



## Dance and walking: towards resurgence to healthy life during Covid lockdown

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### Abstract

Health is important asset for human kind. And non-impact exercise can really advisable to promote cardiac health during the Covid-19 lockdown. The purpose of this study was to find out the effect of dance and walking exercise on Resting Heartrate (RHR), VO<sub>2</sub> max and Body Mass Index (BMI). To achieve the purpose forty-five females (mean age was 30 ± 1.3 years, BMI 26.37 ± 1.36) were purposively selected and divided in to Bharathanatyam dance group (BD, n=15), Health related walkers (HW, n=15) and Control Group (n=15) from Jaffna, Sri Lanka. Bharathanatyam (BD) dancers had been dancing 90 to 120 min per day; 3 days per week over a period of minimum 12 weeks. and health walkers were walking 40-60 min (Covers 4-5 KM) /3 time / week/over the period of 12 weeks. Data were collected on resting heart rate (RHR) using Palpating the radial artery for full one minute for each subject, VO<sub>2</sub> max by Queen's step test [McArdle et al. (1972)] and BMI by Adolphe quetelet formula. Each test conducted on one day after another day. The collected data were subjected to statistical treatment using paired sample "t" test to find out the training effect. In all the cases 0.05 level of confidence was fixed to test the significance, which was considered as appropriate. The result shows that Bharathanatyam Dancers and walking exercise are positively influence on RHR, VO<sub>2</sub> max and BMI. Hence it was concluded that, less impact physical activity such as bharathanatyam dance and walking are best choice to maintain safest health status during covid lockdown.

**Keywords:** Resting Heartrate, BMI, VO<sub>2</sub> max, Bharathanatyam

### Introduction

Frequent technological advancement in all aspects reduces the human efforts that mainly affects the health status. Covid lockdown is another reason that leads to sedentary behaviour such as long-time sitting, too much eating and physical inactivity contributes harmfully to cardiometabolic health of the peoples which leads to premature mortality. (Dempsey PC. et.al. 2014). Physical inactivity is considered a risk factor for developing non- communicable disease such as cardiovascular disease, diabetes, osteoporosis, and other hypokinetic diseases (Dempsey PC, et.al. 2014). Exercise is an important approach to prevent chronic diseases and promote lifelong health of the peoples. Heart and respiratory system are key functional system which mostly affected by physical inactivity and sedentary lifestyle. The cardiorespiratory system plays an important role

in providing the energy required by different body systems for metabolism. Hence the cardiorespiratory health and endurance are most important for human kind to extend healthy life. Therefore, short and long duration exercises are necessary to improve cardio respiratory system physiologically and physically.

Dance is an aesthetic graceful action, and its unique form of movement that inspires creativity, motivation, self-discipline, and self-awareness. It is more than a physical activity which strengthen the body and mind. Through dance, movement is transformed into a purposeful phrase of action that encompasses physical, emotion, and cognition. Dance uses "the movement of the body in its reactions to the environment" (Vanleena, et.al.1996). Every dance, no matter what style, has something in

common. It not only involves flexibility and body movement, but also contribute to cardiovascular health, strength and neurological health.

Regular dance practice improves great strength, kinesthetic awareness, control over weight and balance in motion, and endurance which is developed by prolonged dance training. The dance training also develops awareness of space, a strong sense of rhythm, and an appreciation of music. Grace, fluidity, and harmony of body are also frequently desired in the dance training. Therefore, the dancing activity make the physique beauty.

Walking is a cyclic open kinetic physical activity which reduces the sedentary behavioural diseases. And, improves the body enormously on cardiorespiratory endurance, VO<sub>2</sub> max, Muscle tonus, and reduces lower back pain. The bicyclic activity has huge benefits and good alternative for sedentary peoples. Walking exercise moves the body's bigger postural and stability muscles which can increase energy expenditure above the resting state, and improves physical health by improving cardiac fitness, postural muscle strength and physical performance. Also, an important tool to prevent accumulation of fat. Regular walking stimulates metabolic activity, thereby controlling body weight and prevent from hypokinetic diseases. Multiple advantages are founded from walking interventions (Hanson S, Jones A. 2015) including changes in waist circumference (Lin YP et.al.2018), improvements in aerobic fitness (Serwe KM et.al. 2011), reduction in body fat and improvements in overall health (Amiri H et.al. 2013).

Bharatanatyam: is a sacred traditional dance form codifies into a series of rules determining the gestures used to depict different themes and emotions. It is oldest of all classical dance forms in India and Sri Lanka. The general Etymology of Bharathanatyam is BHAVA (expression) + RAga (music) + TAAla(rhythm) + NATYAM (dance). The variety and style of the dance and musical accompaniment provide to the people tastes and performing them. Many learn as a hobby and few make it as a profession. Whether taken as a hobby or a profession it certainly contributes to huge health benefits.

VO<sub>2</sub> max is the amount of oxygen utilize by one kilogram of muscle in one minute. The long Term Bharathanatyam dance and walking exercise can help to make the muscles that expand the lungs stronger and more efficient which can increase the expansion of breathe in more air with increase number of capillaries around the alveoli enabling to absorb oxygen in the blood quicker (Sabaanath,S. 2014). Exercise at various tempo increases the body tissues utilizing oxygenated blood, capillary density and improvement in lymphatic flow.

Physical inactivity causes overweight and obesity that increases blood pressure. High blood pressure is the main reason for heart attack and strokes. And excess pound of weight also increases rate of high cholesterol, high blood sugar, and heart disease. Resting Heartrate is a best tool to assess cardiac health. And, cardiorespiratory endurance is an ability of the heart and lungs and muscles works effectively over an extended period of time. The aerobic nature of activity is a best way to improve cardiorespiratory endurance. Hence, the bharathanatyam dance and walking exercise are the finest activity that meliorate the cardiac system and postural muscle strength. Bharathanatyam dance and walking exercise strengthen muscles at the back that supports to promote quality human movement and reduces the back injuries.

Walking and bharathanatyam dance are the best functional exercise which perfectly activate the postural muscles such as gluteus and lower back muscles. The weakness of lower back and gluteal muscles are the main reason for fatigued reciprocal inhibition due to the long sitting hours during covid lockdowns. This may cause upper gluteal syndrome or athletic hernia which mainly due to gluteal amnesia. Doing less impact exercise such as bharathanatyam dance and walking exercise specially strengthen the isometric strength of the postural muscle thus lead to efficient human movements and healthier life.

### **Objective of the Study**

Healthiness is precious asset in 21st century. For keeping up the health status, less impactful physical exercise is important. In

modern scenario peoples are spends more time in setting. Thus, may harm the postural muscles which lead to postural muscle weakness and injury. And also physical inactivity is another cause to affect the cardiac health and human performance. Most of the peoples are not aware the benefits of walking and traditional bharathanatyam dance. The bharatha sage created bharathanatyam dance as traditional dance with comprehensive scientific background. Further, peoples cannot hit the playfields and gyms to stay healthy during covid lockdown. Hence the less impact exercise such as dance and walking are the best option to sedentary peoples during lockdown. Therefore, the present study intent to assess the effects of dancing and walking exercise on Resting heartrate, VO2 max, and BMI among sedentary population.

## Methods

To achieve the purpose forty-five females (mean age was  $30 \pm 1.3$  years, BMI  $26.37 \pm 1.36$ ) were purposively selected and divided in to Bharathanatyam dance group (BD, n=15), Health related walkers (HW, n=15) and Control Group (n=15) from Jaffna, Sri Lanka. Bharathanatyam (BD) dancers had been dancing 90 to 120 min per day; 3 days per week over a period of minimum 12 weeks. and health walkers were walking 40- 60 min (Covers 4-5 KM) /3 time / week/over the period of 12 weeks. Data were collected on resting heart rate (RHR) using Palpating the radial artery for full one minute for each subject, VO2 max by Queen's step test [McArdle et al. (1972)] and BMI by Adolphe quetelet formula. Each test conducted on one day after another day. The collected data were subjected to statistical treatment using paired sample "t" test to find out the training effect. In all the cases 0.05 level of confidence was fixed to test the significance, which was considered as appropriate.

## Results

The table I shows the pre and post test result of the resting heartrate among experiment and control group. The baseline (pre-test) data of the all three groups are nearly same and after the intervention the resting heartrate has been

significantly improved to dance and walking group.

The table II shows the pre and post test result of the VO2 Max among experiment and control group. The baseline (pre-test) data of the all three groups are nearly same and after the intervention the VO2 Max has been significantly improved to dance and walking group. The average VO2 max value of the participants after the training is 50 ml/kg/min, which means all the participants are having above average VO2 max level. This is the indication of good health status of the participants.

The table III shows the pre and post test result of the BMI among experiment and control group. The baseline (pre-test) data of the all three groups are nearly same and after the intervention the BMI has been significantly improved to dance and walking group. Further the BMI value of the control group continually increasing. Which means physical inactivity increases the bodyweight (increasing 0.4 BMI rises 1 Kg body weight).

## Discussions

Physical inactivity during the Covid lockdown leads to low level of energy expenditure and prolonged sitting or standing in a most of the day. Increasing sedentary lifestyle link with low level of physical movement which potentially affects the healthy life. Intermittent low impact exercise help people reduce the risk of hypokinetic disease and premature death rate. Low impact joyful exercise is appropriate to sedentary peoples to get involve easily and improving physical activity adherence. Walking and dancing are the less impact exercise which peoples can easily adapted and thus diminish sedentary lifestyle. The nature of the activity leads the participants perform with joyful and minimize overstress to the joints. High stressful activity loads the resistance on the joints which increases the high level of cortisol secretion. Physical and mental stress increases cortisol level in the blood.

Variable	Group	Period of Test	Mean	SD	SE	"t"
Resting heartrate	Bharathanatyam Dance	Pre-test	71.4	2.16	0.55	9.28*
		Post test	68.3	2.13	0.56	
	Walking	Pre-test	71.93	2.31	0.6	7.07*
		Post test	68.0	2.24	0.58	
	Control	Pre-test	71.87	2.23	0.58	0.41
		Post test	72.0	2.3	0.6	

\*Significant at .05 level of confidence. with df (1, 14) is 2.14

Variable	Group	Period of Test	Mean	SD	SE	"t"
VO2 Max	Bharathanatyam Dance	Pre-test	47.7	0.84	0.22	9.41*
		Post test	50.20	1.09	0.28	
	Walking	Pre-test	47.50	0.90	0.23	8.75*
		Post test	50.21	1.81	0.28	
	Control	Pre-test	47.50	1.07	0.28	0.31
		Post test	47.60	1.33	0.34	

\* Significant at .05 level of confidence. with df (1, 14) is 2.14

Variable	Group	Period of Test	Mean	SD	SE	"t"
BMI	Bharathanatyam Dance	Pre-test	26.30	1.15	0.29	14.39*
		Post test	24.08	1.16	0.30	
	Walking	Pre-test	26.37	1.34	0.34	10.84*
		Post test	24.21	1.27	0.32	
	Control	Pre-test	25.93	1.36	0.35	0.8
		Post test	26.3	1.43	0.37	

\*Significant at .05 level of confidence. with df (1, 14) is 2.14

The hormone cortisol is insulin resistance which increase the accumulation of adipose tissue thus leads to narrowing and hardening the arteries wall. Narrowing arteries causes the blood to pumped forcefully that strains the heart. So, the heart rate, VO<sub>2</sub> max, and BMI are the best indicators for assessing general fitness of the sedentary peoples.

Past thirty years maximal aerobic capacity (VO<sub>2</sub>max) has gear up as a powerful predictor of unhealthy outcomes such as cardiac disease and all type of non-communicable disease (Keteyian SJ, et.al. 2008., Myers J, et.al. 2002). During the lockdown, gyms are ceased and peoples can't tie-up their shoes for outdoor sports. So, non-impact homemade exercises are advisable to hold the fitness, healthy body weight as well as mental equilibrium.

Dance involves greatest efficient movement of the body, usually rhythmic graceful action to music that use to express thoughts. The classic dances are performed to social interaction or presented in a spiritual or performance setting. The finding supports to the objective of the study, that the dance as an activity promote aerobic and physical working capacity. Thus, lead to improve the health status of the participants. The dance movements may be sometimes without significance in themselves. But the bharathanatyam is a prominent feature of the aesthetic, artistic and graceful form of dance also enhances the fitness. The performance of the dancer is depending on duration, intensity and frequency of dance they undergo. However, regular dance training is essential to maintain and develop the dancer's fitness. The energetic demands during the dancing sessions stands in very high rather than walking. Bharathanatyam dance movements uses larger postural muscles that need higher rate of energy to perform combination of isometric and isotonic movement. In bharathanatyam dance, the fundamental and foremost essential movement is aria mandi (toe opened half squat) which uses combination of isometric

and isotonic movement in both sides. Thus, improves the reciprocal inhibition of the lower body. The long time sitting during Covid lockdown mainly affect the reciprocal inhibition that lead to poor muscular performance. Muscular efficiency and effectiveness are the main key to improve VO<sub>2</sub> max and Cardiorespiratory endurance. Dance practice increases requirements for oxygen. Because oxygen defuse in skeletal muscle are increased due to extended period of dance practice, thus speedup removal of metabolites and carbon dioxide (Sabaanath,S. 2018). Therefore, low impact exercise such as bharathanatyam dance and walking exercise highly appreciable to improve the base level physical performance.

Walking is the idyllic form of physical activity which to improve health and fitness for non-sportive population (Hardman AE and Morris JN, 1998). It is low impact open kinetic exercise progressively strengthen the cardiac health as well as postural muscle strength. The literature indicates that changes in cardiorespiratory endurance, VO<sub>2</sub> max are directly related to the subject's initial fitness level and the frequency, intensity and duration of the training programme. Some aerobic type of activities is close association with VO<sub>2</sub> max (Hemple and wells, 1985). It has been shown that arm work performed above the head produces a higher VO<sub>2</sub> max than the work performed bellow head level, due to an increased sympathetic tone (Parker et-al 1989). During the bharathanatyam dance practice dancers moves their hands above the head, thus may also leads to have higher VO<sub>2</sub> Max than the walkers in the present study. Bharathanatyam dance has huge potential to promote physical and physiological qualities. During the dance practice the dancers are sitting half squat position and moving upper body in different planes. Thus, may increase the energy cost of the working muscle and increase the strength of the weakest postural muscles such glute, hamstring, abdominal muscles and piriformis etc.

According to Hamilton et.al (1989) aerobic dance and continues training can be intense enough to promote aerobic capacity. The improvement in cardiovascular fitness is depends on mode, frequency, duration, intensity, and rate of progression of exercise (Kirkendall DT & Calabrese LH-1983). Finally, any activity in aerobic nature extended up to 30-40 min in a moderate intensity is more than enough to keep the safest health status. However, the nature of activity should not stress too much to the joints and physiological system.

## Conclusions

The simple recommendation can be provided based on the previous literature and present result that the bharathanatyam Dance and walking exercise are the simplest joyful activity which enrich the basic fitness in respect to RHR, VO<sub>2</sub> max and body weight during covid lockdown. Hence it was recommended that non-impact exercise such as dance and walking are the first and foremost activity need to undergo by sedentary peoples to resurgence to healthy life during any lockdown circumferences.

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### **Conflict of interest**

None of the authors have any conflicts of interest to declare.

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