

Review of Related Literature

CHAPTER- II

REVIEW OF RELATED LITERATURE

The study of the relevant literature was an essential step to get a full picture of what has been done and stated by other researchers. The most relevant literature pertaining to the present study was collected and presented here. The collected reviews have been classified into the following sub-titles.

2.1 Studies on varied dance fitness

2.2 Studies on yoga

2.3 Studies on cardio-pulmonary, physical fitness and psychological variables

2.1 STUDIES ON VARIED DANCE FITNESS

Ahmad *et al.*, (2015) made a study on aerobics that has becoming a popular mode of exercise especially among women due to its fun nature. With a catchy music background and joyful dance steps, aerobic dancers would be able to have fun while sweating out. Depending on its level of aggressiveness, aerobic may also improve and maintain cardiorespiratory fitness other than being a great tool for weight loss. This study intends to prove that aerobic dance activity can bring the same, if not better impacts on health than other types of cardiovascular exercise such as jogging and cycling. The objective of this study was to evaluate and identify the effect of six weeks aerobic dance on cardiovascular fitness and weight loss among women. In conclusion, a six-week long aerobic dance program would have a positive effect on cardiovascular fitness and weight. Therefore this study proved that the aerobic dance may be used as an alternative for people who wish to lead a healthy lifestyle in a fun way.

Anju et al., (2015) examined the effect of moderate Aerobic exercise training on pulmonary functions and its correlation with antioxidant status. 30 healthy volunteers in the age group of 18-22 years were screened. They underwent short term moderate aerobic exercise training. Various Pulmonary function tests including FVC, MVV & SVC were taken prior to aerobic exercise training and later after the exercise period. Antioxidant status was assessed by the level of malondialdehyde in plasma. FVC showed a significant increase while PEF, IRV, MVV and MRF showed a highly significant increase after the aerobic exercise training. Physical exercise also provided a favorable change in the biochemical parameters such as MDA. The study concluded that indulgence in regular physical exercise can result in betterment of health in general and improvement in pulmonary functions and antioxidant status in particular.

Arwa et al., (2018) investigated the effect of such aerobic exercise for three weeks, specifically continuous treadmill running, on lung function (FVC, FEV₁, ratio of FEV₁/FVC, and MVV) in inactive yet healthy male individuals. The results demonstrated that high-intensity aerobic exercise on the treadmill has a positive effect on the pulmonary function of inactive healthy subjects.

Evrin et al., (2011) assessed the effects of aerobic dance exercise on body composition in sedentary overweight women. In this study, Total 55 adult sedentary women participated as volunteers. Result indicated that aerobic dance exercise at a moderate intensity and duration can improve physical fitness and can decrease body fat percentage, Lean Body Mass and Basal Metabolic Rate during weight loss.

Helgerud et al., (2007) compared the effects of aerobic endurance training at different intensities and with different methods matched for total work and frequency. Responses in maximal oxygen uptake ($\dot{V}O_{2\max}$), stroke volume of the heart (SV), blood volume, lactate threshold (LT), and running economy (CR) were examined. Forty healthy, nonsmoking, moderately trained male subjects were randomly assigned to one of four groups: 1) long slow distance (70%).

Jasmina et al., (2016) studied the effects of an aerobic exercise model on cardiorespiratory fitness and body composition. The exercise model was realized three times a week, with an overall number of 36 training sessions. Each individual training session lasted 60 minutes, consisting of a warm-up (10 minutes), the aerobic part (35 minutes), strength increasing exercise (5-10 minutes) and the cool-down (10 minutes). The implemented model of aerobic exercise had positive effects on cardiorespiratory fitness and body composition of the participants of the experimental group. This research has confirmed that the existing conclusions about the positive effects of aerobic exercise, if it is realized with the appropriate intensity, time and duration.

Juliano et al., (2016) evaluated the effects of aerobic training combined with respiratory muscle stretching on functional exercise capacity and thoracoabdominal kinematics in patients with COPD. This study was a randomized and controlled trial. A total of 30 patients were allocated to a treatment group (TG) or a control group (CG; n=15, each group). The TG was engaged in respiratory muscle stretching and the CG in upper and lower limb muscle stretching. Both groups performed 24 sessions (twice a week, 12 weeks) of aerobic training. Functional exercise capacity (6-minute

walk test), thoracoabdominal kinematics (optoelectronic plethysmography), and respiratory muscle activity (surface electromyography) were evaluated during exercise. Analysis of covariance was used to compare the groups at a significance level of 5%. After the intervention, the TG showed improved abdominal (ABD) contribution, compartmental volume, mobility, and functional exercise capacity with decreased dyspnea when compared with the CG ($P < 0.01$). The TG also showed a decreased respiratory muscle effort required to obtain the same pulmonary volume compared to the CG ($P < 0.001$). Our results suggest that aerobic training combined with respiratory muscle stretching increases the functional exercise capacity with decreased dyspnea in patients with COPD. These effects are associated with an increased efficacy of the respiratory muscles and participation of the ABD compartment.

Katie *et al.*, (2002) determined the effects of aerobic training on the maximal aerobic power of healthy, very elderly people. A 12-week control period followed by 24 weeks of progressive, weight bearing, aerobic training. 26 men and women aged 79 to 91 years conforming to pre-determined health criteria. We took measurements before and after a 12 week control period and following 24 weeks of training. These were maximal aerobic power ($VO_2\text{max}$), heart rate at an oxygen consumption of $10 \text{ ml.kg}^{-1}.\text{min}^{-1}$ (HR at VO_210), resting heart rate, isometric knee extensor strength, isometric elbow flexor strength and lower limb extensor power. Pre-control values of $VO_2\text{max}$ for the women and men were 14.1 (SD 2.79) and 22.0 (5.12) $\text{ml.kg}^{-1}.\text{min}^{-1}$ respectively. There was no significant change in the $VO_2\text{max}$ of either group over the control period. After training, there was a 15% increase in the $VO_2\text{max}$ of the women

($P < 0.01$) but no change was observed in the men. In the women, there was no significant change in HR at VO₂₁₀ over the control period but a 14% decrease ($P < 0.01$) after training. In the men there was a 7% ($P < 0.05$) increase in HR at VO₂₁₀ over the control period and a 5% ($P < 0.05$) decrease after training. No effect of training was seen on isometric knee extensor strength, isometric elbow flexor strength or lower limb extensor power of either group. Progressive aerobic training can increase the maximal aerobic power of very elderly women. A 15% increase in VO_{2max} may prevent many elderly women from crossing functionally important thresholds, thereby helping to maintain independence.

Mathewos *et al.*, (2013) investigated the effect of aerobic exercise on improving health related physical fitness components of Dilla University sedentary female community. Twenty females from Dilla university sedentary female community were selected as study subjects and their age range were 22-28 years. All Selected subjects were participated in moderate intensity aerobic exercise for 12 consecutive weeks, i.e. 3 days per week 60 minute duration per day. Pre, during and post training tests were conducted on the components of health related physical fitness variables. The result obtained in this study indicated that there were significant improvement in cardiovascular endurance, muscular endurance, muscular strength and flexibility but in the case of Resting pulse rate and body weight there were reduction. Based on this finding, it can be concluded that Moderate aerobic exercise has positive effect on improvement of health related physical fitness components of sedentary female communities.

Mona et al., (2012) assessed the effect of 8 weeks aerobic exercise on pulmonary indexes of force vital capacity (FVC) and force expiratory volume in one second (FEV1) in obese women. Initially, a total 200 women of National Iranian South Oil Company (name of the place) were enrolled in this study. Subsequently, 40 women with Resting pulse rate ranging from 25 to 29.9 were selected as study population. The study population was divided in 2 groups, each with 20 women. One group (experimental group) performed aerobic exercise for 8 weeks and the other group did not perform any specific physical exercise. FVC and FEV1 were measured in all subjects before the commencement of the study and after the end of the study. The age of the subjects ranged from 40 to 50 years. There was no significant difference in values of FVC and FEV1 between experimental study population and control group at start of the study. Aerobic exercise seems to have an effect on pulmonary function of obese Iranian female.

Mukesh et al., (2015) examined the effect of aerobic training on selected physiological variables. The data were collected through the pre test, before training and post test, after six weeks of aerobic exercises training. The result of the study showed that there was significant difference between pre and post test (experimental group) of Resting Heart Rate (RHR) and Vital Capacity (VC), Another hand there was insignificant difference between pre and post test (control group) of Resting Heart Rate (RHR) and Vital Capacity (VC). On the basis of the findings it was concluded that the aerobic training might be responsible for the improvement of selected physiological variables like Resting Heart Rate (RHR), Vital Capacity (VC).

Manisha et al., (2014) investigated the effect of an sixth week aerobic dance exercise program on body composition parameter. Six week randomised controlled trial. Methodology: A total of 20 healthy participated in this study voluntarily. They were randomly divided in to two group-experimental group (n-10) and a control group (n-10). The subjects in the experimental group participated in a aerobic dance exercise program for one hour per day for six week. The subjects Resting pulse rate (BMI), Weight, waist circumference, hip circumference, biceps circumference, thigh circumference, were assessed before and after the completion of the aerobic dance exercise program. Result: After six week of the Aerobic dance exercise program, significant difference was found in the subjects weight, waist circumference, hip circumference, biceps circumference, thigh circumference BMI level ($p < 0.05$). There was no significant difference in the body composition parameter in the control group. Conclusion: The aerobic dance moves proved to be a useful exercise modality for improving overall fitness level and positive changes in body composition parameter can be procured. Clinical Significance: This study has devised an interesting protocol for reducing circumference of the body and BMI which will help in improving overall well being of an individual.

Murugesan (2019) analyzed the changes on maximum oxygen consumption in response to pranayama practices among working men and women of different age groups. To achieve the aim of this study eighty middle aged people were selected in Virudhunagar District schools, in which 40 subjects were men and remaining 40 subjects were women. They were further categorized into four sub-groups of 20 subjects each.

The first one is 40-44 age groups of men and women separately and another one 45-49 age groups of men and women separately. The maximum oxygen consumption was selected as dependent variable for the study. During the training period, the experimental groups underwent pranayama practices six days a week for twelve weeks. Three-way analysis of variance was used to find out the influence of each factor independently and also their combined influence on each of the selected variables. The level of confidence was fixed at 0.05 for significance. The result of the study shows that due to the effect of pranayama practices the maximum oxygen consumption of 40-44 and 45-49 age category men and women were significantly decreased. It also gives the existence of insignificant difference on maximum oxygen consumption among gender in relevance to different age categories during pre and post tests.

Narayani et al., (2010) determined the effect of aerobic training on Percentage of Body Fat, total Cholesterol (TC) and High Density Lipoprotein Cholesterol (HDL-C) among obese women. For this purpose, 20 female obese women (age 17-25) were selected. The subjects received endurance training only one session in the morning between 6-7 am for three alternate days a week for six weeks. To analyse the collected data, 't'-ratio was used at 0.05 level of confidence. The results showed that there were significant changes in Percentage of Body Fat, TC and HDL-C. It was concluded that the aerobic training is widely believed to induce changes in the lipid profiles and Percentage of Body Fat of women.

Pantelic et al., (2013) determined the effects of a twelve-week aerobic dance-training program on the body composition parameters of young women. On the basis

of the results, they concluded that aerobic dance decreases subcutaneous fatty tissue and body composition of the young women.

Parastoo et al., (2012) investigated the effects of 12 weeks combination training included aerobic dance, step exercise and resistance training on body fat percents and serum lipid profiles in sedentary females. Subjects in exercise group were training for 12 weeks, 3 sessions in week, and 60 minute in sessions with 60-80 percent of Heart Rates Reserve (HRR). Combination training program include aerobic dance, aerobic step exercise and resistance training was performed based on progressive overload training principal. Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein Cholesterol (LDL_C), High Density Lipoprotein Cholesterol (HDL_C) and Body Fat percents (% BF) has been measured before and after 12 weeks training program. Data compared with two tailed paired and independent sample t test ($p \leq 0.05$). The results showed that levels of HDL_C and % BF significantly modified after 12 weeks training ($p < 0.05$). There were no significant changes in TC, TG and LDL_C. These results indicated that moderate intensity combined training included aerobic dance, step exercises and resistance training have positive effect on some serum lipid profiles and body fat percents in sedentary females.

Pereira et al., (2013) examined the effects of 8 weeks of strength training program alone or combined exercise (step aerobics exercise and strength training) on Resting pulse rate (BPM), waist circumference (WC), and maximal strength (1RM) in lower- and upper-body extremities. Thirty-six women were randomized into three groups: strength training (S, N.=13; age: 61.0 ± 9.3 years, BMI: 27.3 ± 4.7 kg/m²),

combined step aerobics training and strength training (SE, N.=11; age: 58.3±8.1 years, BMI: 27.8±3.7 kg/m²), or control (C, N.=12; age: 59.0±7.2 years, BMI: 29.5±4.8 kg/m²) groups. Subjects from both experimental groups performed 3 training sessions per week for 45-60 minutes per session. The S was submitted to a high-speed training that consisted of 40% to 75% of 1RM (3 sets 4–12 reps). The SE group combined aerobic exercise using step platform plus strength training. Both training groups significantly improved leg press (S, 80.7% and SE, 42.4%, P<0.001 respectively) and leg extension strength (S, 71% and SE, 35.7%, P=0.000 respectively). However, only the S group showed a significant increase in seated bench press maximal strength (S, +116.7%, SE, +13.6%, P=0.266 and P=0.000 respectively). Over the 8-week training period, the SE group showed significant changes in BMI and in waist circumference (-5.3%, P=0.016 and -3.0%, -2.5 cm, P=0.005, respectively). No significant differences were found in the S or C groups. Decreases in body fat and waist circumference were more evident following combined training. In contrast, higher strength gains particularly for the upper body occurred following 8 weeks of strength training alone compared to combined training.

Shenbagavalli et al., (2008) investigated the effect of Aerobic training on Resting pulse rate on sedentary obese men. The collected data were analyzed by using ‘t’ ratio. From the findings it is quiet interesting to know that the sedentary obese men have positive influence upon their Resting pulse rate due to the training programme given.

The aerobic training helped the subjects to decrease the weight and BMI. It is thus concluded that mild aerobic training can be adopted by obese men to decrease the magnitude of obesity.

Swathi et al., (2015) analyzed the effect of aerobic training and Zumba training on physical fitness variables of middle age obese women. To achieve the purpose thirty female participants (n=30, females) housewives' were included in this study. All participants were eligible for inclusion in this study on the basis of their pre-medical record. Their age ranged from 30 to 40 years. Participants were randomly allocated into two groups namely aerobic training group (N=15) and Zumba training group (N=15). Additionally an inform consent was obtained from the participants. The following criterion variables were selected for the study such as cardio respiratory endurance, abdominal strength and flexibility. The training period would be the six weeks except Sunday of every week. The aerobic training group underwent twelve weeks of aerobic training, while the Zumba training group underwent twelve weeks of zumba training. Outcomes were measured at baseline and after the 12 weeks of intervention. The data were collected before and after the training period and the pretest, posttest were analyzed by 't' ratio. The level of significance for the study was chosen as 0.05. It is concluded that the physical fitness variables namely cardio respiratory endurance, abdominal strength and flexibility are significantly improved due to aerobic training. It is also concluded that the physical fitness variables namely cardio respiratory endurance, abdominal strength and flexibility are significantly improved due to zumba training.

Zinggui et al., (2020) evaluated the effectiveness of continuous aerobic exercise on lung function and quality of life of asthmatic patients. We searched PubMed, EMBASE, and the Cochrane Central Register of Controlled Trials databases up to May 2019 and included randomized controlled trials (RCTs) of asthmatic patients intervened with whole body continuous aerobic exercise (moderate intensity, at least 20 minutes and two times a week, over a minimum period of four weeks), in which the endpoint measures were lung function and asthma-related quality of life. A fixed-effects model ($I^2 \leq 50\%$) or random-effects model ($I^2 > 50\%$) was applied to calculate the pooled effects according to the I^2 -and Chi-squared (χ^2) test, funnel plots were quantified to present publication bias, and a P value < 0.05 was statistically significant. Eventually, 22 trials conformed to the selection criteria. In the aerobic exercise group, the forced expiratory volume improved in one second (FEV1) ($I^2 = 10.2\%$, WMD: 0.12, $P = 0.011$), peak expiratory flow (PEF) ($I^2 = 87.3\%$, WMD: 0.66, $P = 0.002$), forced vital capacity (FVC) ($I^2 = 0.0\%$, WMD: 0.18, $P < 0.001$), FVC/predict ($I^2 = 3.9\%$, WMD: 4.3, $P = 0.014$), forced expiratory flow between 25% and 75% of vital capacity (FEF25–75%) ($I^2 = 0.0\%$, WMD: 9.6, $P = 0.005$), Asthma Quality of Life Questionnaire (AQLQ) ($I^2 = 0.0\%$, WMD: 0.20, $P = 0.002$), and Pediatric Asthma Quality of life Questionnaire (PAQLQ) ($I^2 = 72.1\%$, WMD: 0.81, $P < 0.001$), respectively, while no statistical significance existed in FEV1%predict ($I^2 = 36.0\%$, WMD: 0.68, $P = 0.312$) and FEV1/FVC ratio ($I^2 = 0.0\%$, WMD: 0.27, $P = 0.443$) compared with the control group. When the exercise mode was taken into account, we observed significant improvement in FEV1, PEF, and FVC in the swimming ($P < 0.05$) or indoor treadmill ($P < 0.05$) training group. Our meta-analysis

proved that regular continuous aerobic exercise benefits asthma patients on FEV1, PEF, FVC, FVC% pred, FEF25–75%, and quality of life, and was well tolerated, while there were no improvements in FEV1%pred and FEV1/FVC%. As such, swimming and treadmill training may be appropriate options.

2.2 STUDIES ON YOGA

Amandeep (2017) investigated effect of yoga on test anxiety of secondary school students. Pre experimental design was used to obtain pertinent and precise information. The study enlists the following objectives. There exists significant difference between mean scores of pre-test and post-test group of students on test anxiety with mean of post test scores on the higher end. Therefore, yoga has made significant impact in reducing test anxiety of students. There exists significant difference between mean of pre-test and post-test scores of male and female 6 students on test anxiety with mean of post test scores on the higher end for both genders. Therefore, yoga has made significant impact in reducing test anxiety of both male and female students. There exists no significant difference between test anxiety of male and female students before and after yogic intervention. This means that gender has not made any impact on the test anxiety of students before and after yogic intervention.

Bal et al., (2009) determined the effects of selected asanas in hatha yoga on agility and flexibility level. The subjects were subjected to the six week yogasanas training programme that includes Swastikasana, Mayurasana, Matsyendrasana, Paschimottanasana and Gomukhasana. The difference in the mean of each group for selected variable was tested for the significance of difference by “t” test. The level of

significance was set at 0.05. The results have shown the significant improvement in flexibility, since $\text{cal. } t (= 8.122) > \text{tab } t .05 (14) (= 2.145)$. The treatment of six week yogasanas training programme also shown significant improvement in case of agility, since $\text{cal. } t (= 7.376) > \text{tab } t .05 (14) (= 2.145)$.

Baljinder, (2015) determined the effects of 4-weeks Training of Kapalbhathi Pranayama on Components of Health-Related Fitness. Based on the analysis of the results obtained, we conclude that the significant differences were found in Components of Health-Related Fitness (i.e., Cardiorespiratory Endurance, Flexibility, % Body Fat, Fat Weight and Lean Body Weight) of University Level Girls. Insignificant between-group differences were noted in Muscular Strength and Muscular Endurance of University Level Girls.

Boggiti et al., (2013) examined whether the field hockey players have better psychological performance through the yogic training. we are taken 60 players It was concluded that twelve weeks yogic exercises significantly altered anxiety, aggression, self-confidence of the inter university hockey players. It was concluded that six weeks autogenic exercises significantly altered anxiety, aggression, self-confidence, achievement motivation and stress of the inter university hockey players. It was concluded that there was no significant differences between yogic exercises and autogenic training groups on anxiety, aggression, and self-confidence of the interuniversity hockey players. Compare to previous work anxiety is saved of 8% aggression is saved of 99% and self-confidence is saved of 99%.

Brian et al., (2013) determined the effect of short-term Bikram yoga training on general physical fitness. Young healthy adults were randomized to yoga training (N = 10, 29.66 years, 24 sessions in 8 weeks) or control group (N = 11, 26.67 years). Each yoga training session consisted of 90-minute standardized supervised posture performed in a heated and humidified studio. Isometric dead lift strength, handgrip strength, lower back/hamstring and shoulder flexibility, resting heart rate and blood pressure, maximal oxygen consumption (treadmill), and lean and fat mass (dual-energy x-ray absorptiometry) were measured before and after training. Yoga subjects exhibited increased dead lift strength, substantially increased lower back/hamstring flexibility, increased shoulder flexibility, and modestly decreased body fat compared with control group. There were no changes in handgrip strength, cardiovascular measures, or maximal aerobic fitness. In summary, this short-term yoga training protocol produced beneficial changes in musculoskeletal fitness that were specific to the training stimulus.

Caren et al., (2015) examined the effects of a 12-week Hatha yoga intervention on cardio respiratory endurance, Muscular strength, and flexibility in Chinese adults. 173 adults were assigned to either the yoga intervention group ($n = 87$) or the waitlist control group ($n = 86$). 19 dropped out from the study. Primary outcomes were changes in cardiorespiratory endurance (resting heart rate (HR) and maximal oxygen uptake (VO₂max)), Muscular strength (curl-up and push-up tests), and lower back and hamstring flexibility (the modified back-saver sit-and-reach (MBS) test). Compared to controls, the yoga group achieved significant improvements in VO₂max

($P < 0.01$), curl-up ($P < 0.05$) and push-up ($P < 0.001$) tests, and the MBS left and right leg tests (both $P < 0.001$) in both genders. Significant change was also found for resting HR between groups in women ($P < 0.05$) but not in men.

Deba et al., (2015) investigated the effect of Hatha yoga, Aerobic training and combination of hatha yoga and aerobic training on physical fitness of college level students. Subjects were divided into four equal groups on random basis (Groups A, B, C & D) consisting.

Divyalaxmi et al., (2013) analysed the effects of asana and core training on breath holding time, vo2 max and resting pulse rate level of middle aged working women. The sample consisting of sixty middle aged women ranging between 35-50 years. They were divided into two groups, consisting control group and experimental group. The control group was not given any treatment and the experimental group was given asana and core training programme was given five days per week for a period of 8 weeks. All the subjects were subjected for pre and post test. Physiological variables of breath holding time, vo2 max and resting pulse rate level. The data collected from the subjects were statistically analyzed with 't' ratio to find out significant difference among experimental group and control group and physiological variables if any. The result indicates that eight weeks of asana and core training programme produced significant improvement in breath holding time, vo2 max and resting heart rate level.

Fatemeh et al., (2013) investigated the effect of one-month fasting along with yoga training on the body composition of novice female athletes. Twenty trained women were randomly assigned to experimental (n=10) and control (n=10) groups.

The experimental group participated in yoga training classes for 4 weeks, two 60-min sessions per week; the control group did not participate in any regular exercise programs. This study was conducted on two fasting groups in the month of Ramadan, 2012. The study variables including body fat percentage, Resting pulse rate (BPM), waist circumference and waist-to-hip ratio (WHR) were measured in three stages: a week before Ramadan, the fifteenth day of Ramadan, and a week after Ramadan. The results showed that BMI in the fasting yoga group decreased; however the changes of BMI in the control group were not significant. Also, subcutaneous fat showed significant reduction in both experimental and control groups, though the changes were more significant in the exercise group; also, the results showed that waist-to-hip ratio significantly changed in the experimental group. As to the results, yoga exercises along with fasting can help overweight people to experience ideal weight loss; also for the athletes who stop exercising in Ramadan, yoga can be used as an alternative to maintain their weight.

Giridharaprasath et al., (2017) investigated the health related parameters response to the influence of on tribal students. To achieve the purpose of the study 30 tribal students were selected from N.S.Iya memorial higher secondary school, Ketti Palada, The Nilgiris. The subjects were randomly assigned to two equal groups (n=15). Group- I underwent aerobic dance (ADG) and group - II was acted as control group (CG). The aerobic dance was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work. The health related fitness

parameters of were measured before and after training period. The data collected from the subjects was statistically analyzed with 't' test to find out significant improvement if any at 0.05 level of confidence. The result of the body composition, cardio respiratory endurance, muscular strength and flexibility speculated significant improvement due to influence of Aerobic dance with the limitations of (diet, climate, life style) status and previous training. The result of the present study coincide findings of the investigation done by different experts in the field of sports sciences. Aerobic dance significantly improved body composition, cardio respiratory endurance, muscular strength and flexibility of Tribal students.

Gurpreet (2003) analyzed the effect of selected asanas on the flexibility of wicket keepers in Cricket. A total No. of 30 wicket keepers, ages ranging between 21 to 30 years were randomly selected to act as subject for the study. The results reveals that there was a significant difference wicket keepers in pre and post test as the mean and standard deviation value of the pre test was 32.43 and 7.31 respectively, whereas the mean and standard deviation values of the post test1, post test2, post test3 and post4 were found to be 34.30 and 7.51, 35.60 and 6.95, 36.50 and 6.84 and 38.53 and 7.50 respectively. The values of Repeated Measure One Way ANOVA shows that the F value of assumed Sphericity was found to be 27.62 against the tabulated value of 2.44 which was significant at 0.05 level. The finding of the present study has strongly indicated that asana training has improved the flexibility of the wicket keepers in cricket. Hence the hypothesis previously said that asana training will improve flexibility of Cricket players is accepted.

Komal et al., (2017) conduct a study to find out the effect of Rajyoga meditation on VO₂ max. 40 healthy male volunteers in the age group of 18-20 years were included in the study. They were randomly allocated into control and intervention groups by blind-cheat technique with 20 participants in each group. Group-A participants were control while Group-B participants were given intervention in the form of Rajyoga meditation under the guidance of Rajyoga trainer for duration of 4 months. VO₂ max was assessed in both groups using AD-instrument before and after 4 months study. Results: Student's paired t-test was used to compare pre- and post-interventional results. Increased VO₂ max was seen in intervention group as compared to control group. $P < 0.05$ was considered statistically significant. VO₂ max indicates aerobic capacity and physical fitness of an individual. Increased VO₂ max after Rajyoga meditation ensures good cardiorespiratory endurance.

Langpoklakpam et al., (2014) analysed the effect of three month yogic exercise in state level football players 50 state level football players were selected as a subject. The pre-test, mid test and post test had been taken by using Dynamic flexibility test, side split flexibility test and shoulder and wrist elevation flexibility test tools. To determine the difference between the 3 groups (initial, mid and post test) of state level football players F test was employed at 0.05 significance level. And to determine the training effect the t test for comparison mean was employed for two tails at the confidence level 0.05 level of significant. The comparative between the initial and post test of dynamic flexibility test, side split flexibility test and shoulder

and wrist elevation flexibility test for the state level football players were found to be statistically significant at .05 confidence level as the values 10.676, 10.003 and 10.102 respectively were found greater than the tabulation value (1.98).

Malathy et al., (2015) analysed to find out the influence of physical exercise, circuit training and yogic practice on endurance among college girls in Tamilnadu state. The experimental group participated in the physical exercise training, circuit training and yogic practice respectively for 12 weeks, 6 days in a week, one session per day and each session lasted 90 minutes. It was concluded that Iyengar yoga practices training group was significantly better than the sundara yoga training group.

Meshram et al., (2021) assessed the effect of yogic exercise module on aerobic capacity (VO₂ max). Total forty, first year MBBS male students, age 18-20 years with normal Resting pulse rate were included in the study. They performed yogic exercise in the form of module which included a set of physical postures (asana), breathing techniques (pranayama), and meditation (dhyana) for 35mins, 5times /week for 6 months. VO₂ max was assessed using (AD-Instrument) pre and post interventional. Mann Whitney U test was used to compare pre and post interventional results. VO₂ max was found to be increased after 6 months practice of yogic exercise. $P < 0.05$ was considered statistically significant. Aerobic capacity of young adult participants was found to be enhanced after 6 month's practice yogic exercise module.

Newby (2014) investigated the effects of a mindfulness-based intervention, Yoga with Meditation (YWM), on self-criticism, self-compassion, and mindfulness in a graduate student population. When compared to a control group, the experimental

group reported decreased self-criticism, and increased self-compassion and mindfulness. The experimental group consisted of graduate students interested in participating in weekly yoga and meditation classes over the course of a two-month time period. Each participant was encouraged to complete self-report measures prior to the first YWM session, and after the completion of each YWM class. Baseline and post-intervention scores of 24 individuals who attended at least four of the classes were included in the data analysis. The control group consisted of 24 graduate students in a research methods class who voluntarily completed the measures at week one for baseline data and at week four of the study to obtain post-test scores. The measures included the Philadelphia Mindfulness Scale (PHLMS), the Levels of Self-Criticism Scale (LOSC), and the Self- Compassion Scale (SCS). The YWM group reported significant decreased scores on the LOSC, and increased scores on the SCS and PHLMS, when compared to the control group who reported no significant changes from baseline to post-intervention. Results suggest that YWM may be a useful tool to increase levels of mindfulness and selfcompassion, and more importantly, to decrease levels of self-criticism.

Pranati et al., (2017) examined the effect of breathing exercises against aerobic exercises in improving the general health of asymptomatic population. The selected subjects were randomly assigned into two groups (Breathing and Aerobic) with 16 subjects each. Breathing group performed breathing exercise in supine, sitting, crook lying and standing with inspiration : expiration ratio 1:1,1:2,1:2:2 for a periods of 6 weeks. Aerobic group performed cycling, stair climbing, walking on ramp.

Total duration of exercise was 5 days per week for 6 weeks. Results of the study showed significant reduction in pulse rate, blood pressure and skin fold thickness from pre to post intervention in both breathing and aerobic group. It also found that, there was significant improvement in vital capacity, MVV, VO2 Max and quality of life from pre to post intervention in both breathing and aerobic group. However there was no statistically significant difference between both groups with regard to the above variables except VO2 Max, which was significantly improved more in aerobic group and skin fold thickness, which was significantly reduced in aerobic group.

Shenbagavalli et al., (2012) examined the effect of specific yogic exercises programme and combination of specific yogic exercises with autogenic training programme on selected physiological variables such as pulse rate, vital capacity, percent body fat, psychological variables such as job anxiety, occupational stress and biochemical variables such as high density lipoprotein, low density lipoprotein and fasting blood sugar of the college men students. Sixty Men students in the age group of 20 to 30 years from the Alagappa University were randomly selected and served as the subjects for the purpose of this study. Practice of the combination of specific yogic exercises with autogenic training and specific yogic exercises programme is significantly effective in promoting desirable changes in the dependent variables.

Volga et al., (2013) analysed the effect of yoga and aerobic trainings on pulmonary and physical fitness factors of healthy female university students. This quasi-experimental study included 60 healthy female students who were randomly assigned into two groups; exercising yoga and aerobics twice a week for three months.

Respiratory rate (RR) along with Pulmonary Function Tests such as pulmonary capacities (PEF, PIF, FEV1, FVC), and physical weight), physical (PWC170 index) and aerobic fitness (predicted VO₂max), spirometry (tidal volume, breathing frequency (BF), minute ventilation (MV), expiratory reserve volume (ERV) and vital capacity (VC) and filled in International Physical Activity Questionnaire (IPAQ). Both MV and VC were directly and statistically significantly associated with aerobic fitness, physical fitness and amount of physical activity. Vigorous PA independently was directly and statistically significantly associated with physical fitness and aerobic fitness. After adjusting for sex, BF was inversely and statistically significantly associated with physical activity amount in female. Both female and male had inverse and statistically significant association of BMI and relative VO₂max.

Zahra et al., (2015) examined the effect of an eight-week yoga and aerobic exercise on selected biomechanical parameters in 30-40-year old women. The yoga and aerobics group's performed their respective exercises for eight weeks (three sessions per week). The following tests were performed before and after the training program: flexibility, muscular endurance (situps), anaerobic capacity (Sargent test), static balance (Stork test), dynamic balance (tandem walking test), and agility (4×9 test). Data were analyzed using the Kolmogorov-Smirnov test of normality and t-tests for independent and correlated samples. The results showed that all the parameters improved in yoga and aerobics groups compared to the controls, except for anaerobic capacity in the yoga group. Moreover, anaerobic exercise, muscular endurance, and agility were higher in the aerobics group than the yoga group. Implications for research are provided.

2.3 STUDIES ON CARDIO-PULMONARY, PHYSICAL FITNESS AND PSYCHOLOGICAL VARIABLES

Adrian et al., (1993) examined relationship between short-term changes in self-concept and mood associated with aerobic dance participation. Female aerobic dance participants (n = 75) and female university students (n = 42) completed multidimensional measures of mood (Profile of Mood States; Shacham, 1983) and self-concept (Self-Description Questionnaire III; Marsh, 1992) before and after their respective activities. Analyses revealed significant positive changes for aerobic dance participants on specific dimensions of mood, whereas controls showed minimal changes. Similar analyses for self-concept revealed significant, but weak changes on 10 of 13 scales by aerobic participants. Controls showed one positive and one negative change. Neither extent of mood change, or Social Physique Anxiety, mediated changes in self-concept. Generally, correlations between self-concept and mood scales were not high, although emotional stability self-concept, physical appearance self-concept, and global self-concept correlated moderately with specific dimensions of mood

Biddle et al., (2011) reviewed by investigating physical activity and depression, anxiety, self-esteem and cognitive functioning in children and adolescents. In addition, a brief review was undertaken to assess the association between sedentary behaviour and mental health. Searches were performed in 2010. Inclusion criteria specified review papers reporting chronic physical activity and at least one mental health outcome that included depression, anxiety/stress, self-esteem, and cognitive functioning

with children or adolescents. Four review papers reported evidence concerning depression, four for anxiety, three for self-esteem, and seven for cognitive functioning. Nine primary studies assessed associations between sedentary behaviour and mental health. Physical activity has potentially beneficial effects for reduced depression, but the evidence base is weak. Intervention designs are low in quality, and many reviews include cross-sectional studies. Physical activity interventions have been shown to have a small beneficial effect for reduced anxiety but the evidence base is limited. Physical activity can lead to improvements in self-esteem, at least in the short term. However, there is a paucity of good quality research. Reviews on physical activity and cognitive functioning have shown evidence that routine physical activity can be associated with improved cognitive performance and academic achievement, but these associations are usually small and inconsistent. Primary studies showed consistent negative associations between mental health and sedentary behaviour. Associations between physical activity and mental health in young people is evident, but research designs are often weak and effects are small-to-moderate. Evidence shows small but consistent associations between sedentary screen-time and poorer mental health.

Bhargava et al., (1998) analysed the effect of autonomic responses to breath holding were studied in twenty healthy young men. Breath was held at different phases of respiration and parameters recorded were Breath holding time, heart rate systolic and diastolic blood pressure and galvanic skin resistance (GSR). After taking initial recordings all the subjects practised Nadi-Shodhana Pranayama for a period of 4 weeks. At the end of 4 weeks same parameters were again recorded and the results

compared. Baseline heart rate and blood pressure (systolic and diastolic) showed a tendency to decrease and both these autonomic parameters were significantly decreased at breaking point after pranayamic breathing. Although the GSR was recorded in all subjects the observations made were not conclusive. Thus pranayama breathing exercises appear to alter autonomic responses to breath holding probably by increasing vagal tone and decreasing sympathetic discharges.

Chanelle et al., (2009) determined whether a 10 week aerobic-based exercise programme performed twice a week, with a 30 minutes duration and an intensity level of 55 – 70% heart rate max would improve aerobic endurance, muscular strength, muscular endurance, flexibility and body composition of 10 – 15 year-old girls living in a farming community. It was concluded that an aerobic-based exercise programme, conducted in a playful and enjoyable manner and according to guidelines set for health enhancement, can improve aerobic endurance, leading to increased physical activity among girls in their teenage years.

Davar et al., (2011) conducted a research that was categorized as “applied” and was conducted with a semi-experimental design. All the male athlete students of the Khorramshahr Marine Science and Technology University make up the Statistical population (N=168) from which 30 subjects were randomly chose and again, randomly divided, in to 2 equal groups, each 15 (group1: aerobic, group2: anaerobic). The smirnov-kolmogorov test, the independent t-test and the dependant t-test were used to test the hypotheses ($\alpha=0.05$). The results showed a meaningful relationship both between the six-week anaerobic intermittent exercises and VO_2max , IRV, ERV

and between the six-week aerobic intermittent exercises and VO₂max, IRV, ERV, VC, TLC. According to the results of this study, a six-week aerobic and anaerobic intermittent swimming had significant effect on VO₂max and some lung volumes and capacities in student athletes.

Diego et al., (2014) evaluated the effect of an aerobic physical exercise program without dietary intervention prescribed with blood lactate levels on body composition and lipid profile of overweight adolescents. A randomized study consisting of pre- and post-treatment tests was conducted on overweight adolescents who were randomly divided into an experimental group submitted to an aerobic exercise program and a control group. The exercise program lasted 12 weeks. After the intervention, a reduction in triceps skinfold thickness, percent body fat and fat mass and an increase in fat-free mass and lipid profile (HDL-c) were observed in the experimental group ($p < 0.05$). These findings indicate a possible reduction in the risk of cardiovascular diseases in overweight adolescents who regularly exercise.

Cassidy (2016) assessed adherence to exercise over a 7 week programme and to explore the role of stress, mood, self-efficacy, optimism, resilience, growth and self-compassion in relation to exercise and exercise adherence. Overall 74 female university students, 42 in the experimental condition and 32 in the control group, were assessed at 3 time points over the 7 weeks. Control participants were matched for age and body shape. Those who scored higher on self-compassion, resilience and growth were more likely to complete the programme and taking part in the programme was associated with increased positive mood and reduced perceived stress.

Additionally, exercise appeared to increase optimism, self-efficacy, resilience and perceived growth while reducing pessimism. **Guner et al., (2018)** investigated the effect of aerobic and core strength exercises on forced vital capacity in sedentary women. A total of 40 healthy sedentary women (20 in an aerobic-step group and 20 in a core strength exercise group) with a mean age of 34.4 ± 2.4 years participated voluntarily in this study. Two different exercises were applied to the women for 12 weeks, 4 days a week, at the intensity of 70% for 60 minutes. The women's resting heart rate (RHR), maximal oxygen consumption ($VO_2\max$), forced vital capacity (FVC), and forced air volume in the first second of forced expiration (FEV1) were measured before and after exercise. For statistical analysis, the Paired Samples-t test was used for intra-group evaluations, and the Independent Samples-t test was used for inter-group evaluations. After the exercise program, significant increases were found in the $VO_2\max$, FVC, and FEV1 values, while both groups experienced a decreased RHR ($p < 0.01$). Since the aerobic and forced vital capacities of the sedentary women show a parallel increase as a result of the applied 12-week aerobic and core strength exercises, it can be said that the RHR, $VO_2\max$, FEV, and FEV1 respiratory parameters also improved in a positive manner.

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Gormley et al., (2008) determined the effect of Intensity of Aerobic Training on $\dot{V} \text{O}_2\text{max}$. whether various intensities of aerobic training differentially affect aerobic capacity as well as resting HR and resting blood pressure (BP). Fifty-five subjects completed a 6-wk training protocol on a stationary bicycle ergometer and pre- and post testing. During the final 4 wk, the moderate-intensity group exercised for 60 min, 4 d/wk; the vigorous-intensity group exercised for 40 min, 4 d/wk; and the near-maximal-intensity group exercised 3 d/wk performing 5 min at 75% $\dot{V} \text{O}_2\text{R}$ followed by five intervals of 5 min at 95% $\dot{V} \text{O}_2\text{R}$ and 5 min at 50% VO_2R . VO_2max significantly increased in all exercising groups by 7.2, 4.8, and 3.4 mL/min/kg in the near-maximal-, the vigorous-, and the moderate-intensity groups, respectively. Percent increases in the near-maximal- (20.6%), the vigorous- (14.3%), and the moderate-intensity (10.0%) groups were all significantly different

from each other ($P < 0.05$). There were no significant changes in resting HR and BP in any group. Conclusion: When volume of exercise is controlled, higher intensities of exercise are more effective for improving $\dot{V}O_2\text{max}$ than lower intensities of exercise in healthy, young adults.

Jaywant (2013) determined dance aerobics is a popular means of exercise in the urban population. This study evaluates effect of Dance Aerobics on cardiovascular endurance and body fat percentage in middle aged women. To ensure uniformity in the findings, Cooper Protocol, a standardised protocol for dance aerobics was followed, ensuring optimal exercise intensity and minimal musculotendinous damage. 120 middle aged women divided in two groups were examined for $VO_2\text{max}$ and body fat percentage. Group I comprised 60 women engaged in regular aerobic dance sessions, since 6 months. Group II did not engage in any exertional physical activity. Unpaired t test was used. $p = 0.001$ considered significant. Aerobic dancers exhibited i) no significant difference in $VO_2\text{max}$ ($p = 0.00201$) ii) lower fat percentage ($p = 0.01462$), indicating aerobics is highly effective in weightloss, but effects on cardiovascular endurance are not pronounced. Increasing intensity of existing protocol to achieve increased $VO_2\text{max}$ may hasten musculotendinous damage. This should be considered before an individual selects aerobic dancing as fitness activity.

Lehri et al., (2006) conducted a study on 120 females ranging in age from 20 to 40 years to determine the effectivity of different exercise programmes in causing weight loss and favourable body composition. Based on the results of the study, it is concluded that both the strength training and aerobic exercise programs

exhibit great potentials for weight management. Aerobic training has been observed to decrease body weight from both the fat and muscle compartments while strength training conserved the lean body mass and reduced the fat compartment and thus caused favourable body composition in females.

Lee (2013) examined the effects of a 12-week Aerobics and Exercise Perception course on Health-related Physical Fitness and Exercise Behavior of the middle-aged and elderly people. It is concluded that Aerobics and Exercise Perception course could improve Exercise Attitude of the middle-aged and elderly participants and enhance the cardiopulmonary, muscular, and flexibility fitness. For the improvement of body composition, intervention in exercise and diet control suitable for individuals should be planned so as to reduce weight and enhance health.

Lemma (2014) evaluated the effects of selected types of aerobic exercise on enhancing muscular endurance, strength and flexibility of young male karate trainees. After 12 weeks of training the LIEG, MIEG and HIEG achieved an average of 11.95 (73.12 %), 16.2(97.66%) and 15.2 (82.18%) mean difference respectively on improving muscular endurance. The LIEG achieved an average of 3.45 MD of muscular strength, MIEG gained an average of 6.53 MD and HIEG achieved an improvement of the muscular strength with an average of 6.58 MD. On the other hand, LIEG achieved an average of 17.66% of MD, 33.25% of MD in the MIEG and 33.41% of MD in HIEG in improving muscular strength level. When LIEG achieved an average of 7.99MD, the MIEG gained 6.49MD and achieved 6.07MD in flexibility. In other words, LIEG achieved an average of 97.64% MD on performance

of flexibility, MIEG gained an average of 51.29% and HIEG achieved an average of 56.58% in MD of flexibility. According to the results of these exercise training, the improvement of muscular endurance, strength and flexibility in the low, moderate and high intensity training level are 7.79 MD, 9.75 MD and 9.72 MD respectively.

Ozcan et al., (2011) investigated the effects of 12 week aerobic exercise program on health related fitness components and blood lipids in obese girls. In this study, a total of 40 girls were recruited as exercise group (n = 20) and control group (n = 19). Participants joined sessions for 60 min per day, 3 days per week for 12-week. There were significant differences in weight, Resting pulse rate (BPM), flexibility, sit-ups, hand grip for both hands, VO₂max, skin fold measurements (thigh, triceps, biceps, abdomen, suprailiac, subscapula, chest, body fat percent, heart rate, high density lipoproteins (HDL), low density lipoproteins (LDL), total cholesterol, and triglyceride between pre-test and post test scores in the exercise group (p< 0.05). It was concluded that regular aerobic exercise may affect health related fitness components and blood lipids positively in girls. Furthermore, it may result in decreasing obesity in girl.

Parisa et al., (2011) examined the effect of six-week aerobic interval training on some Blood lipids and VO₂max in female athlete students. Thus, 15 players of university's teams with an average age of 19.4–25.7, height of 158.8–172.6 centimetres, and weight of 45.3–63.8 kg were chosen. The effect of six- week aerobic interval training on body weight, waist circumference, body mass index, triglycerides, total cholesterol, HDL-cholesterol, LDL-cholesterol and VO₂max was evaluated on pre

and post test. The subjects participated in four weekly 60–75 minute training sessions in a 6 week period. Descriptive statistic and t-Test at ($\alpha = 0.05$) were used to analyze data. The results showed that there was a significant difference in body weight, waist circumference, body mass index, triglycerides, total cholesterol, HDL-cholesterol and VO₂max. According to the results, the training programs produced significant benefits on some blood lipids and VO₂max in athletes.

Schiffer *et al.*, (2008) determined the Aerobic Dance and Health and Fitness Effects in Middle-Aged Premenopausal Women. The goal of the study was to evaluate the long-term adaptations in endurance and strength as well as changes in blood lipoprotein concentrations after participation in an aerobic dance and fitness programme (AD) in middle-aged sedentary healthy women. Eighteen healthy women (Age 43 ± 7 years) participated in the study. Subjects were randomly assigned to either a non exercising control group (n=8) or a training group (n=10). The training group exercised AD twice a week for 3 months. In addition to the anthropometric data and blood lipoproteins, endurance capacity and core muscle strength was analyzed before and after the training period. 12 weeks of AD training (ADI) decreased heart rate significantly at given running speeds ($p < 0.05$) in an incremental field test. Strength tests showed an increase in abdominal muscle strength ($p < 0.01$). The ADI did not result in any significant alteration of blood lipoproteins and body composition. Length and intensity of the ADI were not sufficient to evoke improvements in blood

lipoproteins or body composition. Even though AD partly stresses intensive anaerobic metabolic pathways which are considered to have negative effects on blood lipoproteins low and high density blood lipoproteins were not impaired.

Udatha et al., (2020) evaluated the effectiveness of aerobic exercises on depressive symptoms, anxiety, self-esteem, and quality of life among adults suffering from depression. Participants (N = 80) were assigned to the experimental group (40), received the aerobic exercises along with medication and control group (40), received the medication only. The intervention was carried out over a period of 8 weeks with the intervention group performing the exercise for 3 days a week. The mean age of the experimental group 40.0 ± 10.18 and control group is 43.63 ± 11.86 respectively. Significant reduction was seen in the depressive symptoms and anxiety when in intervention group when compared to control group using independent t-test. The study also showed improvement in the self-esteem and overall quality of life scores and specifically significant improvement was seen in the area of psychological, social and environmental domain as measured by WHO QOL scale. The study concludes that exercise had definitely helped in reducing the depressive symptoms, anxiety and improved the self-esteem and quality of life of patients with depression. The study was found to be cost-effective and feasible to be made as a routine intervention along with medication for patients to manage depressive symptoms.

Umang et al., (2015) determined if vital capacity can predict quality of life as well as document the effect of aerobic exercise on vital capacity. Participants were selected from different offices, call centres and IT sectors in Jaipur (Rajasthan).

Incentive Spirometer was used to measure vital capacity and WHOQOL was used to measure quality of life. The results of present study indicate that three weeks intervention of moderate intensity aerobic exercises training improves the vital capacity and quality of life in the asymptomatic individuals with sedentary lifestyle. However the aerobic training was more effective in physical domain of quality of life. The present study concluded that there is a significant increase in vital capacity and physical domain of health related quality of life in asymptomatic individuals with sedentary lifestyle as an effect of moderate intensity aerobic exercises i.e treadmill running for 3 weeks.

Yadav et al., (2011) determined the effects of yogasanas and pilates exercises training on physical status variables including flexibility and Cardiovascular Endurance. Fortyfive randomly selected male students of K. V. Pattom, Trivandrum, India aged 18 –24 years, volunteered to participate in the study. Subjects were assigned into three groups: I (experimental A: N-15), II (experimental B: N-15) and III (control: N-15). The subjects from Group I and II were subjected to 12-weeks yoga and pilates training programme. Each yoga session consisted of 25 minutes of asanas, 15 minutes of pranayamas, and 5 minutes of supine relaxation in savasana. The subjects were evaluated pre and post the 12-week training program. Analysis of covariance was used to assess the between-group differences for dependent data to assess the Post-Pre differences. Results indicated including flexibility and Cardiovascular Endurance variables including ($p < 0.05$) significantly improved in group I and II compared with the control group. There was non-significant difference

was found between two experimental groups for flexibility and cardiovascular endurance. These findings indicate that regular yoga and pilates practice can elicit improvements in the flexibility and cardiovascular endurance.

Zahra et al., (2013) examined the effect of interval aerobic exercise on forced vital capacity in non-active female students. Forty healthy non-active female students with no cardiovascular and pulmonary disease and skeletal deformity or smoking experience were randomly selected and divided into two groups; experimental group (N=20) and control group (N=20). The experimental group performed 36 sessions of 45-minute interval aerobic running with 65-80% of heart rate reserve while control group had no training program. Before beginning exercise plan and after 18th, 24th and 36th session of training program, forced vital capacity (FVC) was evaluated by Lung Test1000 Spirometer. The results were analyzed by General Linear Model- Repeated Measures and the mean differences were tested. $P > 0.05$ was considered as non-significant. The results showed that interval aerobic training had significant effect on forced expiratory vital capacity (FVC EX) and forced inspiratory vital capacity (FVC IN) ($P < 0.05$). It seems interval aerobic training programs can be used.