CHAPTER II

REVIEW OF RELATED LITERATURE

Reviews on Physical variables

Ozcan Saygin and Mehmet Ali ozturk (2011) conducted a study on the effect of twelve week aerobic exercise programme on health related physical fitness components and blood lipids in obese girls. The aim of this study was to investigate 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, body mass index (BMI), 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 girls.

Dr Fatma Arslan (2011) conducted a study on the effects of an eight-week step-aerobic dance exercise programme on body composition
parameters in middle-aged sedentary obese women. Background: Regular physical activity leads to significant changes in terms of the reduction of health-related risks. Research question: The purpose of this study was to investigate the effects of an eight-week step-aerobic dance exercise programme on weight loss and body composition parameters in middle-aged sedentary obese women. Type of study: This study comprised an eight-week randomised controlled trial. Methods: A total of 49 healthy sedentary obese women participated in this study voluntarily. They were randomly divided into two groups: that undertaking a step-aerobic dance extends (BMI), weight, waist circumference, waist-hip ratio, four-site skin fold thickness, fat percentage, basal metabolic rate and lean body mass were assessed before and after the completion of the step-aerobic dance exercise programme. Results: After the eight weeks of the step-aerobic dance exercise programme, significant differences were found in the subjects' weight, BMI, body composition parameters, waist-hip ratio (WHR), waist circumference (WC), fat percentage, lean body mass (LBM) and basal metabolic rate (BMR) in the experimental group (p<0.05). There were no significant differences in the control group after the experiment in terms of the same measures (P>0.05). Conclusion: The step aerobic dance programme proved to be a useful exercise modality for weight loss and in terms of body exercise programme (n=29) and a control group (n=20). The subjects took part in a step-aerobic dance
exercise programme for one hour per day, three days a week for eight weeks. The subjects' Body Mass Composition. There was a clear response to the eight-week step aerobic dance programme in terms of central obesity in sedentary obese Turkish women.

Marcelo, Cozzensa Silva, Ayton, Jose Rombaldi, and Anderson, Leandro Peres Campos (2010) conducted a study on Effect of the sequence of aerobic and resistance exercise on physical fitness in women over the age of 50. Concurrent training has been frequently used, although little is known about the effects of the exercise sequence on physical fitness in elderly women. The objective of this study was to determine the effect of the sequence of aerobic and resistance exercise on physical fitness in women over 50 years old. The sample consisted of 26 women randomly divided into two groups: A1 (aerobic and resistance training) and M1 (resistance and aerobic training). Body weight, height, body mass index (BMI), sum of skin folds, flexibility, and leg, back and hand grip strength were measured. Descriptive statistics and one-way ANOVA were used for data analysis, adopting a level of significance of 5%. The results showed significant changes in back strength (p=0.01) and leg strength (p=0.0002) after 12 weeks in group A1, and in leg strength (p=0.02) in group M1. Except for BMI (p=0.05), no differences in anthropometric measures, strength or flexibility were observed between groups after testing. In conclusion,
Improvement of strength and the lack of change in the other indices were observed in the women studied, irrespective of the sequence of concurrent training. This finding is important for older adults since it directly affects improvement in the quality of life and health of this population.

Shenbagavalli, A and Mary, R. D (2008) conducted a study on Effect of Aerobic Training on Body Mass Index on Sedentary Obese men. The aim of this study was to investigate the effect of Aerobic training on Body Mass Index on sedentary obese men. Thirty obese Men were selected randomly and equally divided into two groups - Experimental group and Control group. The experimental group was administered aerobic training programme, five days in a week for a period of 8-weeks. The control group did not involve in any fitness programme or training programme. Once in 2 weeks the load was increased. The Body Mass Index (BMI) was selected as variable. The collected data were analyzed by using t’ ratio. From the findings, it is quite interesting to know that the sedentary obese men have positive influence upon their Body Mass Index due to the training programme given. The aerobic training helped the subjects to decrease the weight and BMI. It is thus concluded that obese men to decrease the magnitude of obesity can adopt mild aerobic training.
Everim Cakmak, et al. (2006) conducted a study on the effects of aerobic dance exercise on body composition changes associated with weight change in sedentary women. The purpose of this study was to assess the effects of aerobic dance on body composition in sedentary overweight women. In this study, Total 55 adult sedentary women participated as volunteers. Body composition (via skin folds caliper), waist hip ratio, waist circumference were measured and body fat percentage, Basal Metabolic Rate and Lean Body Mass were calculated at sedentary women. The measurements were taken twice as before and after aerobic dance exercise being applied an 8-week series of one hour exercise three days per week. The control group did not participate in any physical activity during the six-week period. There were significant differences between pretest and posttest for weight, body mass index, waist circumference, waist hip ratio, metabolic and body composition parameters in exercise group (p<0,05). Besides there were significantly decreased body weight, Lean Body Mass, Basal Metabolic Rate and fat percentage (p<0,05). Furthermore, there were not significant differences between pretest and posttest for waist circumference, waist hip ratio, body composition parameters, Lean Body Mass, Basal Metabolic Rate, body weight and body fat percentage in control group(p>0,05). As a result, it can be say 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.

**Laurence Z. Rubenstein, et al. (2000)** conducted a study on Effects of a Group Exercise Program on Strength, Mobility, and Falls among Fall-Prone Elderly Men. This randomized controlled trial studied the effects of a low- to moderate-intensity group exercise program on strength, endurance, mobility, and fall rates in fall-prone elderly men with chronic impairments. Fifty-nine community-living men mean age 74 years with specific fall risk factors (i.e. leg weakness, impaired gait or balance, previous falls) were randomly assigned to a control group (n=28) or to a 12-week group exercise program (n=31). Exercise sessions (90 minutes, three times per week) focused on increasing strength and endurance and improving mobility and balance. Outcome measures included isokinetic strength and endurance, five physical performance measures, and self-reported physical functioning, health perception, activity level, and falls. Exercisers showed significant improvement in measures of endurance and gait. Isokinetic endurance increased 21% for right knee flexion and 26% for extension. Exercisers had a 10% increase (p < .05) in distance walked in six minutes, and improved (p < .05) scores on an observational gait scale. Isokinetic strength improved only for right knee flexion. Exercise achieved no significant effect on hip or ankle strength, balance, self-reported physical functioning, or number of falls. Activity level increased
within the exercise group. When fall rates were adjusted for activity level, the exercisers had a lower 3-month fall rate than controls (6 falls/1000 hours of activity vs. 16.2 falls/1000 hours, \( p < .05 \)). These findings suggest that exercise can improve endurance, strength, gait, and function in chronically impaired, fall-prone elderly persons. In addition, increased physical activity was associated with reduced fall rates when adjusted for level of activity.

Hideki, Shimamoto, et al. (1998) conducted a study on low Impact Aerobic Dance as a Useful Exercise Mode for Reducing Body Mass in Mildly Obese Middle-Aged women. The purpose of this study was to test the hypothesis that a low impact aerobic dance is a useful exercise mode for weight loss in obese middle-aged women. Sixty Japanese women, aged 50.9 ± 6.7 years (initial %fat = 35.2 ± 5.3%), participated in our 3-month weight-loss program consisting of diet and exercise prescription. To compare the effectiveness of exercise modes, the subjects were divided into the following two groups: aerobic dance group and jogging and/or cycling group. As a result, body mass (-3.1 and -3.3 kg respectively) and %fat (-6.1 and -5.3% respectively) significantly decreased (\( P<0.05 \)) in both groups, while fat-free mass remained essentially unchanged. Aerobic power such as maximal oxygen uptake and oxygen uptake corresponding to lactate threshold significantly increased (\( P<0.05 \)) in both groups. Significant differences in the
alterations of these variables between groups could not be seen. The data of this study indicates that our weight-loss program with a low impact aerobic dance is as useful as jogging or cycling in improving body composition and aerobic power for mildly obese middle-aged women.

**Mills, Eugenia M. (1994)** conducted a study on the effect of low-intensity aerobic exercise on muscle strength, flexibility, and balance among sedentary elderly persons. An experimental group of 20 elderly subjects participated in 8 weeks of low-intensity aerobic exercise while 27 subjects in a comparison group maintained their usual level of activity. The program consisted of stretching and strengthening chair exercises. A significant difference between the groups was found for flexibility of the ankles and the right knee. No significant difference was found between the groups for muscle strength or balance, although the experimental group improved their balance by 22%.

**David R. Hopkins, et al. (1990)** conducted a study on Effect of Low-Impact Aerobic Dance on the functional Fitness of Elderly Women. To determine the effect of low-impact aerobic dance on sedentary elderly women (N=53), functional fitness was measured by items from the proposed American Alliance of health, Physical Education, Recreation, and Dance (AAHPERD) fitness test for older adults. After 12-weeks of low-impact aerobic dance, the group improved significantly on all
functional fitness components except motor control/coordination, including cardio respiratory endurance, strength/endurance, body agility, flexibility, body fat, and balance.

**Reviews on Physiological variables**

**Wiley- Blackwell, et al. (2010)**, Researchers from the University of Grenoble Medical School in France determined that cardio-respiratory aerobic exercise is safe for patients with stable rheumatoid arthritis (RA). The team found that RA patients who exercised regularly had improved function, less joint pain, and greater quality of life. Full findings of the study are now available online and will publish in the July print issue of Arthritis Care & Research, a journal of the American College of Rheumatology. A chronic inflammatory disease characterized by swollen joints, pain, stiffness, fatigue, and general malaise affects up to 1% of the global population, according to the World Health Organization (WHO). The Centers for Disease Control and Prevention (CDC) citing health-related quality of life (HRQL) studies found that RA patients were 40% more likely to report fair or poor general health and twice as likely to have, a health-related activity limitation compared with those without arthritis. The current study led by Athan Baillet, M.D., conducted an abstract search of relative medical journals for studies that researched RA patients and impact of aerobic exercise. The team analyzed 14 studies and
meta-analysis included 510 patients in the intervention group and 530 in the control group. Participants in these studies had a mean age of 44-68 years and their RA disease duration was 1-16 years. Researchers compared HRQL, the Health Assessment Questionnaire (HAQ), joint count, and pain using a visual analog scale (VAS) among patients in the studies. Our results show that patients with stable RA would benefit from regular aerobic exercise,” said Dr. Baillet. "Cardio-respiratory conditioning appears safe and its effects, while small, help to reduce joint pain and improve function.” Researchers assessed the efficacy of exercise on RA symptoms using standardized mean differences (SMDs) which is the difference (between groups) of mean outcome variation from baseline/SD at baseline of aerobic exercises versus non-aerobic rehabilitation. Meta analysis of the research showed that exercise improved the post-intervention quality of life (SMD=0.39), HAQ score (SMD=0.24), and pain VAS (SMD=0.31). The difference in scores between those who exercised and those who had not are considered clinically meaningful by both patients and doctors noted the researchers. The American College of Rheumatology states that exercise is beneficially for everyone, including those with RA, and currently recommends 150 minutes of moderate intensity aerobic activity each week. Safe forms of aerobic exercise, such as walking, aerobic dance, and aquatic exercise, help arthritis patients to control weight, and improve
sleep, mood, and overall health. While past studies have indicated that RA patients are quite physically inactive, our study shows aerobic exercise to be a safe and beneficial intervention for this group. Further trials are needed to clearly determine the clinical impact of cardio-respiratory conditioning in the management of RA," concluded Dr. Baillet.

Ales, Jakubec, et al. (2009) conducted a study on changes in heart rate variability after a six month long aerobic dance or step dance programme in women 40-65 years old: The influence of different degrees of adherence, intensity and initial levels. The aim of the present study was to investigate how changes in heart rate variability (HRV) after a 6 month long aerobic dance or step-dance programme are related to adherence, to exercise intensity and to the initial level of HRV. The experimental group consisted of 44 women aged 47.3 years. Methods used were the spectral analysis of short term recordings of R–R intervals and the incremental uphill walk jog test till maximum on the treadmill. Intervention consisted of a group aerobic exercise, done for a period of six months, three times per week, for 40–45 minutes. Exercise intensity was monitored and followed using monitors of heart rate. There were great differences among the women in the realized training units (9-73). The average weight decrease which occurred measured from 72.1 12.9 kg to 71.1 11.8 kg and the average VO2max increase measured from 33.3 5.7 ml.kg–
1. min–1 to 37.0 5.1 ml·kg–1·min–1. The exercise programme did not cause any statistically significant changes in the monitored parameters of HRV. Only two characteristics of exercise intervention (total duration of the aerobic part of the exercise and the average intensity of the exercise) correlated with changes in HRV. A negative correlation was found between most monitored parameters of HRV and their changes. Correlation analyses suggested that the shift of spectral power from sympathetic to parasympathetic happened in the women with a higher adherence to the programme, but it was shown that the influence of volume and quality of exercise were suppressed by the initial level of each parameter of HRV. The lower or worse the initial values of these parameters were before starting the programme, the greater were their increases in a half a year. With regards to the relationship between aerobic power and ANS activity, it is possible to state that in light of its impact on ANS activity, aerobic dance or step-dance could serve as a suitable exercise activity more for subjects with lower aerobic power.

John P. Porcari, et al. (2009) conducted a study on effects of a 10-week step aerobics training program on the aerobic power and body composition of college-age women. This study determined the effect of a 10-week step aerobics training program on aerobic power and body composition of college-age women (mean age, 19.4 years). Subjects in the experimental group (n = 21) exercised three times per week for 10
weeks, at an intensity that represented 76% of maximal heart rate. A control group (n = 28) did not exercise. All subjects performed a maximal treadmill test, were hydrostatically weighed, and were measured for maximal buttocks, thigh, and calf girth prior to and on completion of the study. Compared with the control group, the experimental group showed significant (p ≤0.05) improvement in peak oxygen consumption (11.7%), maximal minute ventilation (6.7%), and time to exhaustion on the treadmill (33.1%). There was no significant (p >0.05) change in percent body fat in either group. Thus, it appears that step aerobics training can be an effective method of improving aerobic power in college-age women. However, while the acute caloric requirement of step aerobics compares favorably with other modes of exercise, the duration and frequency of training used in the current study was not adequate to affect body composition positively in this group of women.

Lexie, D Williams, et al. (2008) conducted a study on Changes in selected cardio respiratory responses to exercise and in body composition following a 12-week aerobic dance programme. Cardio respiratory and body composition changes were evaluated in 25 sedentary females, aged 18 to 30 years, following 12 weeks of aerobic dance training (3 days a week, 45 min a session). Fifteen subjects, from the same population, comprised a control group: they maintained their normal activity and dietary habits over the course of the study. Analysis of variance of the
values for selected cardio respiratory responses revealed that the aerobic
dance programme produced training effects in the experimental group.
These training effects were indicated by significant improvements in
$O_2$ pulse, $V_E$, heart rate and perceived exertion during sub maximal
exercise. Significant improvements were also noted in $VO_2$ max, maximal
$O_2$ pulse, $V_E$ max, maximal heart rate and maximal running time on the
treadmill. Additionally, increases in lean body mass and body density,
together with decreases in percentage body fat and the sum of four skin
fold thicknesses were found to be significant for the experimental group.
No significant improvements in any of these variables were found for the
control group. It was concluded that this 12-week aerobic dance
programme was successful in promoting beneficial changes in cardio
respiratory fitness and body composition.

**Patricia A. Gillett and Patricia A. Eisenman (2007)** conducted a study
on the effect of intensity controlled aerobic dance exercise on aerobic
capacity of middle-aged, overweight women. The purpose of this study
was to determine the effect of intensity controlled exercise on the aerobic
capacity of overweight, middle-aged women. Thirty-eight moderately
overweight women, age 35–57, participated in a 16-week dance-exercise
program. Random assignment was made to an experimental group ($n = 
20$) in which intensity of exercise was controlled and prescribed, and a
control group ($n = 18$) in which exercise was of an intensity typical to
commercial aerobic classes. Prior to the onset of training, and at the completion of 16 weeks, the following fitness tests were administered: Aerobic capacity expressed as VO$_2$ max, body composition analysis, blood chemistry, blood pressure, resting heart rate, muscular endurance, and flexibility. T-tests, ANCOVA, and gain-score analyses were utilized to evaluate data. Both groups showed small changes in weight, percent fat, resting systolic and diastolic blood pressure, resting heart rate, high density lipoprotein-cholesterol (HDL-C), muscular endurance, and flexibility, but these changes were statistically non significant. The VO$_2$ max for the experimental group increased 41%, while the VO$_2$ max for the control group increased 22% ($p < 0.05$). The results suggest that the cardiovascular fitness changes for overweight, middle-aged women are greater when exercise intensity and progression are tailored to their age and fitness level.

S, Grant and K, Corbett. (2002) conducted a study on a comparison of physiological responses and rating of perceived exertion in two modes of aerobic exercise in men and women over 50 years of age. To compare the physiological responses and ratings of perceived exertion to aerobic dance and walking sessions completed at a self selected pace. Six women and six men with a sample mean (SD) age of 68 (7) years completed aerobic dance and walking sessions in random order. A treadmill test was performed by each subject from which peak oxygen uptake (VO2) and
maximum heart rates (H R max) were determined. During the aerobic dance and walking sessions, heart rate and VO2 were measured continuously throughout. Rate of perceived exertion (RPE) was measured every three minutes throughout the session. The sample means (SD) for %peak VO2 were 67 (17)% for the aerobic dance sessions and 52 (10)% for the walking sessions, and the % H R max sample means (SD) were 74 (12)% for the aerobic dance sessions and 60 (8)% for walking sessions. The sample mean (SD) RPE for the aerobic dance sessions was 11 (2), and for the walking sessions it was 10 (2). %peak VO2, % H R max, and RPE were significantly higher for aerobic dance than for walking. However, both the aerobic dance and walking sessions were of adequate intensity to improve aerobic fitness in most subjects. Further investigation into the relation between RPE and percentage peak VO2 in a field setting over representative exercise time periods would be useful.

Iva, Holmerova, et al. (2001) conducted a study on Effect of the Exercise Dance for Seniors (EXDASE) Program on Lower-Body Functioning among Institutionalized Older Adults. The authors conducted a randomized control trial to examine the effect of the Exercise Dance for Seniors (EXDASE) program on lower-body functioning among older individuals from residential care facilities in the Czech Republic. Participants were randomly assigned into an experimental or control group. The experimental group completed a 3-month EXDASE program.
Lower-body functioning was assessed using four performance-based measures. A 2 (group) × 2 (test) general linear model for repeated measures was used to explore whether differences in performance could be attributed to the intervention. The authors found Group x Test interactions for the chair stand test, $F(1, 50) = 14.37, p < .001$, the 2-minute step test, $F(1, 50) = 7.33, p = .009$, the chair sit-and-reach test, $F(1, 50) = 5.28, p = .026$, and the timed up-and-go test, $F(1, 44) = 6.59, p = .014$, indicating that the experimental group outperformed the control group from pretest to posttest. A relatively simple dance-based exercise can support lower-body functioning in previously sedentary, frail older adults.

A.S. Grant, et al. (1998) conducted a study on comparison of physiological responses and rating of perceived exertion between high-impact and low-impact aerobic dance sessions. The aim of this study was to compare the exercise intensity and rating of perceived exertion (RPE) of a high-impact (HIP) and a low-impact (LIP) university aerobic dance session. Ten women [mean (SD) age 22.9 (2.6) years] took part in the study. Each subject to determine maximum oxygen consumption (VO2 max) and maximum heart rate (HR max) performed an incremental treadmill test. The measured VO2 max [mean (SD)] was 49.0 (7.5) ml/kg/min. The subjects were randomly assigned to LIP and HIP sessions (i.e. five of the subjects participated in the HIP session first, and the other
five participated in the LIP session first). In a laboratory, heart rate, oxygen uptake and RPE were measured throughout each session for each subject. Expired air was collected continuously throughout the sessions using Douglas bags (ten bags over a 30-min period). The sessions consisted of 20 min of aerobic exercise (bags 1–7) followed by 5 min of local muscular endurance exercise (bags 8 and 9) and 5 min of flexibility exercises (bag 10). The mean intensity of the aerobic section of the LIP and HIP sessions was 51.6% and 64.7% VO₂ max, respectively. Ninety-five percent confidence intervals for the average difference between the HIP and LIP sessions demonstrate that the % VO₂ max was between 12% and 14% higher for the HIP session. The mean % HR max for the LIP and HIP sessions was 71.4% and 76.7%, respectively, with the %HR max in the HIP session being between 5.4% and 7.2% higher on average than that of the LIP session. On average, the RPE for the aerobic section of the HIP session (12.1) was consistently higher than that of the LIP session (11.1). HIP activity has the potential to maintain/improve the aerobic fitness of its participants. According to the literature, the exercise intensity elicited by LIP activity may have a limited training effect for the population utilized in this study, and for some individuals may result in detraining. Conversely, LIP activities may be an appropriate mode of exercise for overweight and unfit individuals.
Garber, C. E, et al. (1992) conducted a study on is aerobic dance an effective alternative to walk-jog exercise training? In order to compare the physiological effects of an 8 week aerobic dance program to those of a walk-jog exercise training program, 60 male and female University employees ages 24-48 years were randomly assigned to an aerobic dance program (N = 22), a walk-jog program (N = 24), or a sedentary control group (N = 15). Subjects who had an exercise compliance rate less than or equal to 85% were dropped from the study, as were control subjects who had scheduling conflicts or illnesses precluding post-treatment testing. Thirty-five subjects completed the 8 week period with a compliance rate greater than or equal to 85%, leaving 14 in the aerobics group, 11 in the walk-jog group and 10 in the control group. Significant increases (p less than 0.001) in maximal oxygen uptake occurred in the aerobics (+3.9 ml/kg-1/min-1) and walk-jog group (+3.4 ml/kg-1/min-1), while no significant change was observed in the control group. Peak heart rate decreased significantly (p less than 0.05) in the aerobics (-4 b/min) and walk-jog groups (-3 b/min but was unchanged in the control group (-1 b/min) following the treatment period. Body weight, peak respiratory exchange ratio and peak minute ventilation remained the same in the aerobics, walk-jog and control groups throughout the treatment period. It is concluded that aerobic dance programs can result in similar improvements in aerobic power as a walk-jog program. Thus, an aerobic
dance program is an effective alternative to a traditional walk-job training regime.

Brian, W Epps, et al. (1983) conducted a study on Preliminary Investigation of the Effects of an Eight-Week Aerobic Exercise Program for Female Clerical Employees. This investigation was undertaken to: 1) determine the effects of a short-term aerobic exercise program on fitness, 2) pre-test possible physiological metrics for inclusion in a fitness information feedback system in anticipation of a future long-term research study. Eight female participants in an eight-week aerobic exercise program served as subjects. Three measurement sessions (pre, mid and post-program) were used to collect: body weight, percent body fat, resting heart rate, resting systolic blood pressure, resting diastolic blood pressure, sub maximal heart rate during bicycle ergometer exercise, recovery heart rate, and post-exercise systolic and diastolic blood pressures. VO$_2$ max was predicted based on sub maximal heart rate, workload, and weight. Subjects were given measurement results following each session as a form of fitness information feedback. Results based on multivariate analysis of variance, univariate analysis at variance, and subsequent Newman-Keuls tests revealed that short-term aerobic exercise classes could be expected to produce cardiovascular training effects, but have minimal effect on body weight and percent body fat.
Reviews on Psychological Variables

According to crumbock, et al. (2009), Physical activity and stress reduction are recognized strategies for chronic disease management. They are recommended for people with a variety of diseases: However, little attention has been paid to the effects of regular physical activity and stress reduction in people with chronic disease (CD). The aim of this pilot study was to examine the relationship that both physical activity and stress levels have with disease activity (a subscale of a quality of life (QOL) measure). A 2 pronged approach to sampling, using an online chronic support forum and snowball sampling, was implemented over a period of 3 months to conduct this survey. Seventeen adults with CD completed 3 questionnaires measuring physical activity, stress levels, disease activity and QOL. Although no significant correlations were found for disease activity with stress or physical activity, significant relationships were revealed for QOL with both stress and physical activity. The direct relationship between physical activity and QOL and the inverse relationship between stress and QOL are noteworthy for persons with CD, as well as their health care providers. Suggestions for important research design considerations are presented, along with future research needs.
Elsie, Hui Bo, Tsan-keung Chui. (2009) conducted a study on effects of dance on physical and psychological well-being in older persons. The study was aimed at determining the effects of dancing on the health status of older persons. A pool of 111 community-dwelling subjects were allocated to either an intervention group (IG), which included 23 sessions of dance over 12 weeks, or a control group (CG). All participants were assessed at baseline and 12 weeks. Physical outcome measures included the 6-min timed walking test (6MWT), trunk flexibility, body composition, lower limb endurance and strength, balance, the timed up-and-go test (TUG), resting heart rate and blood pressure. Quality of life was assessed by the Medical Outcomes Survey Short Form (SF-36) questionnaire. The IG’s views toward dancing were also evaluated at 12 weeks. Significant difference was observed between the groups in six outcome measures: mean change in resting heart rate, 6MWT, TUG, lower limb endurance and the ‘general health’ and ‘bodily pain’ domains of SF-36. The majority of the dance group felt the intervention improved their health status. These findings demonstrate that dancing has physical and psychological benefits, and should be promoted as a form of leisure activity for senior citizens.

Adrian D. McInman and Bonnie G. Berger (2007) conducted a study on Self-concept and mood changes associated with aerobic dance. This study 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, nor Social Physique Anxiety mediated changes in self-concept. Generally, correlations between self-concept and mood scales when not high, although emotional stability self-concept, physical appearance self-concept, and global self-concept correlated moderately with specific dimensions of mood.

*Brandon L. Alderman, et al. (2007)* conducted a study on aerobic exercise intensity and time of stress or administration influence cardiovascular responses to psychological stress. This study examined cardiovascular responses as a function of time following exercise in which participants were exposed to a laboratory stressor. Ninety (42 women) young (18–35 years old) non smoking normo tensive participants engaged in 30 min of high and low intensity (75–80% and
50–55% VO$_2$ max) aerobic exercise and a sedentary control condition. Participants were randomly assigned to a laboratory stressor 5, 30, or 60 min following the exercise bout. Results indicate that low and high intensity exercise significantly reduces heart rate (HR) and systolic and diastolic blood pressure reactivity and HR recovery values. An inverse relationship between intensity of exercise and subsequent cardiovascular reactivity was found. These findings suggest attenuated stress responses following acute exercise depend both on exercise intensity and on the time of exposure to psychological stress following exercise.

**Gillian Burgess, et al. (2005)** conducted a study on Effects of a 6-week aerobic dance intervention on body image and physical self-perceptions in adolescent girls. This Research examining the impact of physical activity on body image dissatisfaction and physical self-perceptions has been both limited and equivocal. The current research investigated the effects of 6-week aerobic dance on these variables with 50 British school girls aged 13–14 years. A cross-over design was used with two equivalent groups taught normal physical education and aerobic dance in a different order. The Body Attitude Questionnaire (BAQ) and Children and Youth Physical Self-Perception Profile (CY-PSPP) were administered as pre, mid and post-test to each participant in each group before the first intervention, at the changeover and after 12 weeks. The results of this study revealed that participation in 6 weeks of aerobic dance significantly
reduced body image dissatisfaction (Attractiveness, Feeling Fat, Salience and Strength and Fitness) and enhanced physical self-perceptions (Body Attractiveness and Physical Self-Worth), although these improvements were not sustained. The implications and future research directions are discussed.

Attila, Szabo, et al. (2003) conducted a study on acute psychological benefits of exercise performed at self selected workloads: implications for theory and practice. Given that most studies to date examined the connection between exercise and affect without considering the participants’ preferred exercise workload, in this research the affective-benefits of jogging or running at a participant-selected pace were investigated in a pilot field and a laboratory experiment. Ninety-six male and female students (19.5 yrs) took part in the pilot field experiment whereas 32 women (20.3 yrs) completed the laboratory experiment. In both experiments, the participants ran/jogged for 20 minutes at a self-selected pace. They completed an abbreviated version of a ‘right now form’ of the Profile of Mood States (POMS – Grove and Prapavessis, 1992) inventory before and after exercise. In both experiments all dependent measures changed significantly from pre to post-exercise, except ‘fatigue’ and ‘vigor’ that did not change in the laboratory. Total mood disturbance (TMD) decreased significantly in both experiments (68% and 89%). No significant correlations were found between exercise
intensity (Expressed as percentage) of maximal heart rate reserve) and the magnitude of changes seen in the Dependent measures. It is concluded that exercising at a self-selected workload yields positive changes in affect that are unrelated to exercise intensity. These results suggest that the physiological theories linking exercise with positive changes in effect, in which exercise intensity is instrumental, could not account for the acute affective benefits of exercise. It is proposed that a ‘cognitive appraisal hypothesis’ may be more appropriate in explaining the acute affective benefits of exercise.

According to Salmon (2001), until recently, claims for the psychological benefits of physical exercise have tended to precede supportive evidence. Acutely, emotional effects of exercise remain confusing, both positive and negative effects being reported. Results of cross sectional and longitudinal studies are more consistent in indicating that aerobic exercise training has anti depressant and anxiolytic effects and protects against harmful consequences of stress. Details of each of these effects remain unclear. Antidepressant and anxiolytic effects have been demonstrated most clearly in subclinical disorder and clinical applications remain to be exploited. Cross-sectional studies link exercise habits to protect from harmful effects of stress on physical and mental health but casualty is not clear. Nevertheless, the pattern of evidence suggests the theory that exercise training recruits a process, which confers enduring resilience to
stress. This view allows the effects of exercise to be understood in terms of existing psychobiological knowledge and it can thereby provide the theoretical base that is needed to guide future research in this area. Clinically, exercise training continues to offer clinical psychologists a vehicle for non specific therapeutic social and psychological processes. It also offers a specific psychological treatment may be particularly effective for patients for whom more conventional psychological interventions are less acceptable.

**Reviews on Biochemical Variables**

**Kelley, GA, et al. (2012)** conducted a study on combined effects of aerobic exercise and diet on lipids and lipoproteins in overweight and obese adults: A Meta- Analysis. The study used the aggregate data meta-analytic approach to determine the combined effects of aerobic exercise and diet on lipids and lipoproteins in overweight and obese adults. Twelve studies representing 859 men and women (443 interventions, 416 controls) were included. Using random-effects models, statistically significant, intervention minus control reductions were found for TC (−12.8 mg/dL, 95% CI, −19.9 to −5.7), TC : HDL-C (−0.5 mg/dL, 95% CI, −0.8 to −0.1), LDL-C (−6.8 mg/dL, 95% CI, −11.8 to −1.8), and TG (−13.1 mg/dL, 95% CI, −21.2 to −5.0) but not HDL-C (−0.4 mg/dL, 95% CI, −2.3 to 1.6). Results remained robust when adjusted for publication
bias, deleting each study from the model once, and collapsing results for multiple groups from the same study into one effect size. These findings suggest that concurrent aerobic exercise and diet improve TC, LDL-C, and TC:HDL-C, and TG, but not HDL-C, in overweight and obese adults.

M, Muralikrishna. and V, Gopinath. (2010) conducted a study on effect of aerobic exercise on lipo profiles of middle aged man. The modern lifestyle in western industrialized societies are generally viewed as a major contributor to increased risk of cardiovascular disease (CVD) as well as of other common medical conditions and chronic diseases affecting middle aged and older people. The present study investigated the effect of aerobic exercise on lipoplates of middle-aged men. Twenty (N=20) male subjects were selected randomly from Annamalai University Summer Fitness programme in the year 2010. Their age ranged between 40 and 55 years. The subjects were divided into two equal groups (n = 10). Group I acted as Control and Group II underwent aerobic exercise (brisk walking), 4 days/week for 12 weeks. The aerobic load was fixed 45 to 60% of their target heart rate. The load was fixed by adopting age predicted methods [Target Heart Rate = (load %) (220Age)] Load was increased 3% in every alternative week. 5 ml blood sample were collected two days prior to and immediately after the aerobic exercise programme as pre and post data from both the groups. Biochemical parameters such
as Serum high-density lipoprotein – cholesterol (HDL-C); low-density lipoprotein -cholesterol (LDL-C) and triglycerides (TG) were analyzed using Auto analyzer available in Bio-chemistry Lab, Raja Muthiah Medical College Hospital, Annamalai University, Tamilnadu, India. Data were collected and statistically analyzed by applying analysis of covariance (ANCOVA). The level of significance was fixed at 0.01. The result of the study indicated that, aerobic exercise group increased HDL-C level and reduced the LDL-C and TG levels, when compared to Control. Hence, it was concluded that aerobic exercise positively influence the lipo profile level in the middle aged men.

Thorsten, schiffer, et al. (2008) conducted a study on aerobic dance, health and fitness effects on middle-aged pre menopausal 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.

George A. Kelley, et al. (2007) conducted a study on Aerobic Exercise and Resting Blood Pressure: A Meta-Analytic Review of Randomized, Controlled Trials. In this study the authors used the meta-analytic approach to examine the effects of aerobic exercise on resting systolic and diastolic blood pressure in adults. Forty-seven clinical trials representing a total of 72 effect sizes in 2543 subjects (1653 exercise, 890 controls) met the criteria for inclusion. Statistically significant exercise-minus-control decreases were found for changes in resting systolic and diastolic blood pressure in both hypertensive (systolic, $-6$ mm Hg, 95% CI, $-8$ to $-3$; diastolic, $-5$ mm Hg, 95% CI, $-7$ to $-3$) and normotensive (systolic, $-2$ mm Hg, 95% CI, $-3$ to $-1$; diastolic, $-1$ mm Hg, 95% CI, $-2$ to $-1$) groups. The differences between groups were statistically significant (systolic, p=0.008; diastolic, p=0.000). Relative decreases were approximately 4% (systolic) and 5% (diastolic) in hypertensive, and 2%
(systolic) and 1% (diastolic) in normotensive. It was concluded that aerobic exercise reduces resting systolic and diastolic blood pressure in adults.

**Barry, Franklin., et al. (2006)** conducted a study on Aerobic Exercise and Lipids and Lipoproteins in Women: A Meta-Analysis of Randomized Controlled Trials. Cardiovascular disease (CVD) in women is the leading cause of mortality in the United States, and less than optimal lipid and lipoprotein levels are major risk factors for CVD. The purpose of this study was to use the meta-analytic approach to examine the effects of aerobic exercise on lipids and lipoproteins in women. Studies were retrieved via computerized literature searches, review of reference lists, hand searching selected journals, and expert review of our reference list. The inclusion of studies was limited to randomized controlled trials published in the English language literature between January 1955 and January 2003 in which aerobic exercise was used as the primary intervention in adult women aged ≥18 years. One or more of the following lipids and lipoproteins were assessed: total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and triglycerides (TG). Using a random effects model, statistically significant improvements were observed for all lipids and lipoproteins (TC, $\bar{X} \pm$ SEM, $-4.3 \pm 1.3$ mg/dl, 95% CI $-6.9$ to $-1.7$ mg/dl; HDL-C, $\bar{X} \pm$ SEM, $1.8 \pm 0.9$ mg/dl, 95% CI 0.1 to 3.5 mg/dl; LDL-C, $\bar{X} \pm$ SEM, $-4.4 \pm 1.1$ mg/dl, 95% CI $-6.5$ to $-2.2$ mg/dl; TG, $\bar{X} \pm$ SEM, $-4.2 \pm 2.1$ mg/dl, 95% CI $-8.4$ to $-0.1$ mg/dl). Reductions of
approximately 2%, 3%, and 5%, respectively, were observed for TC, LDL-C, and TG, whereas an increase of 3% was observed for HDL-C. Aerobic exercise is efficacious for increasing HDL-C and decreasing TC, LDL-C, and TG in women.

Byrne, D.G. Byrne (1993) conducted a study on the effect of exercise on depression, anxiety and other mood states: A review. The study addresses the current literature related to investigations of the link between exercise treatments and depression, anxiety and other mood states. Results from these investigations are supportive of the anti-depressant, anti-anxiety and mood enhancing effects of exercise programs. There were considered to be, however, a number of potential methodological problems in many of the research studies; the nature of these was considered. Finally, some possible directions for future research are outlined.

Kathleen, A., et al. (1979) conducted a study on psycho–physiological analysis of an aerobic dance programme for women. The purpose of this study was to determine: (1) the energy cost and (2) the psycho-physiological effects of an aerobic dance programme in young women. Twenty-one college-age women participated 40 minutes a day, three days a week, for a 10-week training period. Each work session included a five-minute warm-up period, a 30-minute stimulus period (including walk-runs) and a five-minute cool-down period. During the last four weeks of the training period, the following parameters were monitored in six of the
subjects during two consecutive sessions: perceived exertion (RPE) utilizing the Borg 6-20 scale, Mean = 13.19; heart rate (HR) monitored at regular intervals during the training session, Mean = 166.37; and estimated caloric expenditure based on measured oxygen consumption VO2 utilizing a Kofranyi-Michaelis respirometer, Mean = 289.32.

Multivariate analysis of variance (MANOVA) computed between pre and posttests for the six dependent variables revealed a significant approximate F-ratio of 5.72 (p <.05). Univariate t-test analysis of mean changes revealed significant pre-post test differences for VO2 max expressed in ml/kg/min, maximal pulmonary ventilation, and maximal working capacity on the bicycle ergometer, sub maximal HR and sub maximal RPE. Body weight was not significantly altered. It was concluded that the aerobic dance training programme employed was of sufficient intensity to elicit significant physiological and psychophysiological alterations in college-age women.