

EFFECT OF MUSCULAR FITNESS TRAINING ZUMBA DANCE TRAINING AND HATHA YOGA TRAINING ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES OF DEAF AND DUMB COMMUNITY

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Abstract

The study was designed to know about the importance of effect of muscular fitness training, Zumba Dance training and hatha yoga training on selected physical and physiological variables of deaf and dumb students. In ordertoachieve the study,60deaf and dumb students were selected fromCoimbatore,theiragerangedbetween18and24years.The selectedpopulation weredividedintotwoequalgroupsconsistof15each.ThegroupI(n=15)wasgivenmuscular fitness training, group II (n=15) was given zumba training, group III (n=15) hatha yoga training and groupIV(n=15) was consideredas controlgroup.Theinvestigators didnotmadeanyattempt toequatethegroup. Thecontrolgroup wasnot givenanytreatment andtheexperimentalgroupwasgivenrespective trainingforthree daysperweek,fora period oftwele weeks. Flexibility was assessed by sit and reach test and unit of measurement was in centimeters and resting pulse rate was assessed by Radial Artery Palpation Methodand unit of measurement was Beats Per Minute.

Thecollected data on selected physical and physiological variables

was analyzed by using 't' test, one way analysis and ANACOVA at 0.05 level of confidence. The result of the present study explored that the flexibility and resting pulse rate significantly improved due to the muscular fitness training, zumba training and hatha yoga training of deaf and dumb students.

Key words:-Muscular fitness training, Zumba Dance training and Hatha yoga Training deaf and dumb students, flexibility and Resting pulse rate.

Introduction

Strength training can be resulted in hypertrophy of the muscle, partly through an enlargement of muscle fibers. In addition, training with high resistance can change the fiber type distribution in the direction of faster twitch fibers. There is also neuromotor effect of strength training and part of the increase in muscle strength can be attributed to changes in the nervous system. Improvements in muscular strength training isolated movements seem closely related to training speeds. Most athletic activities involve far faster movements and far higher power outputs than are found in maximal strength exercises. An athlete can be exceptionally strong but lack significant explosive power if they are unable to apply their strength rapidly. Strength is the ability of the body, or a part of the body, to apply or withstand force. The development of strength relies on resistance training and involves exercising at various loads, modes, speeds, angles and frequencies. The combination of these variables dictates the outcome of the resistance programme.

Strength is required for power production, stabilizing a joint, supporting arms and legs (core stability), avoiding injury, and coping with contact. The resistance used during strength training can be one's bodyweight, bodyweight plus a weighted vest, barbells and dumbbells with light, medium or heavy loads, medicine balls or an unstable surface such as a wobble board or Swiss ball. The unstable surface creates resistance for the body to work against. Strength is the neuromuscular capability to overcome an external and internal resistance. The maximum strength that an athlete can produce depends on the

contraction of the muscles involved. In addition, the maximum strength is also a function of the intensity of an impulse (Bompa, 1999).

Most sports require power, muscular endurance or both. The level of maximum strength affects both power and muscular endurance. Power cannot reach high standards without a high level of maximum strength because power is the product of speed and maximum strength. Strength and power are the most critical for many sports. All team sports and speed-power dominant sports rely on solid strength and power development. Understanding the mechanics and physics of strength training and incorporating those principles into our training program will give our athletes a competitive edge (Ibid).

Zumba is the world's largest and most popular dance fitness program (Zumba fitness, 2013). It is valued 9th on the American Council of Exercise Fitness Trends to watch in (Thompson, 2011) and it is currently used by fourteen million people in 185 countries worldwide (Zumba fitness, 2013). Zumba has no set rules and it is naturally an enjoyable workout where the movement of the body matches the rhythm of the music, allowing a structured style of exercise class hence the idiom 'ditch the workout, join the party'. The difference between zumba and the other aerobic dance programs is that in zumba, the repetition is not counted over the music but an individual is encouraged to enjoy the music and move to the beat. Therefore, it is geared at having fun whereas working to achieve improved cardiovascular fitness, muscular endurance, balance and coordination. A study has been carried out on the potential benefits of zumba (Luettgen *et al.*, 2011, Otto *et al.*, 2011). Zumba is used not only to reduce obesity and maintain fitness level, it is used as a total body workout to improve core strength and endurance. Group fitness exercise represents the form of programmed physical activity to improve health and change in body shape. The zumba fitness is a new kind of dance workout, inspired by Latin American music and Latin American dance. The

exercise combines the basics of dance like Salsa, samba, cumbia and other Latin American dances and use basic and advanced aerobic steps, but also enrich their composition of other dance like hip-hop, belly dancing, Indian, African dance, etc. The key concept of zumba that makes it so effective is its combination of aerobic exercise and resistance training. The fluctuation from the controlled movements to rapid, high-intensity cardiovascular exercise keeps your metabolism in high gear for an hour which improves cardiovascular endurance. Zumba routines incorporate interval training, alternating fast and slow rhythms and resistance training. A week of vigorous aerobic activity recommended for most healthy adults by the Department of Health and Human Services.

Hatha yoga called as yoga of forceful exertion. A few Hatha yoga texts replicate Patanjali's classical Astanga yoga, but there are numerous other classifications. Gheranda Samhita tells seven fold path of purification. While Hatha Yoga Pradipika describes yoga as a four steps path. Goraksha Samhita and several other Tantric texts showed that Hatha yoga can be referred as six-limbed path as a means to distinguish it from eight-limbed yoga of Yoga Sutra of Patanjali. The major difference between Patanjali Yoga Sutra and Hatha yoga is the absence of Yama and Niyama. According to Yogi Ramacharaka (1905) it is the branch of Philosophy that deals with the physical body – its care, wellbeing, health, strength and all that tends to keep it in its natural and normal state of life. Another important feature in Hatha yoga is addition of 'Shatkarma' or yogic cleansing process for the cleansing of human system for higher practices.

The oldest text about Hatha yoga is Hatha Yoga Pradipika (HYP) written by Swami Swatmarama about 15th century CE. It is written in HYP (I/1) that Adinatha or Bhagaban Shiv is the expounder of knowledge of Hatha yoga which is like a staircase to the Rajyog. Later different authors described the meaning of Hatha in different ways in their respective books. But according to Yog Shikhopanishad 'Ha' means Sun and 'Tha' means Moon. So merging of Sun and Moon is called 'Hatha'. According to HYP the method of sadhana for

practiced to - i) keep one healthy and free from diseases; ii) to prepare for Rajyog and iii) to build body.

Experimental Approach to the Problem

In order to address the hypothesis presented herein, 60 deaf and dumb students were selected from coimbatore district. The subjects were randomly assigned in to four equal groups, namely, muscular fitness training group, Zumba training group, hatha yoga training group and control group. The respective trainings were given to the experimental group the 3 days per week (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine.

DESIGN

The evaluated physical fitness parameters were Flexibility was assessed by sit and reach test and unit of measurement was in centimeters and resting pulse rate was assessed by Radial Artery Palpation Method and unit of measurement was Beats per Minute. The variables were measured at baseline after 12 weeks of training program were examined.

TRAINING PROGRAMME

The training programme was lasted for 60 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 60 minutes included 10 minutes warm up, 40 minutes for respective exercises and 10 minutes warm down. The equivalent in core muscle exercises and training is the length of the time each action is held for and the number action in total 3 day per weeks (Monday, Wednesday and Friday). The selected subjects underwent regular physical exercise on other 3 days (Tuesday, Thursday, and Saturday).

STATISTICAL ANALYSIS

The collected data on above said variables due to all groups were statistically analyzed with using 't' test, one way analysis and ANACOVA at 0.05 level of confidence to find out the significant Improvement between pre and posttest. In all cases the criterion for statistical significance was set at 0.05 level of confidence. ($P < 0.05$).

TABLE 1

Computation of 't' ratio of Muscular fitness training group (MSTG), Zumba training group (ZTT), Hatha yoga training group (HYTG) and Control group (CG) on Flexibility (Measurement in Centimeter)

Groups	Pre-test Mean	Post-test Mean	Mean Difference	Std. Error Dm	't'-Ratio
MSTG	24.13	27.00	2.86	0.95	3.01*
ZTG	24.33	28.26	3.93	0.65	6.04*
HYTG	25.00	30.60	5.60	0.45	12.72*
CG	25.46	25.73	0.26	0.20	1.29

*Significant at 0.05 level for the degrees of freedom 1 and 14, 2.14

Table 1 shows that the 't' ratios on flexibility of muscular fitness Training Group (MSTG), Zumba Training Group (ZTT), Hatha yoga Training Group (HYTG) and Control Group (CG) on Flexibility were 3.01, 6.04 and 12.72 respectively. Since, these values were higher than the required table value of 2.14, it was found to be statistically significant at 0.05 level of confidence for the degrees of freedom 1 and 14. Further, the obtained 't' ratio of 1.29 between pre-test and post-test of control group (CG) was lesser than the required table value of 2.14 and hence found to be statistically insignificant.

From the result it was inferred that, all the three zumba training group (ZTG), plyometric circuit training group (PCT), combined zumba and plyometric circuit training group (CZPCT) produced a significant improvement in the flexibility of deaf and dumb students.

TABLE 2

Analysis of covariance on pre-test, post-test and adjusted post means of Muscular fitness training group (MSTG), Zumba training group (ZTT), Hatha yoga training group (HYTG) and Control group (CG) on flexibility

Test	MSTG Group	ZTG Group	HYTG Group	CG Group	Source of Variance	Sum of Squares	Df	Mean Square	'F' ratio
Pre-test Mean	24.13	24.33	25.00	25.46	B/G	5.73	3	1.91	0.29
					W/G	359.86	56	6.42	
Post-test Mean	27.00	28.26	30.60	25.73	B/G	122.18	3	40.72	5.02*
					W/G	454.80	56	8.12	
Adjusted Post-test Mean	27.50	28.60	31.37	25.12	B/G	113.47	3	37.82	50.2*
					W/G	41.48	55	0.75	

Table 2 shows the results of ANCOVA for Pre-test scores, post-test and adjusted post test scores of MSTG, ZTG, HYTG and CG group on flexibility.

The obtained 'F' ratio for the pre-test was 0.29. It was found to be lesser than the required table value of 2.76 for the degrees of freedom 3 and 56. Hence, it was inferred that the mean difference among four groups at pre-test on flexibility was statistically insignificant at 0.05 level of confidence.

The 'F' ratio was applied to test the significance of mean differences among the MSTG, ZTG, HYTG and CG group on flexibility. The obtained 'F' ratio for the post-test was 5.02. The 'F' ratio needed for the significant differences on the mean, for degrees of freedom 3 and 56 was 2.76 at 0.05 level of confidence. Since the observed 'F' ratio on this variable was higher than the required table value needed for significance, it was inferred that the mean differences among four groups at post-test of flexibility was statistically significant.

The 'F' ratio was applied to test the significance of mean differences among the MSTG, ZTG, HYTG and CG group on flexibility. The obtained 'F' ratio was 50.2. Since the observed 'F' ratio was higher than the required table value of 2.77 for degrees of freedom 3 and 55 at 0.05 level of confidence, it was concluded that the performance of flexibility was significantly influenced by the treatments used in this study.

TABLE 3

Scheffe's test for the differences between the adjusted means of MFTG, ZTG, HYTG and CG on Flexibility

MSTG Group		ZCT Group	HYTG Group	CG Group	M D	CI
27.50		28.60	-----	-----	1.1	0.90
27.50		-----	31.37	-----	3.87	
27.50		-----	-----	25.12	2.38	
-----		28.60	31.37	-----	2.77	
-----		28.60	-----	25.12	3.48	
-----		-----	31.37	25.12	6.25	

*Significant at 0.05 level of confidence

Table 3 shows The absolute mean differences between the muscular fitness training group (MFTG) with Zumba training group (ZTG) was 1.1, the muscular fitness training group (MFTG) with Hatha Yoga Training Group (HYTG) was 3.87, muscular fitness training group (MFTG) with control group (CG) was 2.38, Zumba training group (ZTG) with Hatha Yoga Training Group (HYTG) was 2.77, Zumba training group (ZTG) with control group (CG) 3.48, Hatha Yoga Training Group (HYTG) and control group were (CG) 6.25 respectively. Since the value of mean difference was higher than the critical value of 0.90. Hence, it was found to be statistically significant at 0.05 level of confidence.

From the result it was inferred that 12 weeks of Hatha Yoga Training Group (HYTG) program had improved flexibility more significantly than the muscular fitness training group (MFTG), Zumba training group (ZTG) and control group (CG).

From these results it was inferred that Zumba training group (ZTG) had showed better improvement when compared with muscular fitness training group (MFTG). Also the muscular fitness training group (MFTG) had a significant improvement when compared with control group (CG).

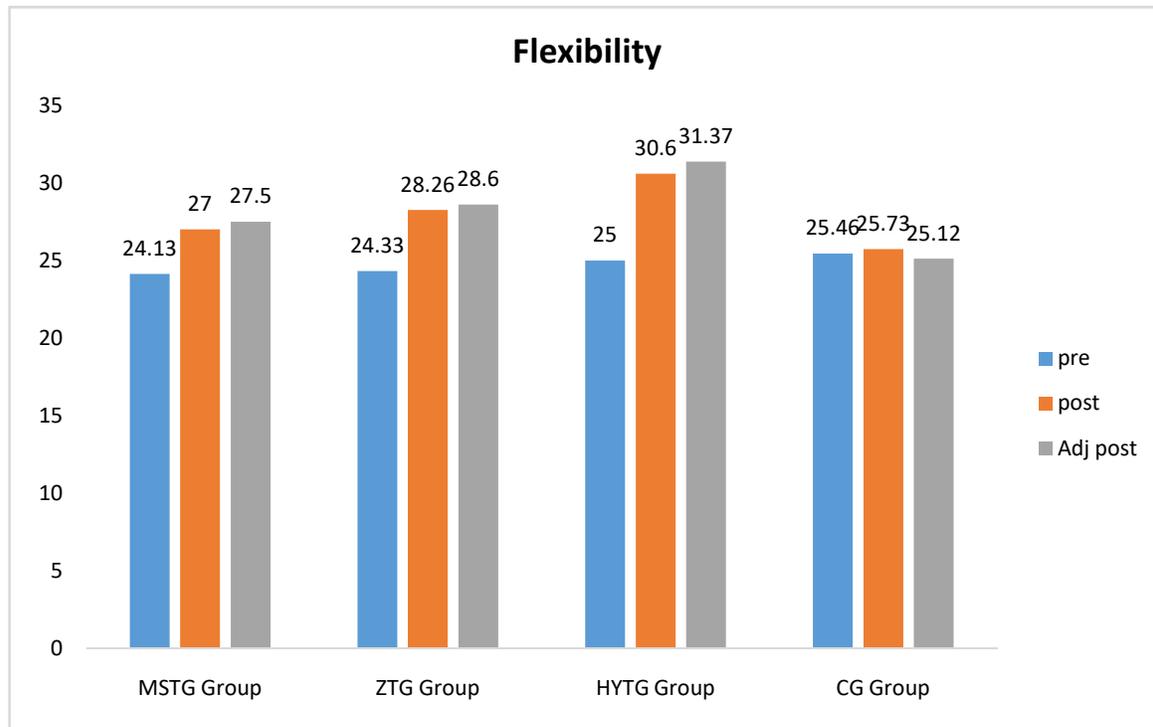


FIGURE- I

BAR DIAGRAM SHOWING THE MEAN VALUE ON FLEXIBILITY OF DEAF AND DUMB STUDENTS ON MUSCULAR FITNESS TRAINING, ZUMBA DANCE TRAINING, HATHA YOGA TRAINING AND CONTROL GROUP

Table 4

Computation of 't' Ratio of muscular fitness Training Group (MSTG), Zumba Training Group (ZTT), Hatha yoga Training Group (HYTG) and Control Group (CG) on Resting pulse rate (Measurement in Beats per Min)

Groups	Pre-test Mean	Post-test Mean	Mean Difference	Std. Error Dm	't'-Ratio
MSTG	73.00	71.06	1.94	0.34	5.79*
ZTG	72.93	70.46	2.47	0.29	8.88*
HYTG	73.00	68.80	4.2	0.22	18.87*
CG	73.6	73.4	0.2	0.15	2.09

*Significant at 0.05 level for the degrees of freedom 1 and 14, 2.14

Table-4. show that the 't' ratios on resting pulse rate of muscular fitness Training Group (MSTG), Zumba Training Group (ZTG), Hatha yoga Training Group (HYTG) and those were 5.79, 8.88 and 18.87 respectively. Since, these values were higher than the required table value of 2.14, it was found to be statistically significant at 0.05 level of confidence for the degrees of freedom 1 and 14. Further, the obtained 't' ratio of 2.09 between pre-test and post-test of control group (CG) was lesser than the required table value of 2.14 and hence found to be statistically insignificant.

From the result it was inferred that, all the three muscular fitness Training Group (MSTG), Zumba Training Group (ZTG), Hatha yoga Training Group (HYTG) produced a significant improvement in the resting pulse rate of deaf and dumb students.

Table 5
Analysis of covariance on pre-test, post-test and adjusted post means of Muscular fitness training group (MFTG), Zumba training group (ZTT), Hatha yoga training group (HYTG) and Control group (CG) on Resting Pulse Rate

Test	MST Group	ZTG Group	HYTG Group	CG Group	Source of Variance	Sum of Squares	Df	Mean Square	'F' ratio
Pre-test Mean	73.00	72.93	73.00	73.6	B/G	0.13	3	0.04	.084
					W/G	179.86	56	3.21	
Post-test Mean	71.06	70.46	68.8	73.4	B/G	160.31	3	53.43	15.06*
					W/G	198.66	56	3.54	
Adjusted Post-test Mean	71.53	71.06	68.80	73.33	B/G	156.72	3	52.24	84.35*
					W/G	34.06	55	0.61	

*Significant at 0.05 level of confidence

Table 5 shows the result of ANCOVA for Pre-test scores, post-test and adjusted post-test scores of MSTG, ZTG, HYTG and CG group on resting pulse rate.

The obtained 'F' ratio for the pre-test was .084. It was found to be lesser than the required table value of 2.76 for the degrees of freedom 3 and 56. Hence, it was inferred that the mean difference among four groups at Pre-test on resting pulse rate was statistically insignificant at 0.05 level of confidence.

The 'F' ratio was applied to test the significance of mean differences among the MSTG, ZTG, HYTG and CG group on resting pulse rate. The obtained 'F' ratio for the post-test was 15.06. The 'F' ratio needed for the significant differences on the mean, for degrees of freedom 3 and 56 was 2.76 at 0.05 level of confidence. Since the observed 'F' ratio on this variable was higher than the required table value needed for significance, it was inferred that the mean differences among four groups at post-test of resting pulse rate was statistically significant.

The 'F' ratio was applied to test the significance of mean differences among the MSTG, ZTG, HYTG and CG group on resting pulse rate. The obtained 'F' ratio was 84.35. Since the observed 'F' ratio was higher than the required table value of 2.77 for degrees of freedom 3 and 55 at 0.05 level of confidence, it was concluded that the performance of resting pulse rate was significantly influenced by the treatments used in this study.

Table 6

Scheffe's Test for the Differences between the Adjusted Means of MSTG, ZTG, HYTG and CG on Resting Pulse Rate

MSG	ZTG	HYTG	CG	MD	CI
71.53	71.06	-----	-----	0.47	1.16
71.53	-----	68.80	-----	2.73	
71.53	-----	-----	73.33	1.80	
-----	71.06	68.80	-----	2.26	
-----	71.06	-----	73.33	2.27	
-----	-----	68.80	73.33	4.53	

*Significant at 0.05 level of confidence

Table 6 shows The absolute mean differences between the muscular fitness training group (MSTG) with Zumba training group (ZTG) was 0.47, the muscular fitness training group (MSTG) with Hatha Yoga Training Group (HYTG) was 2.73, muscular fitness training group (MSTG) with control group (CG) was 1.80, Zumba training group (ZTG) with Hatha Yoga Training Group (HYTG) was 2.26, Zumba training group (ZTG) with control group (CG) 2.27, Hatha Yoga Training Group (HYTG) and control group were (CG) 4.53 respectively.

Since the value of mean difference was higher than the critical value of 1.16. Hence, it was found to be statistically significant at 0.05 level of confidence.

From the result it was inferred that 12 weeks of Hatha Yoga Training Group (HYTG) program had improved flexibility more significantly than the muscular fitness training group (MSTG), Zumba training group (ZTG) and control group (CG).

From these results it was inferred that Zumba training group (ZTG) had showed better improvement when compared with muscular fitness training group (MSTG). Also the muscular fitness training group (MSTG) had a significant improvement when compared with control group (CG).

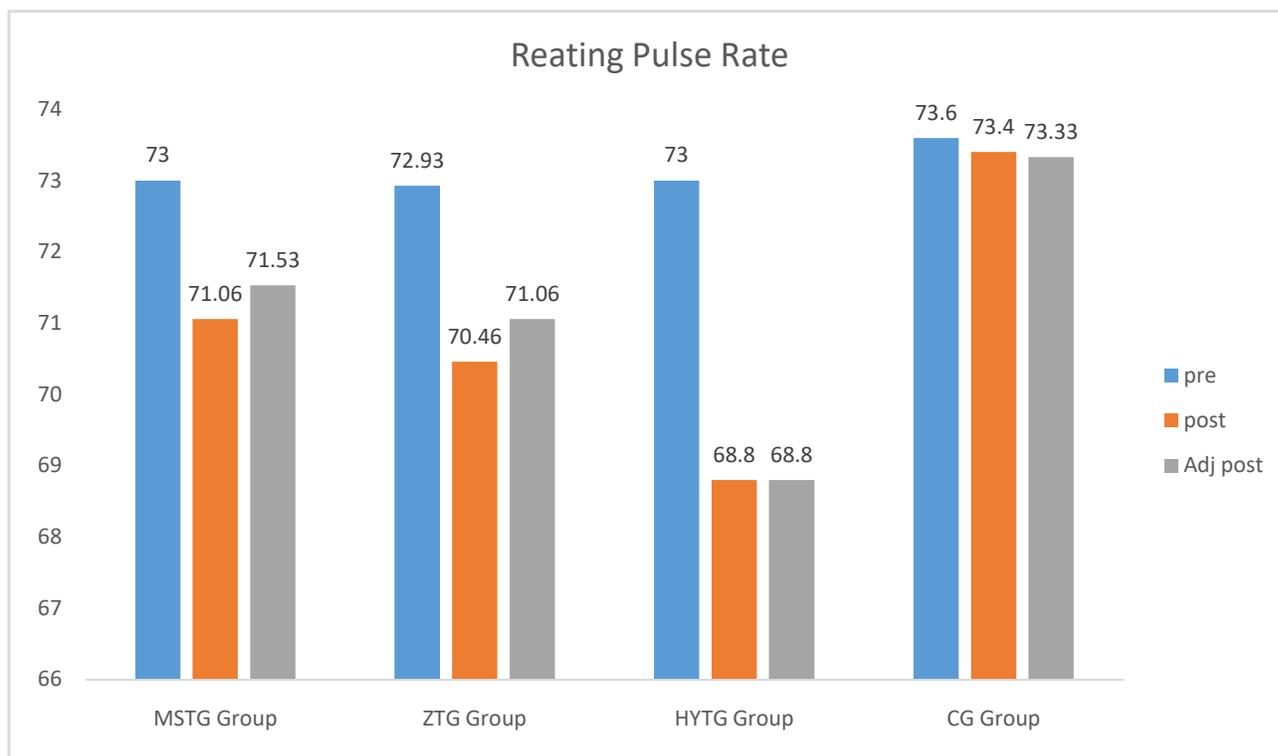


FIGURE- ii

BAR DIAGRAM SHOWING THE MEAN VALUE ON RESTING PULSE RATE OF DEAF AND DUMB STUDENTS ON MUSCULAR FITNESS TRAINING, ZUMBA DANCE TRAINING, HATHA YOGA TRAINING AND CONTROL GROUP

DISCUSSION ON FINDINGS

The results of the study indicated that the selected physical and physiological such as flexibility and resting pulse rate were improved significantly after twelve weeks of muscular fitness training group, Zumba training group, hatha yoga training group. The changes in these selected variables were attributed to the proper planning, preparation and execution of the training package given to the students. The findings of the present study had similarity with the findings of the investigations referred in this study. *Adriana Ljubojevic et al., (2014)* investigated the effects of zumba fitness program on changes of women body composition.

The study results clearly indicated that the Zumba fitness exercise can be used as an effective group fitness exercise for the change in body composition of women. **Anne Delestrat (2015)**.

The objective of this study was to investigate the effects of Zumba on physiological and psychological outcomes in healthy women. These results highlight that Zumba is beneficial to improve fitness and well-being in healthy women, but does not change body composition. **Araneta (2015)** The aim of this study was to assess the feasibility of a 12-week Zumba Fitness pilot study and temporal changes in components of the metabolic syndrome (MetS) among sedentary, obese women with at least two MetS components.

Twelve-week Zumba Fitness intervention

showed good feasibility and adherence, with significant reductions in blood pressure and triglyceride levels, despite minimal weight loss. **Bareneet al., (2014)** Effects of the Workplace Health Promotion Activities Soccer and Zumba on Muscle Pain, Work Ability and Perceived Physical Exertion among Female Hospital Employees.

The present study indicates that workplace-initiated soccer and Zumba training improve neck-shoulder pain intensity as well as duration among female hospital employees. **Bareneet al., (2014)** examined the soccer and Zumba exercise to improve fitness and indicators of health among female hospital employees.

The present study indicates that workplace-initiated short-term soccer training as well as Zumba outside working hours may result in fitness and modest health benefits among female hospital employees. **Cugusiet al., (2016)**

studied about cardiovascular effects, body composition,

quality of life and pain after a Zumba fitness program in Italian overweight women. **Donath**

et al., (2013) examined the effects of Zumba training (group fitness based on salsa and aerobics) on endurance, trunk strength, balance, flexibility, jumping performance and quality of life (QoL) in female college students. It was observed a large statistically significant between-group

Instructed Zumba training can be applied to improve well-being, aerobic fitness and neuromuscular function in female college

students. **Hausken et al., (2013)** Heart Rate, Accelerometer Measurements, Experience, and Rating of Perceived Exertion in Zumba, interval running, Spinning, and Pyramid Running.

Jain et al., (2016) examined the effect of 12-week Zumba program and healthy

diet on anthropometry, body composition and fitness parameters in working women. **Jitesh et al., (2016)** to know the effect of Zumba dance on blood pressure 30 volunteers who were

suffering from hypertension were selected under the inclusive factors. After zumba dance, the mean of systolic and diastolic is 141.4000 / 88.8333 mmHg. After zumba the mean reduction in systolic and diastolic pressure was 3.33 mmHg and 3.2 mmHg respectively. **MarjanHaghjooetal.,(2016)** examined Effect of 8-week Zumba training on overweight women's. Zumba exercise has a positive effect on body composition and rate of calorie burn and also improve people's cardiovascular endurance. **Priyaetal., (2015)** analyzed the effect of aerobic training and Zumba training on physical fitness variables of middle age obese women. It is also concluded that the physical fitness variables namely cardiorespiratory endurance, abdominal strength and flexibility are significantly improved due to zumba training. **Sallet(2005)** the purpose of the study was to examine the effects of 8 weeks of Zumba fitness training on balance ability and body composition in sedentary women. Fourteen sedentary women, aged 24.6 ± 5.7 years, were assigned into two groups.

CONCLUSION

1. It was concluded that twelve weeks of muscular fitness training produced significant improvement over flexibility and resting pulse rate of deaf and dumb students.
2. Twelve weeks of Zumba dance training produced significant improvement over flexibility and resting pulse rate of deaf and dumb students.
3. It was concluded that twelve weeks of Hatha Yoga training produced significant improvement over flexibility and resting pulse rate of deaf and dumb students.
4. It was concluded that Hatha Yoga training produced better performance over flexibility and resting pulse rate of deaf and dumb students when compared with Muscular fitness training and Zumba dance training.
5. It was concluded that Zumba produced better performance over flexibility and resting pulse rate of deaf and dumb students when compared with Muscular fitness training a training and control group.

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