The effect of Garba dance of Gujarat on fitness components of young adult females

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Abstract
Introduction: Physical fitness has been defined as the individuals' ability to meet the demands of a specific physical activity. Dance is recognized as a mode of physical activity, which requires physical fitness activities like sport and exercise. Garba is a folk dance of Gujarat, India, composed of multiple levels of speed, co-ordination and full body movements with fast steps synchronized with the rhythm of music and lyrics.

Aims and Objective: To measure the effects of Garba dance on physical fitness, cardiovascular fitness, and emotional status in women.

Materials and Methods: The study design was non-experimental. 25 female college students, age range 19-25 years, gave voluntary consent. All participants performed Garba, 3 times per week for 10 weeks, for total 30 sessions. Each session lasted for about 30 minutes. Sessions were composed of the following activities: 5 minutes warm up, 20 minutes Garba and 5 minutes cool down. Variables measured were flexibility, BMI, skin fold thickness, cardio-vascular fitness and emotional status of participants. All statistical analyses were performed using the SPSS version 20.0 (IBM, Armonk, NY, USA) for Windows.

Results: Post training, significant changes ($p<0.05$) were observed only for skin fold thickness, sit to stand, and sit and reach test have significant changes with a P value < 0.05.

Conclusion: A 10-week Garba programme improved physical fitness, cardiovascular fitness, lower body flexibility lower body strength as well as exercise tolerance.

Keywords: Folk dance of Gujarat – Garba, Physical fitness, Cardiovascular fitness, Emotional status.

Introduction
Physical fitness may be defined as "the individual's ability to the demands of a specific physical task." and it includes components such as cardiovascular endurance, musculoskeletal strength and endurance, power, speed, flexibility, agility, balance, reaction time, and body composition. In dance, the performer has to work under anaerobic and aerobic conditions, so it requires joint mobility, muscle flexibility and strength, and body composition. The quality of the dancer's technique and the artistic performance depends on their physical fitness components and motor abilities.[1-6]

Dance is recognized as a type of physical activity, which produces the same positive health effects as traditional activities like sports and physical exercise. Dance-based physical activities combine social, physical, and cognitive stimulation. Music initiates delight through the interaction with dance partners and increases positive beliefs toward the exercise. When used as therapy, dance provides innovative, creative, and useful ways to help individuals to improve their fitness through a comprehensive focus on the mind and body and integrating both cognitive and social aspects. The American Dance Therapy Association defines dance therapy as 'the psycho therapeutic use of movement to further the emotional, cognitive, physical, and social integration of the individual'.[6,7]

Folk dance is local dance which was initially developed among the peasantry and maintained by them in a fluid tradition without the aid of the professional dancer, teacher or artist. Folk-dance is primarily for the sheer pleasure of the performers and not for the entertainment of the public. The Garba is performed in a circle which moves in an anticlockwise direction, when it is interpreted as an 'upward ascending' and while the coming down or descent is clockwise. The beautiful dance patterns, in which women move and revolve in the circle smartly and lithely, gradually increasing the tempo to reach the climax of the dance. They dance with ease, grace, and vior, precisely keeping and co-coordinating time, tempo, harmony and rhythm by their exact Tali (clap) strike, feet thumping and physical movements, actions, and gesture. Clever quick, sure and easy steps and an agile elaborate balanced half turn and flexible movements following the Tali (clap), are really beautiful when the Garba enters into fast or double rhythmic time, and the tempo rises to its zenith.[8,9]

We hypothesized that the body twirls, arm movements and fast footsteps synchronized to a speedy rhythm performed in Garba dance can provide an exercise stimulus to the body which is comparable to aerobic exercise. Based on this, we aimed to measure the effects of Garba dance on physical fitness, cardiovascular fitness and emotional status in young adult females.

Materials and Methods
Participants
The present study is an observational study conducted on 25 female college students as participants who had given written informed consent to participate. The inclusion criteria were only female non-professional dancers aged 19–25 years. Exclusion criteria were males, professional dancers, musculoskeletal injury of the upper limb or lower

limb, any neurological or medical problem, and any surgical condition.

Outcome Measures

Besides anthropometric measures i.e. height, weight and BMI; the following outcome measures were used, Skin fold thickness for body fat percentage,[10,11] Blood pressure, heart rate and VO_2 max for cardio vascular fitness,[12,13] Six minute walk test[14,15] and Borg rating of perceived exertion scale for functional capacity evaluation & exercise tolerance,[16,17] Sit and reach test for flexibility,[18] Sit to stand test for lower limb strength[19] and Positive and Negative Affect Schedule (PANAS) score for emotional status.[20]

Procedure

Data on anthropometric and fitness parameters were obtained using the standard procedure. Data were collected three times at 0 week (i.e. before intervention) and after 4 weeks and 10 weeks of Garba sessions. After measuring height and weight, BMI was calculated. Skin fold thickness was measured by caliper at waist level. After measuring the blood pressure and heart rate at rest, participants were instructed to perform the 6-minute walk test. At the end of the test, exertion was measured with Borg rating of exertion scale (15-point scale ranging from 6-20, with 6 as very, very light and 20 as very, very hard). Blood pressure (BPmax) and heart rate (HRmax) were measured. . VO_2 max was calculated using a formula VO_2 max = 15.3 x (maximum HR - resting HR). VO_2 max is an important determinant of cardiovascular fitness. Sit and reach test was performed on customized sit and reach box and distance was measured for flexibility of lower back and hamstring. Sit to stand test was also performed to determine the endurance of lower extremities as well as general fitness.

All the participants received 30 Garba sessions, 3 times per week for 10 weeks. Each session lasted for about 30 minutes. Sessions were composed of the following activities: 5 minutes of warm up, 20 minutes of Garba, 5 minutes of cool down. The Garba steps included basic forward, backward and rotational steps which involved shifting the body weight, stretching the arms in every direction, lifting the legs and flexing the feet. Institutional permission was taken for this study.

Statistical Analysis

Descriptive statistics were done and numerical variables presented as mean ± SD for all 25 participants. Difference between the levels of measurements (before Garba, after 4 weeks and after 10 weeks of Garba sessions) for all the outcome measures were tested using repeated measure analysis of variance test. The statistical analyses were performed using SPSS-20 software, Armonk, New York. The P-value <0.05 was considered to be statistically significant.

Results

The present study was conducted on 25 female college students with mean age 20.76±0.92 years. The demographic data and outcome measures statistics are presented in Table 1 & Table 2.

Table 1: Demographic data of participants

Characteristics of participants	Mean ±SD
Age (years)	20.76±0.92
Height (cm)	160.33±4.58
Weight (Kg)	54.70±10.21
BMI (Kg/m^2)	21.28± 4.31

Discussion

The present study aimed to measure the effects of Guajarati folk dance – Garba on physical fitness, cardiovascular fitness and emotional status. In the study, no significant changes in BMI was calculated before and after the entire duration of dance. This may be due to the short duration of the Garba dance intervention and/or its application in isolation, because the production of changes in body composition often requires the implementation of multidisciplinary programs involving not only physical exercise, but also changes in lifestyle, nutrition, and occasionally the application of cognitive-behavioral therapy with a pharmacologic approach. Kostrzewa-Nowak et al[21] stated that the 12-week-long fitness training program of two alternating styles (low and high impact) has a favorable effect on overweight young ladies. Sasa Pantelic et al[22] concluded that aerobic dance decreases subcutaneous fatty tissue. Likewise in our study, a significant difference in the skin fold measurement taken at waist level after 10 weeks of Garba sessions suggests that Garba is effective in reducing abdominal visceral fat. A significant change in body fat was seen after applying low impact aerobic dance sessions.[23]

Previous studies have indicated increased flexibility after Eight weeks of aerobics dance had a significant effect on joints [knee, hip, and trunk] flexibility of the patients with osteoarthritis.[24] Similarly, in our study significant difference in sit and reach test and sit to stand test suggests that Garba has a significant effect on increasing lower limb and trunk flexibility and strength. The Garba dance has a significant effect on improving oxygen consumption capacity (VO_2 max). A study by Nandhini.[25] has also found the same result on the effect of aerobic dance training on the VO_2 max uptake of college women. Garba dance showed a significant effect on resting systolic BP and on diastolic blood pressure at rest and at the maximal excursion. The effect of Garba dance on Borg rating of perceived exertion scale suggested that there was reduced discomfort in breathing as well as improved functional capacity and tolerance among the participants at the end of 10 weeks of Garba sessions. A study conducted by Pacheco et al. looking into the effects of Colombian Caribbean folk dances found increased physical fitness and health related Quality of life in older women.[27] Similarly another study by Lucia Cugusi, et al., on the Sardinian folk dance 'Ballu Sardu'[28] and one more study conducted by Maria Serrano-Guzman et al. showed that Spanish dance therapy was effective to improve mobility, balance, and levels of physical activity

and fitness in women, which is similar to findings of our study".[29]

Table 2: ANOVA results for the outcome measures

Outcome Measures	Level of Measurements	Mean±SD	F Value	Significance	Partial Eta Squared
BMI	0 week	21.33±4.44	0.881	0.431	0.085
	4 week	21.49±4.28			
	10 week	21.75±4.08			
Sit and reach (cm)	0 week	46.02±7.91	5.614	0.012*	0.371
	4 week	47.29±8.13			
	10 week	48.50±7.85			
Sit to stand (time in seconds)	0 week	17.67±2.08	4.816	0.020*	0.336
	4 week	18.09±2.66			
	10 week	19.14±3.58			
Positive Affect Score of PANAS Scale	0 week	31.90±5.15	3.114	0.068	0.247
	4 week	33.19±5.02			
	10 week	34.66±4.67			
Negative Affect Score of PANAS Scale	0 week	19.48±7.63	0.003	0.997	0.000
	4 week	19.38±7.66			
	10 week	19.42±7.12			
Heart rate (rest) (beats/minute)	0 week	90.25±12.61	4.423	0.027*	0.330
	4 week	79.25±13.57			
	10 week	81.70±7.49			
Heart rate (max) (beats/minute)	0 week	124.29±16.68	14.855	0.000*	0.610
	4 week	104.42±15.13			
	10 week	102.42±15.41			
VO_2 max (litres)	0 week	21.56±3.03	3.408	0.056	0.275
	4 week	20.29±2.32			
	10 week	19.22±2.29			
Blood pressure (rest) systolic (mm Hg)	0 week	106.24±13.56	6.878	0.006*	0.420
	4 week	115.61±7.31			
	10 week	115.95±7.80			
Blood pressure (max) systolic (mm Hg)	0 week	127.48±14.80	0.030	0.971	0.003
	4 week	127.04±10.95			
	10 week	127.57±9.39			
Blood pressure (rest) diastolic (mm Hg)	0 week	63.29±10.76	7.901	0.003*	0.454
	4 week	71.19±6.42			
	10 week	70.09±5.34			
Blood pressure (max) diastolic (mm Hg)	0 week	67.62±6.71	7.377	0.004*	0.437
	4 week	72.85±7.10			
	10 week	72.66±5.21			
Rate of Perceived Exertion	0 week	3.00±0.894	4.878	0.020*	0.339
	4 week	2.61±0.86			
	10 week	2.47±0.74			

* P value is < 0.05

The present study has some limitations also. First, the small sample size could be affecting the findings of the study with low statistical power. Moreover, a convenience sample was used, and those who volunteered may have been different from those who did not or could not participate. As an observational study of short duration, long-term effects were not assessed, but results suggest promise. To build on this promise, further studies including males, longer duration study, and larger samples are needed. According to our knowledge, this is one of the few studies exploring the effects of Garba dance on physical fitness and cardiovascular fitness and emotional status.

Conclusion

A folk dance of Gujarat – Garba, is can cause improvements in physical fitness and cardiovascular fitness in young women in a community setting. A 10-week intervention improved physical fitness and cardiovascular fitness, lower body flexibility, and lower body endurance, as

well as exercise tolerance (rate of perceived exertion). However, Garba dance had no effects on the emotional status of the participants.

Conflict of Interest: None.

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