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Effect of Mat Exercise and Yoga with Fitball on Body Mass Index, Abdominal Obesity & Quality of Life in Young Overweight Individuals: An Experimental Study

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ABSTRACT

BACKGROUND: Obesity is a metabolic disorder with excessive fat accumulation in different parts of the body, and it is a risk factor for cardiovascular and metabolic disorders. The regular exercise reduce the risk for metabolic disease through numerous mechanisms. Several studies have shown that exercise induced relative loss of fat seems to be higher in the abdominal region than other regions. Very few studies have assessed the effect of mat exercise and yoga with ball on BMI, abdominal obesity and quality of life in overweight individuals.

AIM: The aim of the study is to compare the effect of mat exercise and yoga with fitball on BMI, abdominal obesity and quality of life in young overweight individuals.

METHOD: 40 overweight individuals between the ages of 18 to 35 years were included in the study according to the inclusion criteria, patients were divided into 2 groups. Group 1 received Mat exercises and Group 2 received Yoga with fit ball intervention. Treatment took place for 3 times a week for 8 weeks. Pre and post intervention BMI, Abdominal skin fold thickness, Waist-hip ratio, Quality of life were assessed. Data were analysed using statistical package for social science version 20 (SPSS v20) and Microsoft excel 365 with the significance level of statical analysis is $p < 0.05$.

OUTCOMES: Body mass index, abdominal skin fold thickness, Waist-hip ratio, WHOQOL-Brief.

RESULT: The result of present study showed that there was statistically significant improvement in Body mass index, Abdominal skin fold thickness, Waist-hip ratio and, Quality of life in both the groups post intervention in within group analysis and WHQOL-Brief scale Physical domain score post intervention in between group comparison ($p<0.05$).

There was no statistically significant difference in BMI, Abdominal akin fold thickness, Waist-Hip ratio, WHOQOL-Brief scale psychological, social relationship and, environmental domains in between group analysis ($p>0.05$).

CONCLUSION: From the present study it is concluded that 8 weeks intervention programme of mat exercise and yoga with fitball training both are equally effective in reducing BMI, and abdominal obesity and improving health related quality of life in young overweight individuals.

KEYWORDS: Abdominal obesity, Abdominal skin fold thickness, Body mass index, Overweight, Quality of life, Waist-hip ratio, WHOQOL brief.

INTRODUCTION

The term obesity is defined as cluster of non-communicable diseases called "New World Syndrome" creating an enormous socio economic and public health burden in poorer countries.[1]

It is a metabolic disorder with excessive fat accumulation in different parts of the body, and it is a risk factor for cardiovascular and metabolic disorders.[2]

The regular exercise would have a value rather than on scientific evidence and to reduce the risk for metabolic disease through numerous mechanisms. There are various exercise have been designed for obesity such as aerobics exercise, mat exercise, yoga, Pilates etc.[1]

Different exercises have individual benefits like crunches, sit ups and leg raises work only on the anterior portion of the core muscles whereas planks work on the entire core muscles as well as many other muscles in the body.[2]

Yoga is a slow mode of exercise which stimulates muscle contraction and stretching at the same time. Moreover, body and mind connection is a key in this exercise.

Fit ball program can improve core muscle strength, aerobic capacity, muscle power, body composition, postural control and balance, muscular strength, flexibility and endurance.[4]

Health-related quality of life (HRQoL) is commonly described as a multi-dimensional construct, it is a term related to aspects of self-perceived wellbeing in the physical, mental, and social dimensions, as well as how well a person functions in their life. HRQoL is affected by lifestyle and different anthropometrics, fatness, and fitness variables in children and adolescents.[5]

Hence current study will help us to compare the effect of mat exercise and yoga with fitball on BMI, abdominal obesity and QOL in young overweight individuals.

Abdominal obesity is also known as central obesity is where excessive abdominal fat around the stomach and abdomen has built up to the extent that it is likely to have negative impact on health. Abdominal Obesity is a risk factor for cardiovascular and metabolic disorders.

Various types of aerobic and anaerobic exercises have been used such as yoga, swiss ball exercise, thera band exercise, Pilates exercise and mat exercise etc.

Very few studies have compared the effect of mat exercise and yoga with ball on BMI, abdominal obesity and quality of life in overweight individuals. So the need of this study is to compare the effect of mat exercise and yoga with fit ball for BMI reduction, abdominal obesity and quality of life in young overweight individual.

METHODS

ETHICS

This study protocol was approved as a less than minimal risk research by the institutional ethical committee. Prior to the interview, each individual read carefully the consent form, which contains information on the objectives of the study, the selection process, risks, benefits and freedom of individual, as well as information on confidentiality.

Study design: An Experimental study.

Source of data: From community.

Study setting: Physio OPD and Home

Study duration: 1 year
Sampling technique: simple random sampling.
Sample size: n=40 (n=20 in each group) (according to power analysis)

SELECTION CRITERIA:

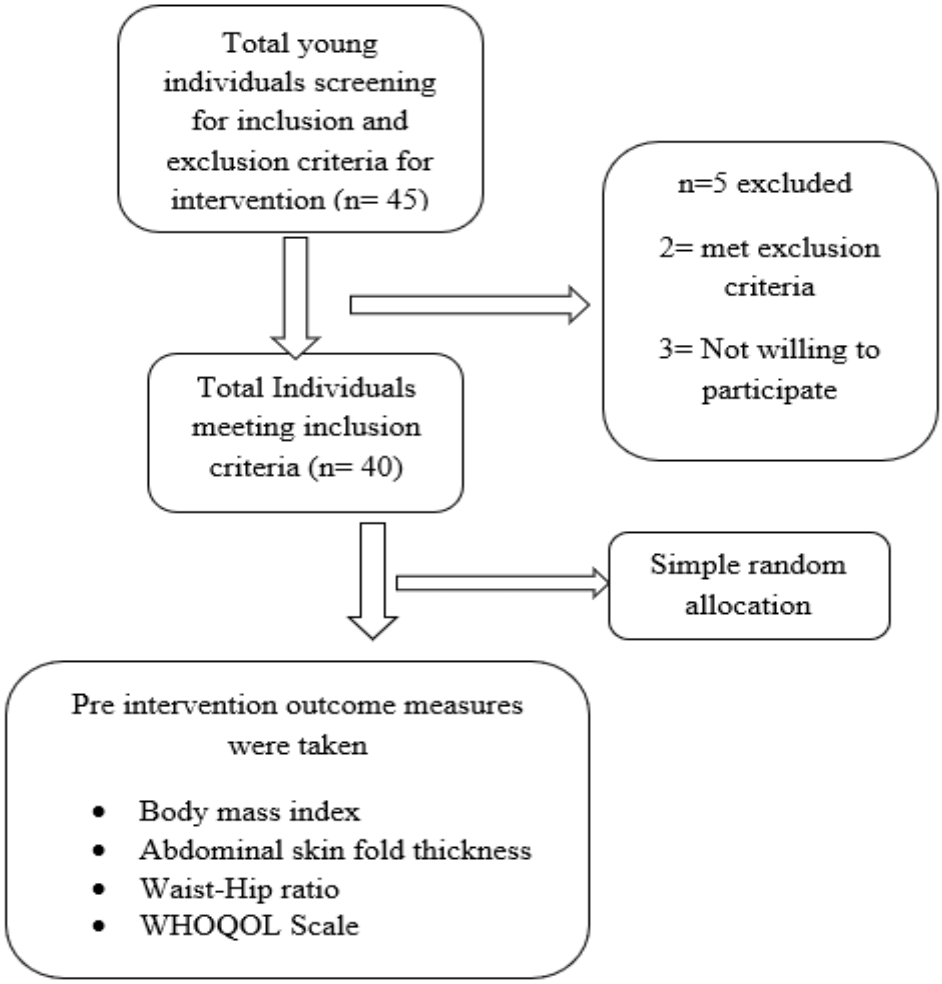
Inclusion criteria:

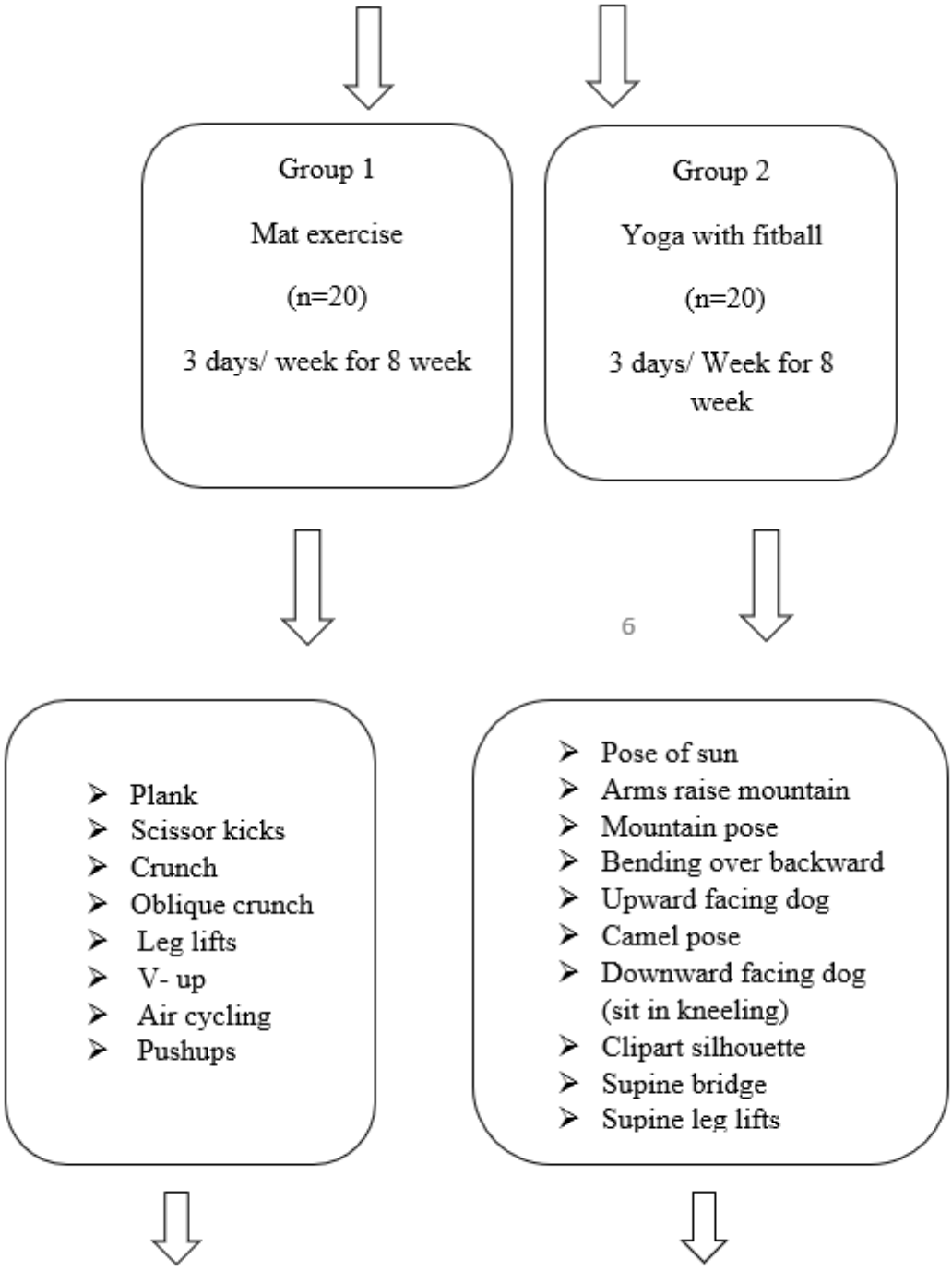
1. Individuals willing to participate
2. 18-30 years age
3. Both Male and Female
4. BMI: 25.0 – 29.9 kg/m^2

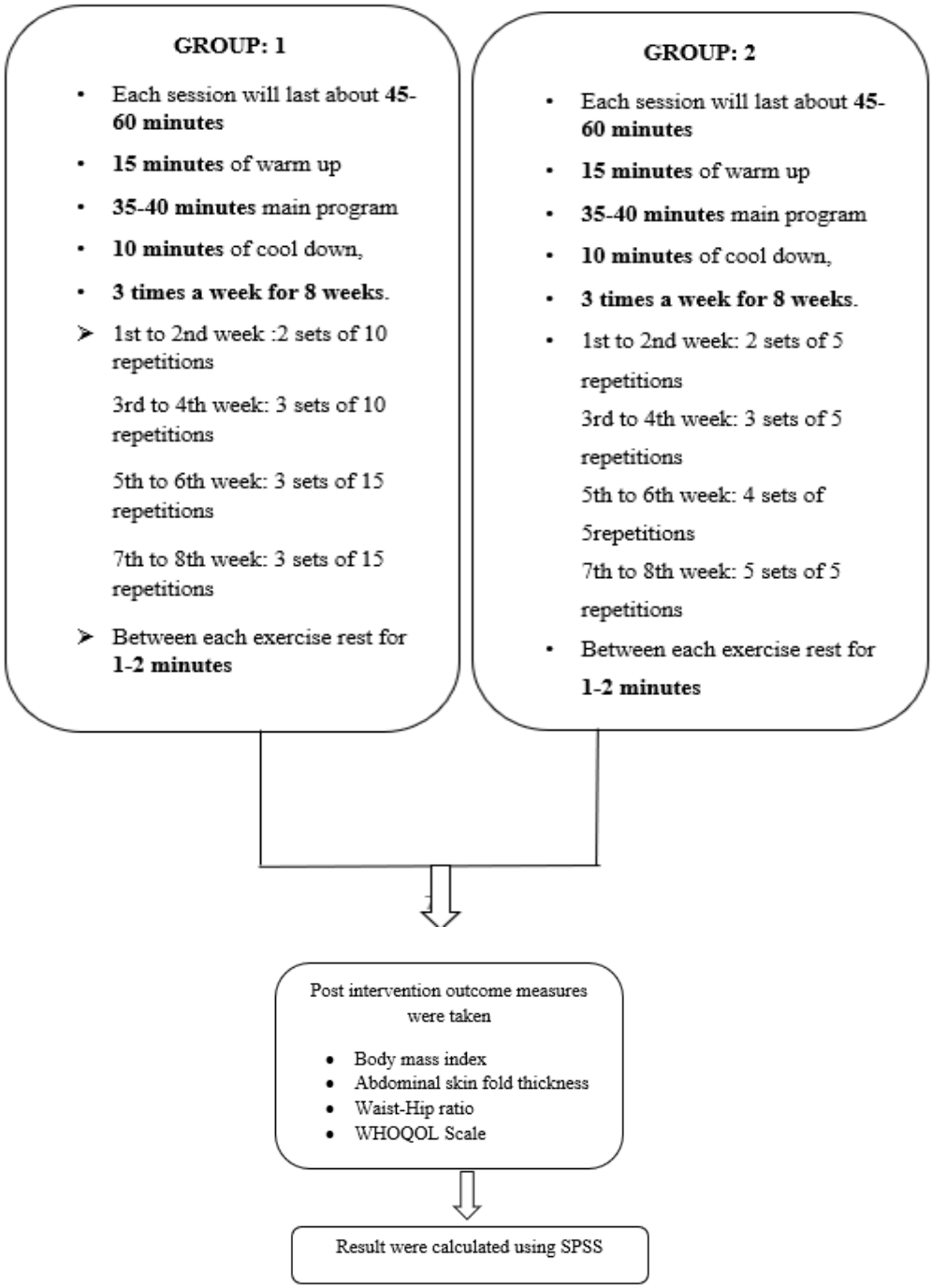
Exclusion criteria:

1. Physical impairments that preclude participation in exercise
2. Individuals who are participating in any other form of weight reduction program.
3. Currently following a weight-loss diet
4. Individuals with any neurological, cardiovascular, metabolic and psychological disorders
5. Pregnant or breastfeeding women

FLOW CHART




Group 1
Mat exercise
(n=20)
3 days/ week for 8 week
Group 2
Yoga with fitball
(n=20)
3 days/ Week for 8 week
6
Plank
Scissor kicks
Crunch
Oblique crunch
Leg lifts
V- up
Air cycling
Pushups
Pose of sun
Arms raise mountain
Mountain pose
Bending over backward
Upward facing dog
Camel pose
Downward facing dog (sit in kneeling)
Clipart silhouette
Supine bridge
Supine leg lifts



RESULT

The present study conducted to see the effectiveness of mat exercise and yoga with fit ball on Body Mass Index, abdominal obesity and quality of life in young overweight individuals.

Fourty participants were included in the study, participants were divided into two Groups. Group 1 participants were given mat exercises. Group 2 participants were given yoga with fitball. Pre and Post intervention outcome measure were evaluated.

Outcome measures evaluated and analyzed are:

- Body mass index
- Abdominal skin fold thickness

- Waist-hip ratio
- WHOQOL-Brief score

Data of 40 patients were analyzed by using Statistical Package for Social Science version 29 (SPSS v.29) and Microsoft Excel 2021.

Firstly, the normality of the data was checked using Shapiro-wilk test of normality. Since most of the data was not normally distributed, so non parametric tests was used. Wilcoxon signed ranked test was applied for analysis of pre and post treatment outcome measures within group, while between group analyses was done using Mannwhitny test for all outcome measures. Level of significance set at p value <0.05.

Table 1: Gender Distribution of Participants in Both the Groups.

GENDER			
GROUPS		**FREQUENCY**	**PERCENT**
MAT EXERCISE	**F**	16	80.0
	M	4	20.0
YOGA WITH FITBALL-EXERCISE	**F**	15	75.0
	M	5	25.0

There is 16 Female and 4 Male in Group 1 mat exercise group and 15 Female and 5 male in Group 2 Yoga with fitball group.

Table 1 shows female predominance in both groups.

Table 2: Mean Age of Participants of Both the Groups.

GROUP	MEAN AGE (IN YEAR)
MAT EXERCISE	24.50±3.36
YOGA WITH FIT BALL	22.90±2.29

Table 3: Within Group Comparison

Out-come measures		Pre Mean±SD	Post Mean±SD	Z-Value	P-Value
BMI	**Group 1**	28.23±1.15	27.37±1.28	3.922	<0.001
	Group 2	28.10±1.22	27.05±1.18	3.922	<0.001
ASFT	**Group 1**	27.41±3.19	25.27±2.94	3.926	<0.001
	Group 2	26.80±169	24.43±1.84	3.927	<0.001
WHR	**Group 1**	0.80±0.03	0.79±0.04	3.199	<0.001
	Group 2	0.85±0.05	0.83±0.05	2.283	<0.001
WHQOL Physical	**Group 1**	73.75±8.13	95.53±7.23	3.933	<0.001
	Group 2	72.68±9.07	86.96±9.36	3.929	<0.001
WHQOL Psychological	**Group 1**	67.70±10.19	90.83±6.57	3.998	<0.001
	Group 2	63.96±8.47	80.41±9.18	3.829	<0.001
WHQOL Social-relationship	**Group 1**	77.92±23.46	90.00±20.87	3.322	<0.001
	Group 2	77.08±13.21	89.17±10.85	2.807	<0.001
WHQOL Environmental	**Group 1**	72.34±11.03	91.09±8.38	3.843	<0.001
	Group 2	65.78±8.45	81.56±11.19	3.746	<0.001

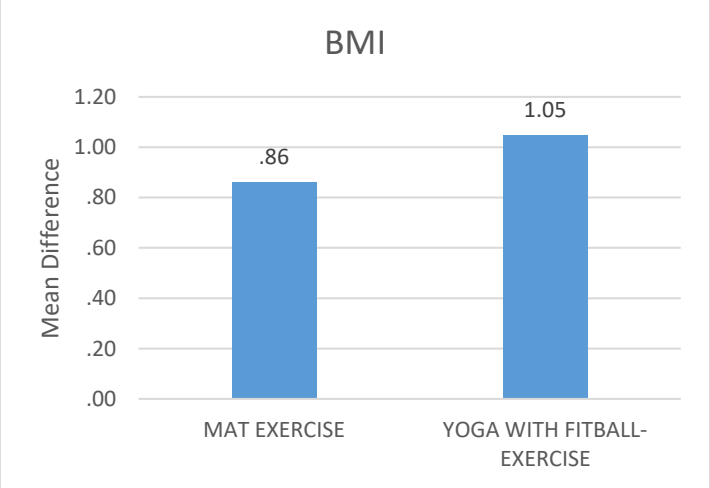
Table 3 shows significant difference in within group comparison of both the groups ($p< 0.05$).

Table 4: Between Group Comparison of Group 1 & 2

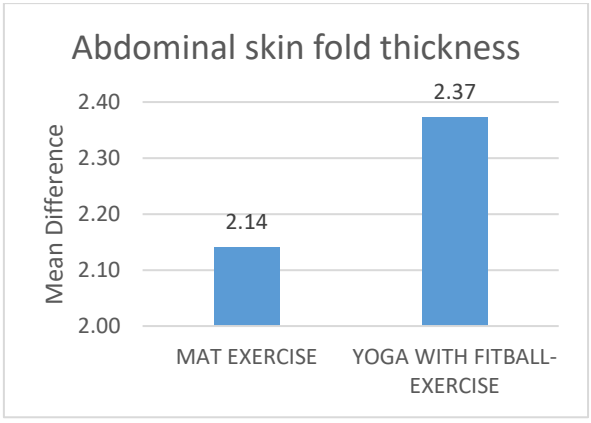
Out-come measures	Group 1 (MEAN±SD)	Group 2 (MEAN±SD)	U VALUE	P VALUE
BMI	0.86±0.33	1.05±0.33	146	0.149
ASFT	2.14±1.03	2.37±0.99	177	0.547
WHR	0.01±0.01	0.02±0.01	282	0.023
WHQOL Physical	21.79±6.65	14.29±7.14	82.5	0.001
WHQOL Psychological	23.12±5.97	16.46±10.85	101	0.007
WHQOL Social-relationship	12.08±9.55	12.08±14.93	192.5	0.841
WHQOL Environmental	18.75±7.31	15.78±10.75	149.5	0.174

Table 4 shows statistically significant difference in WHR, physical and psychological domains score ($p<0.05$). It is shows more improvement in mat exercise group.

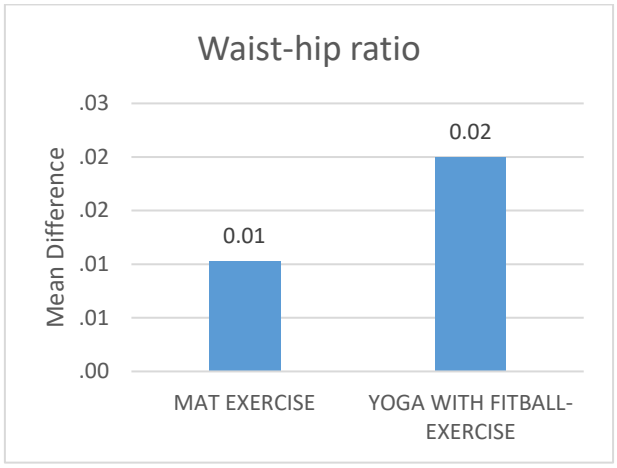
No statistically significant difference in BMI, ASFT, social relationship and environmental domains score between both the groups ($p>0.05$).



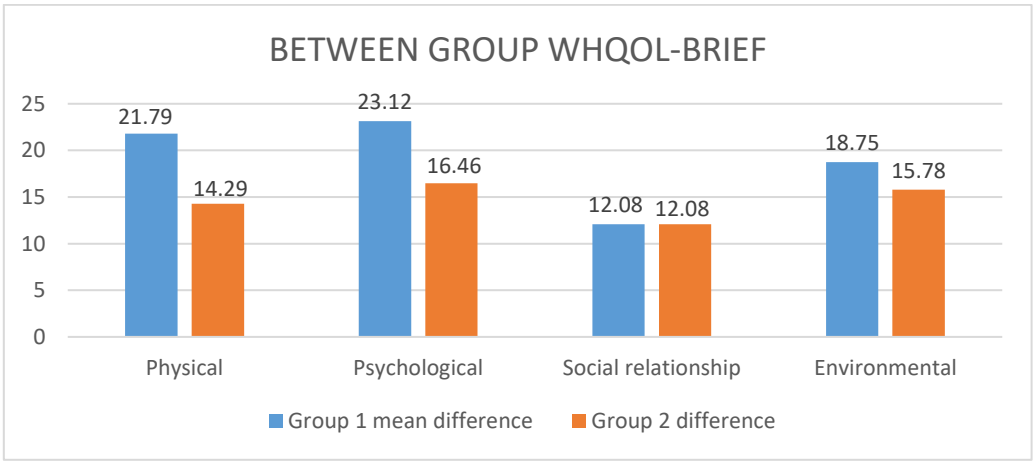
Graph 1: Shows Mean Difference of BMI Between Groups



Graph 2: Shows Mean Difference of Abdominal Skin Fold Thickness Between Groups



Graph 3: Shows Mean Difference of Waist-Hip Ratio Between Groups



Graph 4: Pre and Post Mean WHOQoL-Brief Score Between Groups

DISCUSSION

The present study was conducted to compare the effect of mat exercise and yoga with fitball on body mass index, abdominal skin fold thickness, waist-hip ratio, and quality of life in young overweight individuals. The study was conducted for 8 weeks, 3 days per week.

Obesity is a result of energy imbalance in the body, where the energy intake from food exceeds the energy

expenditure through physical activity. Maintaining a balance between energy intake and expenditure is essential to prevent the deposition of excess fat mass in the body. It is recommended to perform certain physical activities to expend excess amount of energy.[6]

Exercise therapy is one of the five cornerstones of treatment. As a non-medicinal method, exercise has the advantages of convenience, economy, good curative effect, and at the same time has a good impact on other body systems, etc. More and more attention has been paid. In addition, exercise therapy has obvious advantages in preventing obesity. Lot of information shows that, obesity is highly correlated with insufficient exercise.[7]

The result of present study showed that there was statistically significant improvement in Body mass index, abdominal skin fold thickness, waist-hip ratio and, quality of life in both the groups post intervention in within group analysis ($p<0.05$).

There was also statistically significant improvement in waist-hip ratio in yoga with fit ball group, WHQOL-Brief scale physical and psychological domains score post intervention in mat exercise group ($p<0.05$) in between group comparison. There is no statistically significant difference in BMI, abdominal akin fold thickness, WHOQOL-Brief scale social relationship and, environmental domains in between group analysis ($p>0.05$) which shows both the intervention are effective.

The present study showed statistically significant reduction in BMI and abdominal obesity, improvement in quality of life post intervention in mat exercise group.

Mat exercises helps in fat reduction by co-contraction of oblique and core muscles because strengthening of abdominal muscles and helps in tightening the waist line which improvises posture, and results in trimmer shape.[8]

Saran Godcil A. et al studied Effect of Plyometric Exercise Vs Mat Exercise in Reducing Abdominal Obesity in Young Coastal Population, which shows similar result to present study. After 6 weeks of intervention, result of study shows that MAT exercise is more effective when compared to Plyometric exercise. The study indicates that there was a significant difference within group in both BMI and waist hip ratio. This indicates the obese participant which perform the MAT exercise shows reduced BMI and waist hip ratio.[9]

The present study showed that there is significant reduction in BMI and abdominal obesity, improvement in quality of life post intervention Yoga with fitball group.

Yoga involves verity of physical activity, change of postures, repeated contractions, and relaxations of the abdominal muscles might be the cause of reduction of body fat.[10]

The decrease in body fat may be because the participants experienced an abnormal state of yoga exercise over some stretch of time, which produced a decrease in the body fat rate. Yoga includes profound nostril breathing, adaptability of limbs, and extension of various body parts, which may be the reason for the decrease in body fat of the volunteers performing yoga.[11]

According to anatomical and biomechanical properties, yoga with fit ball reflects to be core stabilizing exercise and balance exercise. The results indicated that yoga with fit ball can stimulate contraction of core stabilizing muscles, which provide strength and balance capacity, due to exercise on small base of support exercise with fit ball can improve oxygen use in building muscle power, and increase muscle strength ratio and endurance. Because the yoga training program with fit ball continuously allowed metabolic processes to burn fat cells in the overweight and obese women more efficiently.[6]

Marisa Poomiphak Na Nongkha et al has found the effects of Continuous Yoga on Body Composition in Obese Adolescents, which shows result similar to present study. In this study After 12 weeks of exercise

programme on 18-24 years age participants, study showed that significantly reduction in BMI and BFM in the yoga group.[12]

The result shows statistically significant improvement in waist-hip ratio in yoga with fit ball group, WHQOL-Brief scale physical and psychological domains score post intervention in mat exercise group ($p<0.05$) in between group comparison. There is no statistically significant difference in BMI, abdominal akin fold thickness, WHOQOL-Brief scale social relationship and, environmental domains in between group analysis ($p>0.05$) which shows both the intervention are effective.

Rashmi Yadav et al studied the effect of a Short-Term Yoga-Based Lifestyle Intervention on Health-Related Quality of Life in Overweight and Obese Subjects. The finding is coincide with our result. The study was done on overweight and obese individuals between the ages of 20-60 years. Result of this study showed that the overall quality of life and health improved after short-term yoga-based lifestyle intervention in overweight and obese persons. Physical, psychological and environmental domain scores significantly increased from baseline to day 10, and efficacy was noted in both male and female subgroups.[13]

There is increasing evidence indicating that physical exercise is positively associated with self-esteem and self-efficacy and these favorable traits can improve confidence and life satisfaction, thus contributing to higher QoL.[14]

The present study showed that there was no statistically significant difference in both the groups while comparing the mean difference of BMI, abdominal skin fold thickness.

Which suggested that both the interventions that is mat exercise and yoga with fitball are effective in reducing BMI, abdominal obesity and improving health related quality of life in young overweight individuals.

CONCLUSION

The result of present study has rejected H_0^1 to H_0^6. Hence it is concluded that 8 weeks intervention programme of mat exercise and yoga with fitball training both are equally effective in reducing BMI, and abdominal obesity and improving health related quality of life in young overweight individuals. Also study showed for between group comparisons that yoga with fit ball training was more effective than mat exercise in reducing waist-hip ratio. Mat exercise was more effective in improving physical and psychological domains of health related quality of life.

REFFERENCES

1. Ramachandran, C.J.Sivadharsini, Jibi Paul. Comparative study between mat, swiss ball and theraband exercises on reducing abdominal obesity among college going female students. IJMAES, Vol 6, 686-696, March 2020.
2. Reema Joshi, Chaitanyaa Wani, Vishnu Vardan G.D. et al. Effect of mat exercises and resistance band exercises on obesity among computer professionals –a comparative study. World Journal of Pharmaceutical Research Volume 6, Issue 7, 1222-1229, June 2017.
3. Rajeev Ahirwar, Prakash Ranjan Mondal. Prevalence of obesity in India: A systematic review. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 13 (2019).
4. Sunita Rani. Obesity and its control through yogic practices volume 4(1): 82-84, IJPESH 2017.
5. Yongjie Chen et al. The prevalence and increasing trends of overweight, general obesity, and abdominal obesity among Chinese adults: a repeated cross-sectional study. BMC public health : 15

October 2019.
6. Reema Joshi. Effect of mat exercises and resistance band exercises on obesity among computer professionals - a Comparative study world journal of pharmaceutical research, June 2017.
7. Arunya Buttichak et al. The effects of a yoga training program with fit ball on the physical fitness and body composition of overweight or obese women APST, April 2019.
8. Monika Chaudharya, b, and Priyanshu Sharmaa. Adominal obesity in India: analysis of the National Family Health Survey-5 (2019–2021) data articles May 2023.
9. Ningning Kong et al. Calisthenics exercises to intervene in obesity and diabetes in middle-aged people, 23 December 2021.
10. Reema joshi et al. Effect of mat exercises and resistance band exercises on obesity among computer professionals –a Comparative study WJPR, June 2017.
11. Saran Godcil A., Srinivasan M, Shanmugananth. Effect of Plyometric Exercise Vs Mat Exercise in Reducing Abdominal Obesity in Young Coastal Population Journal of costal life medicine, 23 December 2022
12. Shailee Vyas et al. A study to find out the effect of abdominal exercises in reduction of waist circumference in middle aged women 2022.
13. Marisa Poomiphak Na Nongkhai, Rodsarin Yamprasert, and Chuchard Punsawad. Effects of Continuous Yoga on Body Composition in Obese Adolescents.
14. Ali Ahmet Dogan et al. Investigation of the effects of 12-week Pilates exercise program on some performance tests and body composition International Journal of Curriculum and Instruction 15 February 2023.
15. Zorofi F, Hojjati Z, Elmiyeh A. Effect of yoga exercises on the body composition of fasting females. J Fasting Health 2013; 1:70-8.
16. Santosh Metgud, Charleen D'Silva, Anand Heggannavar. Effect of 30 days abdominals challenge versus 30 days Planks challenge on waist circumference and abdominal skin fold measurements in healthy young Individuals. A randomised control trial International Journal of Physiotherapy and Research, 2016, Vol 4(3):1524-29.