (B)	Control Group (A)	Mean Difference	Scheffe's Post – hoc F - Ratio
19.9		14.6	5.3	31.2
19.9	19.4		0.5	0.28
	19.4	14.6	4.8	25.6

The difference between the means of groups B and C is not significant. It is inferred that the Walking group had improved the Flexibility level than the Yoga group.

CONCLUSION

The purpose of this study was to find out a suitable exercise regimen for the obese ladies at the age group of 40 to 50 years to reduce their body weight and improve their extent of movement and fitness. After thorough examination of the ANCOVA test results, it was concluded that both Walking and Yoga have significant effect on Body Mass Index, Agility and Flexibility. But the Walking group has given better results in the improvement of Agility and Flexibility while Yoga group has improved the Body Mass Index remarkably. It is the advice of the scholar in conformity to his study that the ladies in the age group of 40 to 50 years have a daily walking routine to their ability to keep fit and agile.

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