Effect of Zumba Exercise on Low Back Pain in Obese People: An Experimental Study

[1]Niharika Soni, MPT; [2]Hirva Patel, BPT; [3]Darshita Padsala, BPT; [4]Aashka Thakar, BPT; [5]Dr. Arvind Kumar, PhD

[1]Assistant Professor (Master of Neurological and Psychosomatic Disorders);
[2]Bachelor of Physiotherapy; [3]Bachelor of Physiotherapy; [4]Bachelor of Physiotherapy; [5]Principal and Professor (PhD Physiotherapy)

[1]Venus Institute of Physiotherapy – Swarrnim Startup & Innovation University, Gandhinagar, Gujarat
[2]Venus Institute of Physiotherapy – Swarrnim Startup & Innovation University, Gandhinagar, Gujarat
[3]Venus Institute of Physiotherapy – Swarrnim Startup & Innovation University, Gandhinagar, Gujarat
[4]Venus Institute of Physiotherapy – Swarrnim Startup & Innovation University, Gandhinagar, Gujarat
[5]Venus Institute of Physiotherapy – Swarrnim Startup & Innovation University, Gandhinagar, Gujarat

Abstract

Background
Physical inactivity is a commonly observed cause of increasing incidence of lifestyle diseases like obesity which has increased the incidence of low back pain. As dancing is a physical activity that can be tailored to fit a target population's age and culture therefore, Zumba is becoming a global dance fitness activity to reduce lifestyle disease epidemic. It has a mixture of popular entertaining music, different dance styles and aerobic exercises which improves the health of all age groups. Thus, physiological effects of Zumba can be used as adjuncts to conventional medicine for prevention of various lifestyle diseases e.g., diabetes and obesity. Zumba incorporates movement of large muscle groups for aerobic endurance, strength training and flexibility thereby contributing in reducing obesity and thus decreasing back pain in all ages, especially in the geriatric population. Various researchers have also recorded the positive effect of Zumba on weight, BMI, body fat mass. To summarize, these findings reflect that Zumba intervention can be explored further as a therapeutic tool in complementary and alternative medicine for improving low back pain in obese people.

Methodology
An experimental study with a pre-test/post-test design. 30 obese participants between the ages of 18 to 45 years with low back pain were included. We evaluated changes over time (pre-test to post- test) in all outcome measures. Paired t-tests were used to analyze pain and BMI.

Result
Statistically significant improvements were seen in the Pain ($p = 0.0000005$) and BMI ($p = 0.0000002$).

Conclusion
Conclusion the current finding strongly support that Zumba has health benefits and it reduces lower back pain in obese people.

Keywords
ZUMBA, Low back pain, Obesity, Life style disease.

INTRODUCTION

Low back pain is a symptom not a disease, and can result from several different known or unknown abnormalities or diseases. It is defined by the location of pain, typically between the lower rib margins and the buttock creases. It is commonly accompanied by pain in one or both legs and some people with low back pain have associated neurological symptoms in the lower limbs. For nearly all people presenting with low back pain, the specific nociceptive source cannot be identified and those affected are then classified as having so-called non-specific low back pain. People with low back pain often have concurrent pain in other body sites, and more general physical and mental health problems, when compared with people not reporting low

back pain. The combined effect on individuals of low back pain and co-morbidity is often more than the effect of the low back pain or the co-morbidity alone and results in more care, yet typically a poorer response to arrange of treatments.[1]

Obesity is one of the co morbidity which has been associated with low back pain. Obesity is defined by waist circumference was associated with increased incidence of radiating low back pain after adjustment for age, gender, educational status, occupational status, and smoking status.[2] Scientifically, obesity is caused by consuming more calories than needed by the body, they are not burnt through physical activity / exercise. One of the diseases of inactivity is obesity or overweight. Lack of physical work such as sitting for long periods will give a negative effect on health and can lead to obesity, therefore Physical exercise is vital for a healthy life and has several positive influences on the body.[3] Despite this evidence, many clinicians consider obesity to be a self-inflicted condition of little medical significance. It is thus important to focus on obesity which can decrease the incidence of low back pain immensely.[4]

In an effort to reduce rates of obesity Zumba Exercise has deliberately chosen, for reasons that it can be made in the form of weight-bearing exercise program that is homogeneous in an attempt to lose weight by exercise in the right dose. Lately, Zumba dance workout has been highly in demand by the women and young mothers, as it is evident from the increasing amount of participation in gym. In such case, it appears that high moving motivation overtake fatigue and directly influence the reduction of body fat.[3]

Zumba can be used as a physical activity which provides a large calorie burn through aerobic activities done with interval training. The average person will burn around 600 to 1,000calories in a single Zumba class. It Burn an excessive amount of calorie in compared to cardio workout and improves coordination as it is needed when you grow old. It is a full body workout besides this it help you reach your target heart rate, 145 beats per minute which can help in increasing the cardiovascular endurance.[5]

This study is necessary because the prevalence of low back pain is very high in obese people and this study will help to find the effectiveness of Zumba exercise in low back pain in obese people.

METHODOLOGY

Study Design: Experimental Study

Study setting: Community

Sampling Method: Convenient Sampling

Sample size: 30

Inclusion criteria:

- Age- 18 to 45years
- BMI- 30 or higher
- Low Back Pain

Exclusion criteria:

- Age- Below 18 years and above 45 years.
- People with active lifestyle.
- People suffering from cardiovascular, neurological and musculoskeletal conditions.

Outcome Measure:

- Numeric Pain Rating Scale (NPRS).
- Modified Oswestry low back pain disability questionnaire (MODQ)
- Body Mass Index (BMI)

Procedure:

Identification of subjects were done according to the inclusion criteria. Each of them was explained about the study and its benefits and written consent was obtained from each individual. Subjects who fulfilled inclusion and exclusion criteria along with BMI scoring were recruited and assigned into group: **Zumba Exercise group**. Each individual's weight, pain and disability level i.e. BMI, NPRS and MODQ score were taken Pre and Post Intervention.

Exercise group:

30 subjects were taken into the group for 4 weeks, each session was of 45minutes.

The Zumba Exercise schedule consists of:

a) Warm-up session- 5-10minutes

• Upper limb stretching

• Lower limb stretching

• Trunk stretching

**b) Zumba exercise - 30minutes**

c) Cool-down - 10minutes

• Slowly decrease the intensity of exercise

• Stretching

DATA ANALYSIS

Data were analysed using SPSS statistical software using an intention-to-treat approach. Prior to all hypothesis testing, independent sample t-tests were conducted to examine whether significant mean differences existed in demographic, MODQ, BMI, NPRS scale variables among the group at baseline. We examined whether outcomes changed differentially from baseline to post intervention.
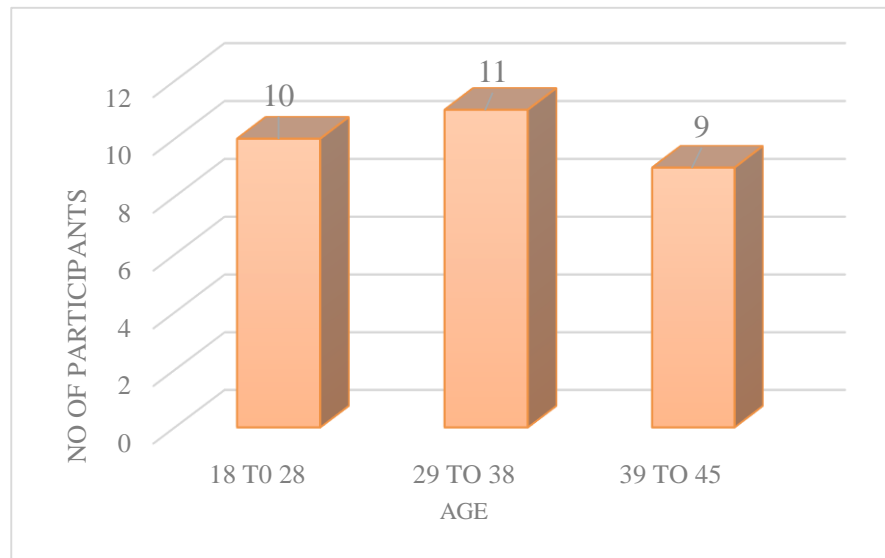
RESULT:

Demographic Profile:

1.   GENDER DISTRIBUTION:

There were total 30 participants among which 17 were females and 13 were males.
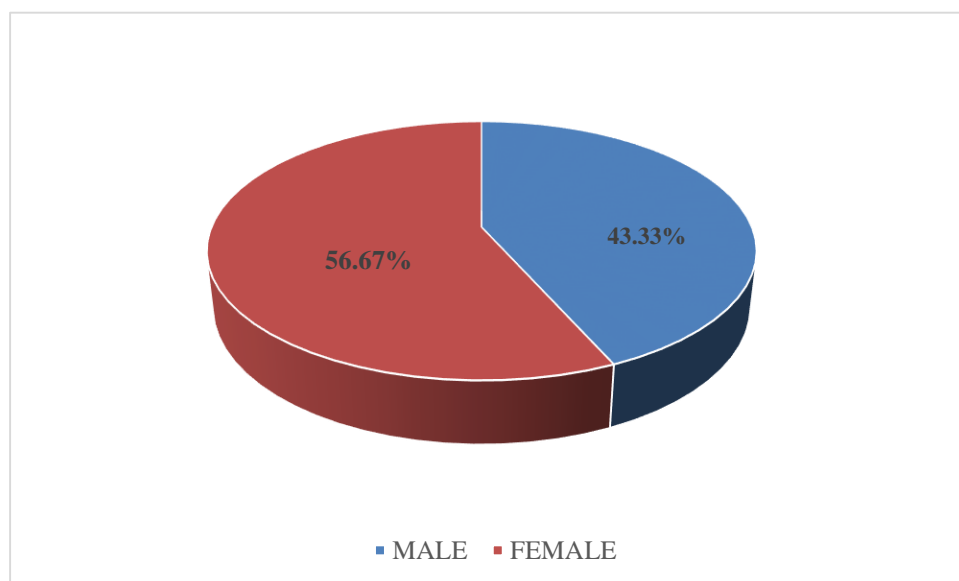
GRAPH 1: GENDER DISTRIBUTION

2.   AGE DISTRIBUTION:

MEASURES	MEAN
GROUP	32

TABLE No. 1: Mean of Age Distribution within group

GRAPH 2: AGE DISTRIBUTION

The above given age chart depicts the information about the number of participants taken in different age groups. It is apparent that the highest participant are in the age group of 29 to 38 which is 11, whereas in the age group of 18 to 28 there are 10 participants. In the age group of 39 to 45 there are 9 participants which is the lowest among all.

Clinical Parameters:

3.   **BMI:**

MEASURES	BMI		DIFFERENCE	T-VALUE	P-VALUE
	PRE	**POST**			
GROUP (comparison within group)	32.70±2.86	31.65±2.39	1.05	0.00000000421308	< 0.01

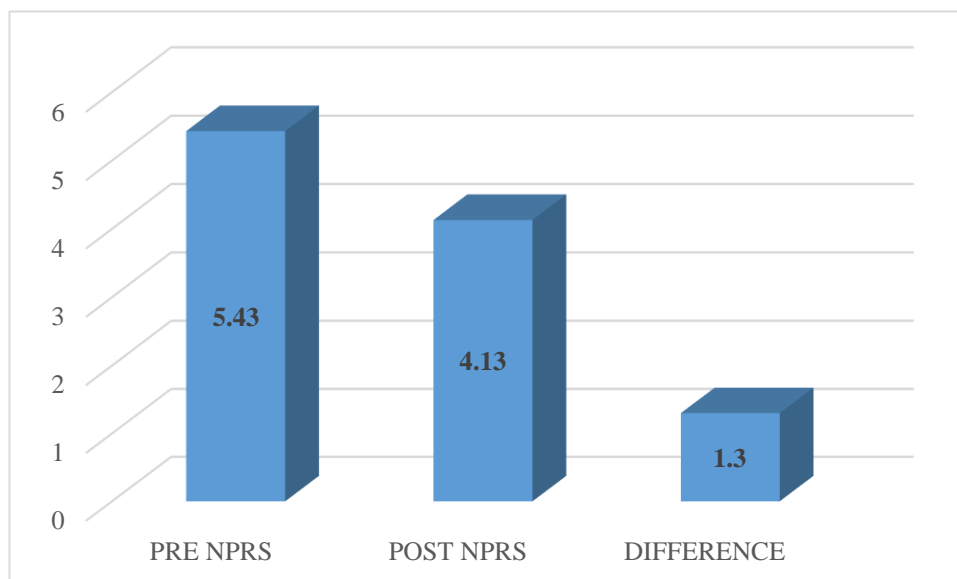**TABLE No. 2: Comparison of within Groups for BMI**
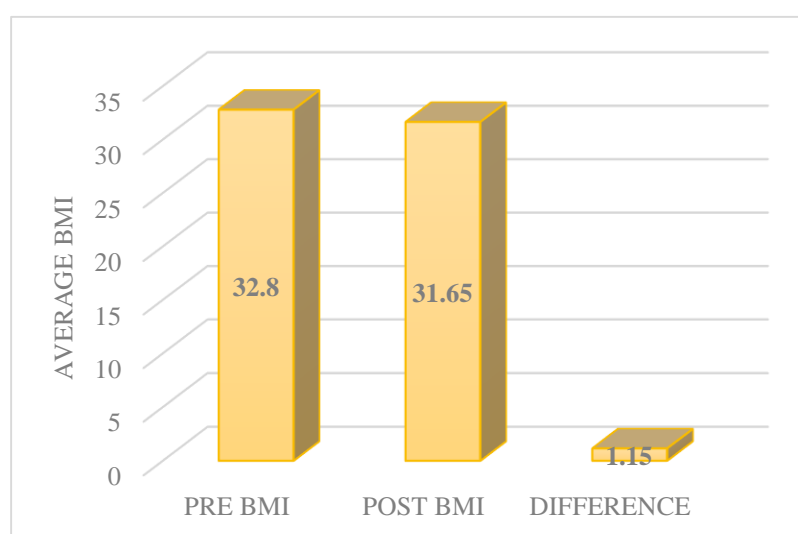
GRAPH 3: Comparison of within Groups for BMI

The above given graph shows the comparison of BMI within the groups. The average BMI were taken before the treatment and it seemed to be 32.8, whereas when the post BMI were taken it had decreased up to 31.65, hence the difference between both turns out to be 1.05.

4.   NPRS (NUMERIC PAIN RATING SCALE)

MEASURES	NPRS (NUMARIC PAIN RATING SCALE)		DIFFERENCE	T-VALUE	P-VALUE
GROUP (comparison within group)	PRE	POST	1.3	0.00000000421308	< 0.01
	5.43	4.13			

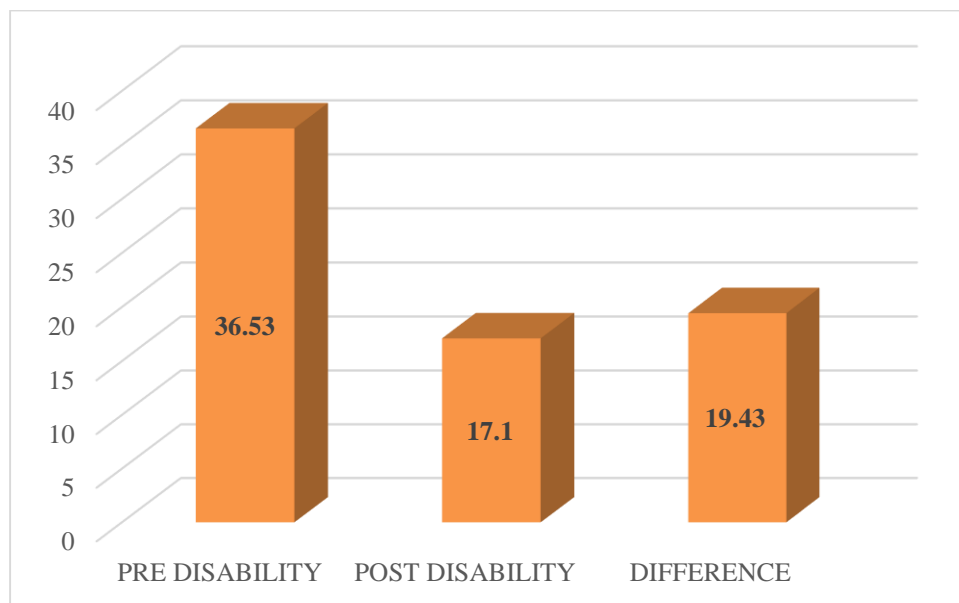TABLE No. 3: Comparison of within Groups for NPRS (NUMERIC PAIN RATING SCALE)

GRAPH 4: Comparison of within Groups for NPRS (NUMERIC PAIN RATING SCALE)

The above given chart shows the comparison of NPRS between the pre and post group. The pre NPRS was noted to be 5.43, however the post NPRS which was taken after the treatment was up to 4.13, hence the difference was noted to be 1.3.

5. MODIFIED OSWESTRY LOW BACK PAIN DISABILITY QUESTIONNAIRE (MODQ).

MEASURES	MODQ		DIFFERENCE	T-VALUE	P-VALUE
GROUP	PRE 36.53	POST 17.1	19.43	0.0000000000000589	< 0.01

TABLE No. 4: Comparison of within Groups for MODQ

GRAPH 5: Comparison of within Groups for MODQ.

The above given disability chart illustrates comparison of MODQ within the groups. The number of disability points seem to be high in pre-treatment part which is 36.53, nevertheless after the treatment a drastic change was noted and it dropped at 17.1 in the post phase of treatment, hence the difference seems to be 19.43.

DISCUSSION

The results of the study support the use of effectiveness of Zumba among obese people in low back pain. The findings obtained suggest that 4 weeks of Zumba exercise (five, forty five minute sessions a week) shows significant differences in Disability, Pain, and BMI on Obese individual.

Excessive body weight is directly related to several conditions of the spine, including the number of lumbar discs with degeneration, progression of disc disease, increased likelihood of radicular pain and neurologic symptoms and a higher prevalence of lumbar facet osteoarthritis. There are known postural changes with obesity that are likely contributing factors to an increase in mechanical load to the spine that include:

•   A more flexed trunk posture leading to a decrease in flexion motion of the thoracic and thoracolumbar segments.

•   An increased lordosis and decreased lateral bending of the lumbar spine.

•   An increased hip joint movement.

•   An increased anterior pelvic tilt.

•   An increased hip-to-bench ratio for table-top work activities (a person has to stand further back from the table due to the size of the abdomen and reach farther forward). This limited spinal mobility has a negative impact on disc nutrition by limiting fluid movement and rehydration. The discs and facet joints are also affected directly by increased inflammatory responses generated by the adipose cells in the form of cytokines and acute-phase reactants.[6]

Despite these proposed and known theories of the effects of obesity on the spine, the role of obesity in directly causing LBP is still being confirmed. A review by Leboeuf-Yde of 56 research studies between 1965 and 1997 led to a conclusion that increased body weight may be a possible weak risk factor for LBP, but there were insufficient data to link it as a clear causative factor.[7]

Snow et al. randomized 54 obese patients (mean BMI 42.6 kg/m2) with musculoskeletal pain as measured by VAS (0–10 points) >5 to a physical therapy treatment program versus control group prior to a weight-loss program. The group receiving physical therapy experienced a significant reduction in VAS to 2.3 with the weight-loss program.[8]

The most recent study of nonsurgical weight loss in 46 adults with LBP and a mean BMI of 44.7 kg/m2 used a 52-week multidisciplinary program. This program included liquid meal replacements for 12 weeks (phase 1) followed by supervised caloric restriction from weeks 13–52 (phase 2). Study participants went to weekly educational meetings and group therapy sessions for the first 26 weeks, and monthly group meetings for the Second 26 weeks. During the second 26 weeks, they also participated in 60–90 min of physical activity. Over the year-long study, mean BMI was reduced to 39.6 kg/m2 (mean decrease of 5.1 kg/m2 [11.4%]) and ODI improved significantly from 31.9 to 27.1, and Numerical Pain Score (NPS) showed improvement (3.3 at baseline; 2.6 at 1 year). Weight, BMI, NPS and ODI all showed the most improvement during the initial 13 weeks of liquid meal replacements, and as the mean weight and BMI decreased, the NPS and ODI scores also decreased.[9]

Many health-associated problems are caused by the increased body fat mass and overweight. Given the global prevalence of overweight, using an accurate method is necessary to decrease overweight. Although Zumba is currently used to lose weight, this type of sport is rarely addressed in practical research as a weight loss method. Thus through this study it can be said that Zumba can be used as a conservative management to reduce weight which significantly decreases low back pain and Disability.

CONCLUSION

The current findings strongly support that Zumba exercise benefits the people having low back pain and who are suffering from obesity.

LIMITATIONS

- Small sample size.
- Limited age group of 18-45 years.
- The self-selection and convenience sampling of participants to complete the study may also influence on the result.

FUTURE RECOMMENDATIONS

- Future research should replicate these findings in other large samples, take larger age groups
- Investigate relationship between Pain and Obesity.

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