Chapter II

REVIEW OF RELATED LITERATURE

"A literature review uses as its database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases reports are written documents. The types of scholarship may be empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe, summarise, evaluate, clarify and/or integrate the content of primary reports" Cooper (1988).

Review of related literature gives valuable insight to the investigator regarding the problem to be solved. The review of related can be extremely helpful to the investigator in identifying the method that has been successfully used to solve the particular types of problems. Valuable elements from other studies may include the characteristics of the subject, data collecting, test procedure, statistical designs, and analysis of the data. A researchers and it will creatively help the investigator to know deeply about the chosen study and related study already done.

In order to get a thorough knowledge about the proposed area of study the investigator searched available research references, periodicals, Journals, internet web pages, books and already conducted similar studies. The collected references have been presented in the logical order.
2.1 Physical education programme

Review of related to Physical education programme

Coe, et al., (2006), determined the effect of physical education class enrollment and physical activity on academic achievement in middle school children. Methods: Participants were 214 sixth-grade students randomly assigned to physical education during either first or second semesters. Moderate and vigorous physical activity (MVPA) (number of 30-min time blocks) outside of school was assessed using the 3-d physical activity recall (3DPAR). The 3DPAR time blocks were converted to ordinal data with scores of 1 (no activity), 2 (some activity), or 3 (activity meeting Healthy People 2010 guidelines). Academic achievement was assessed using grades from four core academic classes and standardized test scores (Terra Nova percentiles). Results: Grades were similar regardless of whether students were enrolled in physical education during first or second semesters. Physical education classes averaged only 19 min of MVPA. Students who either performed some or met healthy people 2010 guidelines for vigorous activity had significantly higher grades (P G 0.05) than students who performed no vigorous activity in both semesters. Moderate physical activity did not affect grades. Standardized test scores were not significantly related to physical education class enrollment or physical activity levels. Conclusion: Although academic achievement was not significantly related to
physical education enrollment, higher grades were associated with vigorous physical activity, particularly activity meeting recommended Healthy People 2010 levels.

Fernandes and Sturm (2011), conduct a study on the role of school physical activity programs in child body mass trajectory. The researchers analyzed a cohort from the early childhood longitudinal survey-kindergarten cohort which included 8246 children in 970 schools across the country. Growth curve models estimate the effect of physical education (PE) and recess on individual child body mass trajectories controlling for child and school characteristics. Hierarchical models allow for unobserved school and child effects. Among first graders, 7.0% met the national association of sport and physical education (NASPE) recommended time for PE and 70.7% met the recommended time for recess in the previous week. Boys experienced a greater increase in body mass than girls. Meeting the NASPE recommended time for recess was associated with a 0.74 unit decrease in BMI (body mass index) percentile for children overall. Meeting the NASPE recommendation for physical education was associated with 1.56 unit decrease in BMI percentile among boys but not girls. It was found that meeting the national recommendations for PE and recess is effective in mitigating body mass increase among children.

Zhu, et al., (2010), conducted study on physical education and school contextual factors relating to students’ achievement and cross-
grade differences in aerobic fitness and obesity using two major data sets from the Texas youth fitness study, ordinary least squares regression, and hierarchical linear modeling, we examined the impact of key correlates in school physical education programs and policies on students' fitness status and cross-grade differences. While a number of factors, such as teachers' training/updates, recess time, available physical activity space, a school wellness policy, and fitness testing before administration, were confirmed, these correlates can explain only limited variance. Other aspects, such as socioeconomic status and community confounding factors, were recognized and illustrated. Future studies should include more factors such as these in data collection and analysis.

O'Malley et al. (2009), To explore whether characteristics of the U.S. secondary school physical activity environment are associated with student body mass index (BMI) and physical activity. This report uses data from two studies: Monitoring the future (MTF; an annual nationally representative survey of 8th-, 10th-, and 12th-grade public and private school students) and youth, education, and society (a survey of administrators in schools that have completed their 2-year participation in the MTF study). School policies and programs related to various health issues, including physical education (PE) and sports activity were examined for relationships with student self-reported height, weight, being active in sports, exercising vigorously, and participating in school athletics. The results show that in 2004-2007,
the percentage of students who attended schools that required PE in their grade differed sharply by grade level: 88% of 8th graders, 48% of 10th graders, and 20% of 12th graders. There were few statistically significant associations between school PE requirements and student BMI. The average percentage of students who participated in interscholastic or varsity sports was associated at the bivariate level with a lower percentage of students being overweight in all three grades. Other measures of PE and sports activity showed varying associations with BMI and physical activity measures. Relationships between the school physical activity environment and student BMI and physical activity were not uniformly strong. We conclude that, as currently practiced in schools, existing variations in physical activity policies may not be sufficient to produce discernible school-wide differences; thus, there is a need for more vigorous PE programming than is typically provided.

Sallis et al., (1997), evaluated a health-related physical education program for fourth- and fifth-grade students designed to increase physical activity during physical education classes and outside of school. Seven schools were assigned to three conditions in a quasi-experimental design. Health-related physical education was taught by physical education specialists or trained classroom teachers. Students from these classes were compared with those in control classes. Analyses were conducted on 955 students with complete data. Students spent more minutes per week being
physically active in specialist-led (40 min) and teacher-led (33 min) physical education classes than in control classes (18 min; P < .001). After 2 years, girls in the specialist-led condition were superior to girls in the control condition on abdominal strength and endurance (P < .001) and cardiorespiratory endurance (P < .001). There were no effects on physical activity outside of school. A health-related physical education curriculum can provide students with substantially more physical activity during physical education classes. Improved physical education classes can potentially benefit 97% of elementary school students.

Fox et al., (2010), examines the associations between sports team participation, physical activity, and academic outcomes in middle and high school students. Data were drawn from project EAT (Eating Among Teens), a survey of middle and high school students (n = 4746). Students self-reported their weekly hours of physical activity, sports team participation, and academic letter grades. Two statistical models were considered: first, 2 separate regression analyses with grade point average (GPA) as the outcome and either sports team participation or physical activity as the predictor; second, a single regression with GPA as the outcome and both sports team participation and physical activity as the simultaneous predictors. For high school girls, both physical activity and sports team participation were each independently associated with a higher GPA. For high school boys, only sports team participation was independently
associated with a higher GPA. For middle school students, the positive association between physical activity and GPA could not be separated from the relationship between sports team participation and a higher GPA. Regardless of whether academic success was related to the physical activity itself or to participation on sports teams, findings indicated positive associations between physical activity involvement and academic achievement among students.

2.2 Handball drill

**Review of related to handball drill**

Oxyzoglou (2007), compare a 6-mo. specific handball training program and a typical physical education program on various strength and jumping skills. The participants (\(M\) age=13.7 yr., \(SD=1.5\)) were divided into the Handball Group (\(n=51\)) and the Physical Education Group (\(n=70\)). The latter performed 3 sessions/week (60 min.) including ball-handling drills, horizontal and vertical jump shots, fast break, and several defensive skills. The former performed the program provided by the ministry of education including track and field and other team sport drills. Analyses of covariance showed that the handball group displayed greater improvement in explosive strength of upper limbs, jumping performance, maximum isometric force of right grip, and 10-m running velocity. Handball training can significantly improve preadolescent performance with upper and lower limbs.
Inclusion of specific handball drills in the physical education program is recommended.

Koç (2011), determining the effect of five-day competitions on some blood electrolyte values of male handball players. Twelve male handball players voluntarily participated into the study. After briefing the handball players concerning the test to be conducted, physical measurements including age, body height, body weight, body-mass index (BMI) and body fat percentage (BFP) were taken from the players before and after the competitions. In order to determine their level of blood electrolytes, 5 ml blood samples were taken before (BC) and after the competition (AC) in line with hygiene rules from the forearm ante-cubital area into yellow-tap tubes with gels and analyzed in the central laboratory by using auto-analyzer for calcium, magnesium, sodium, potassium, chlorine, iron, iron binding capacity, creatine and urea levels. Measurement results were presented as averages and standard deviation. Student t-test for dependant samples was used in order to make a comparison between BC and AC values. In the outcome of the study, the change in BC and AC body weight, BMI, BFP and calcium values was found to be significant (p<0.01) whereas the changes in magnesium, sodium, potassium, chlorine, iron and iron binding capacity values were insignificant (p>0.05). As a conclusion, findings show that acute competition exercises do not have any effect on blood electrolyte levels.

Abernethy and Bleakley (2007), evaluated the effectiveness of preventive strategies in adolescent sport and to draw conclusions on
the strength of the evidence. A literature search in seven databases (Medline, SportDiscus, EMBASE, CINAHL, PEDro, Cochrane Review and DARE) was carried out using four keywords: adolescent, sport, injury and prevention (expanded to capture any relevant literature). Assessment of 154 papers found 12 studies eligible for inclusion. It can be concluded that injury prevention strategies that focus on preseason conditioning, functional training, education, balance and sport-specific skills, which should be continued throughout the sporting season, are effective. The evidence for the effectiveness of protective equipment in injury prevention is inconclusive and requires further assessment.

van Dooren (2002), aims at designing a training program for some complex feints with the ball in junior Japanese handball players and identifying the effects of this program on some physical variables and performance level (duration-performance) and complex feints with the ball in junior Japanese handball players. The researchers used the quasi-experimental approach with one-group design and pre/post measurement. Sample was purposefully chosen from Japanese junior handball players-Faculty of Sports and Health Science-Fukuoka University-Japan. Sample included 40 junior players (born in 1988-1989-1990). The researchers concluded that the recommended training program had a positive effect on the post-tests of the experimental group on physical variable, with improvement percentage 1.11-15.64%, skills variables (feint duration) with
improvement percentage 2.99-10.35% and ills variables (feint performance) with improvement percentage 22.39-45.59%

**Yahia and Hasaballa (2010),** aims at designing a ballistic training program for developing speed strength and to identify its effect on improving the shooting skill of junior handball players. The researchers used the quasi-experimental approach with one-group design and pre-/post- measurement. Sample was purposefully chosen from the national project for giants' players (under 18 years) - middle delta area, 2009/2010 season. Sample was chosen from 13/2/2009 to 10/4/2009. Sample included 30 players. Results indicate that the ballistic training program had a positive effect on developing physical variables of the sample. This, in turn, increased the improvement percentage between the pre- and post- tests from 1.6% to 20.31%. The program, also, improved the skills variables from 30.89% to 36.89%.

**Buchheit et al., (2010),** to compare the effects of speed/agility (S/A) training with sprint interval training (SIT) on acceleration and repeated sprint ability (RSA) in well-trained male handball players. In addition to their normal training program, players performed either S/A (n = 7) or SIT (n = 7) training for 4 wk. Speed/agility sessions consisted of 3 to 4 series of 4 to 6 exercises (eg, agility drills, standing start and very short sprints, all of <5 s duration); each repetition and series was interspersed with 30 s and 3 min of passive recovery, respectively. Sprint interval training consisted of 3 to 5 repetitions of 30-s all-out shuttle sprints over 40 m, interspersed with 2 min of passive recovery. Pre- and post tests included a countermovement
jump (CMJ), 10-m sprint (10m), RSA test and a graded intermittent aerobic test (30-15 Intermittent Fitness Test, V(IFT)). S/A training produced a very likely greater improvement in 10-m sprint (+4.6%, 90% CL 1.2 to 7.8), best (+2.7%, 90% CL 0.1 to 5.2) and mean (+2.2%, 90% CL -0.2 to 4.5) RSA times than SIT (all effect sizes [ES] greater than 0.79). In contrast, SIT resulted in an almost certain greater improvement in V(IFT) compared with S/A (+5.2%, 90% CL 3.5 to 6.9, with ES = -0.83). In well-trained handball players, 4 wk of SIT is likely to have a moderate impact on intermittent endurance capacity only, whereas S/A training is likely to improve acceleration and repeated sprint performance.

Ibrahim (2001), examine the relationship between skill performance and selected physical fitness variables of hand ball players of Osmania University, Hyderabad, India. Sample sizes of 30 handballers were randomly selected from the players undergoing rigorous training camp for the all India inter university tournament. The age of the subjects ranged between 18 to 22 years. Defensive ability, passing ability, and dribbling ability were taken as independent variables under the skill performance. For physical fitness variables, speed, explosive power, agility, cardio-respiratory endurance, and flexibility were taken into consideration. Defensive ability, passing ability, and dribbling ability was assessed by defense movement test, passing test, and control dribbling test. The tests selected for the physical fitness variables are as under. For speed 50m run, for explosive power sergeant jump, for agility 6 x 10m shuttle
run, for cardio respiratory endurance 12 min run/walk test and for flexibility bend & reach test. The statistical tool used was Pearson product moment correlation. The data indicated some interesting results. Defensive ability had positive correlation with speed and agility whereas explosive power, cardio-respiratory endurance, and flexibility had a negative correlation. The passing ability had a negative correlation with speed & agility and a positive correlation with explosive power, cardio respiratory endurance, and flexibility. The skill of dribbling had a positive correlation with speed and agility, a negative correlation with explosive power and was insignificantly correlated to cardio respiratory endurance and flexibility. The results showed that defensive ability performance can be improved by good speed & agility. A player can excel in passing if he has a better explosive power, cardio respiratory endurance, and flexibility. The skill of dribbling can be taken care if a player has speed and agility.

Ostojic et al., (2000), investigate the effects of soccer-specific training on physical fitness components in adolescent elite soccer players and make comparisons with older counterparts. Twenty two male soccer players from the Serbian first division team were allocated to two assigned trials according to age – young group (YG) and mature group (MG). Players in their teenage years (19 years and younger) were assigned to YG (10 subjects) and others to MG (12 subjects). Between the first and second test session, all subjects followed twelve weeks of soccer-specific periodized training programme. There were no differences between groups at pre- and post-training trial for body
mass, vertical jump height, average anaerobic power and VO\(_2\)max (P>0.05). Body fat was significantly lower in YG before and after training program as compared to MG (P<0.05). Body mass and fat dropped significantly in both groups after training program (P<0.05). Furthermore, average anaerobic power and VO\(_2\)max along with vertical jump height, were significantly improved in both groups (P<0.05) at post-training performance. Finally, the magnitude of change in VO\(_2\)max was significantly superior in MG as compared to YG after training program (18.3 vs. 7.8%; P<0.05). The findings of the present study indicate that the trainability indices are not highly influenced by age in top-level soccer players.

Bryner et al. (1999), examine the effect of intensive, high volume resistance training combined with a VLCD on these parameters. Twenty subjects (17 women, three men), mean age 38 years, were randomly assigned to either standard treatment control plus diet (C+D), n = 10, or resistance exercise plus diet (R+D), n = 10. Both groups consumed 800 kcal/day liquid formula diets for 12 weeks. The C+D group exercised 1 hour four times/week by walking, biking or stair climbing. The R+D group performed resistance training 3 days/week at 10 stations increasing from two sets of 8 to 15 repetitions to four sets of 8 to 15 repetitions by 12 weeks. Groups were similar at baseline with respect to weight, body composition, aerobic capacity, and resting metabolic rate. Maximum oxygen consumption (Max VO\(_2\)) increased significantly (p<0.05) but equally in both groups. Body weight decreased significantly more (p<0.01) in
C+D than R+D. The C+D group lost a significant (p<0.05) amount of LBW (51 to 47 kg). No decrease in LBW was observed in R+D. In addition, R+D had an increase (p<0.05) in RMR O2 ml/kg/min (2.6 to 3.1). The 24 hour RMR decreased (p<0.05) in the C+D group. The addition of an intensive, high volume resistance training program resulted in preservation of LBW and RMR during weight loss with a VLCD.

Davis et al., (2000), examined anaerobic threshold alterations caused by endurance training in middle-aged men. Nine previously sedentary middle-aged males underwent cycle endurance training 45 min/day for 9 wk with an average attendance of 4.1 days/wk. seven males served as controls. Before and after the training period, the subjects performed three cycle ergometer tests. Work rate was incremented by 15 W/min, to the limit of the subjects' tolerance, in the first two tests; the third test consisted of contant-load cycling at an O₂ uptake (VO₂) just below the pretraining anaerobic threshold (AT). After training, the AT increased significantly by 44%, expressed as absolute VO₂, and by 15%, expressed relative to VO₂ max. Significant increases were also noted in VO₂max (25%), maximal minute ventilation (19%), and maximal work rate (28%). The test-retest correlation coefficients for the AT (%VO₂max) were 0.91, pre- and posttraining. Training did not alter steady-state VO₂ during the submaximal exercise test whereas significant decreases occurred in CO₂ output, VE, respiratory quotient, and VE/VO₂. No changes occurred in the control subjects during this period. These results
demonstrate that the AT is profoundly influenced by endurance training in previously sedentary middle-aged males.

### 2.3 Physical fitness

**Review of related to Physical fitness**

Izquierdo, (1999), determine the acts of 6-weeks of heavy-resistance training on physical fitness and serum hormone status in adolescents (range 14±16 years old) 19 male handball players were divided into two deferent groups: a handball training group (NST, n = 10), and a handball and heavy-resistance strength training group (ST, n = 9). A third group of 4 handball goalkeepers of similar age served as a control group (C, n = 4). After the 6-week training period, the ST group showed an improvement in maximal dynamic strength of the leg extensors (12.2%; P < 0.01) and the upper extremity muscles (23%; P < 0.01), while no changes were observed in the NST and C groups. Similar differences were observed in the maximal isometric unilateral leg extension forces. The height of the vertical jump increased in the NST group from 29.5 (SD 4) cm to 31.4 (SD 5) cm (P < 0.05) while no changes were observed in the ST and C groups. A significant increase was observed in the ST group in the velocity of the throwing test; [P < 0.001] during the 6-week period while no changes were observed in the NST and C groups. During a sub maximal endurance test running a significant decrease in blood lactate concentration occurred in the NST group [from 3.3 (SD 0.9) to 2.4 (SD 0.8) P < 0.01]
during the experiment, while no change was observed in the ST or C groups. Finally, a significant increase (P < 0.01) was noted in the testosterone:cortisol ratio in the C group, while the increase in the NST group approached statistical significance (P < 0.08) and no changes in this ratio occurred in the ST group. The present findings suggested that the addition of 6-weeks of heavy resistance training to the handball training resulted in gains in maximal strength and throwing velocity but it compromised gains in leg explosive force production and endurance running. The tendency for a compromised testosterone:cortisol ratio observed in the ST group could have been associated with a state of overreaching or overtraining.

Krouscas (1999), combat the decreasing levels of physical activity in many young people, health professionals are calling upon middle and high school physical education to equip students with the skills and knowledge necessary to become physically active for a lifetime. In order to accomplish this goal in physical education, it is imperative that student attitudes be considered when making curricular and program decisions. Therefore, the purpose of this study was to examine middle school students’ attitude toward a physical education program and to determine the various aspects of the program that appear to contribute to positive and negative attitudes towards middle school physical education. Students (n=348) from one middle school located in a mid-Atlantic state completed a survey regarding their attitudes toward physical education. All responses were categorized using a critical incident technique. Results indicate
that positive attitudes towards physical education decline between grades six and eight. This trend was more apparent for females than for males. Major categories associated with positive and negative attitudes towards physical education include curriculum content, class atmosphere, teacher behavior, dressing out, and self-perception.

Cochrane. (1990), determine whether fitness alters psychological and physiological indices of well-being, male police officers were assigned to either an aerobic or anaerobic training condition or to a no treatment control group. The training groups met three times per week in 45 min sessions aimed at improving either cardiovascular endurance or muscle strength. Aerobic fitness level, heart rate, blood pressure and self-report of stress and well-being were measured prior to and following 10 weeks of training. Post-training fitness measures confirmed the effectiveness of training and between group differences for physiological and self-report measures was found. Subjects undergoing aerobic training evinced larger changes on the self-report measures of well-being and stress than the anaerobic trainers and both groups showed significant improvement when compared to controls. This experiment provides support for the hypothesis that exercise, and in particular aerobic exercise, has positive effects of well-being. It is suggested that future research might usefully explore the particular contribution of different aspects of the training situation to these effects.

Gelieber et al., (2001), determine the Effects of strength or aerobic training on body composition, resting metabolic rate, and peak
oxygen consumption in obese dieting subjects. Given that resting metabolic rate (RMR) is related largely to the amount of fat-free mass (FFM), the hypothesis was that strength training, which stimulates muscle hypertrophy, would help preserve both FFM and RMR during dieting. In a randomized controlled intervention trial, moderately obese subjects (aged 19-48 y) were assigned to one of three groups: diet plus strength training, diet plus aerobic training, or diet only. Sixty-five subjects (25 men and 40 women) completed the study. They received a formula diet with an energy content of 70% of RMR or 5150 +/- 1070 kJ/d (x +/- SD) during the 8-wk intervention. They were seen weekly for individual nutritional counseling. Subjects in the two exercise groups, designed to be isoenergetic, trained three times per week under supervision. Those in the strength-training group performed progressive weight-resistance exercises for the upper and lower body. Those in the aerobic group performed alternate leg and arm cycling. After 8 wk, the mean amount of weight lost, 9.0 kg, did not differ significantly among groups. The strength-training group, however, lost significantly less FFM (P < 0.05) than the aerobic and diet-only groups. The strength-training group also showed significant increases (P < 0.05) in anthropometrically measured flexed arm muscle mass and grip strength. Mean RMR declined significantly, without differing among groups. Peak oxygen consumption increased the most for the aerobic group (P = 0.03). In conclusion, strength training significantly reduced the loss of FFM during dieting but did not prevent the decline in RMR.
Impellizzeri et al. (2006), compare the effects of specific (small-sided games) vs. generic (running) aerobic interval training on physical fitness and objective measures of match performance in soccer. Forty junior players were randomly assigned to either generic (n = 20) or specific (n = 20) interval training consisting of 4 bouts of 4 min at 90 - 95 % of maximum heart rate with 3 min active rest periods, completed twice a week. The following outcomes were measured at baseline (Pre), after 4 weeks of pre-season training (Mid), and after a further 8 weeks of training during the regular season (Post): maximum oxygen uptake, lactate threshold (Tlac), running economy at Tlac, a soccer-specific endurance test (Ekblom’s circuit), and indices of physical performance during soccer matches (total distance and time spent standing, walking, and at low- and high-intensity running speed). Training load, as quantified by heart rate and rating of perceived exertion, was recorded during all training sessions and was similar between groups. There were significant improvements in aerobic fitness and match performance in both groups of soccer players, especially in response to the first 4 weeks of pre-season training. However, no significant differences between specific and generic aerobic interval training were found in any of the measured variables including soccer specific tests. The results of this study showed that both small-sided games and running are equally effective modes of aerobic interval training in junior soccer players.
Tsutsumi et al., (1997), studied psychological and behavioral adaptations in response to 12-weeks of strength training were examined in medically healthy but sedentary 42 older adults (mean age=68 years). The purpose of this study was to evaluate the effects of high and low intensity resistance training intensity on a) muscular fitness, b) psychological affect, and c) neurocognitive functioning. Subjects were randomly assigned to high intensity/low volume (EXH: 2 sets of 8 to 10 repetitions for 75 to 85% of 1 RM), low intensity/high volume (EXL: 2 sets of 14 to 16 repetitions for 55 to 65% of 1 RM), or no exercise control programs. Prior to and following the 12-week program, subjects underwent comprehensive physiological and psychological evaluations. Physiological assessment included measurements of blood pressure, heart rate, arm and leg muscle strength, body composition, and oxygen consumption (VO2max). Psychological measures included evaluations of mood, anxiety, and physical self-efficacy as well as cognitive functioning. The results of this study indicated that both high and low intensity strength programs were associated with marked improvements in physiological fitness and psychological functioning. Specifically, subjects in the strength training programs increased overall muscle strength by 38.6% and reduced percent body fat by 3.0%. Favorable psychological changes in the strength-trained subjects included improvements in positive and negative mood, trait anxiety, and perceived confidence for physical capability. The treatment effects of neurocognitive functioning were not significant. In summary, this study
demonstrated that participation in 12-weeks of high or low intensity strength training can improve overall physical fitness, mood, and physical self-efficacy in older adults while cognitive functioning remains constant.

**Geus, et.al. (1999)**, assessed the association of aerobic fitness with psychological make-up and physiological stress-reactivity in a group of untrained men, as well as the effects of 4 and 8 months of exercise training on these parameters. Psychological assessment included questionnaires on personality (Neuroticism, Type A, Hostility), coping styles (Anger In, Anger Out), negative affect (Depression, Anxiety), and self-esteem. Stress reactivity was measured as the cardiovascular and urinary catecholamine response to two competitive reaction time tasks and the cold pressor test. No cross sectional relationships were found between aerobic fitness, defined as the maximal oxygen consumption during an exhaustive exercise test, and any of the psychological variables. In addition, psychological make-up did not change as a consequence of exercise training. In further contrast to our hypothesis, aerobic fitness was associated with high, rather than low, cardiovascular reactivity. Longitudinal effects of training were limited to a reduction in the overall levels of heart rate and diastolic blood pressure. This suggests that regular exercise does not increase the resistance to stress-related disease by influencing psychological make-up or acute psychophysiologic reactivity.

**Scully et al., (1998)**, reviewed the physical exercise and psychological well being. The relation between physical exercise and
psychological health has increasingly come under the spotlight over recent years. While the message emanating from physiological research has extolled the general advantages of exercise in terms of physical health, the equivalent psychological literature has revealed a more complex relation. The paper outlines the research evidence, focusing on the relation between physical exercise and depression, anxiety, stress responsively, mood state, self esteem, premenstrual syndrome, and body image. Consideration is also given to the phenomena of exercise addiction and withdrawal, and implications for exercise prescription are discussed.

2.4 Physiological parameters

Review of related to Physiological parameters

Obert et al., (2002), evaluate the effect of an aerobic training programme on the maximal power (Pmax) developed during a short-term exercise test in prepubertal children. Thirty-three 10-11 year old boys and girls were investigated: 17 (TG) participated twice a week (1 h per session) in a 13-week running programme and 16 (CG) served as a control group. Pmax was measured during a force-velocity test conducted on a friction-loaded cycle ergometer. The force (Fopt) and velocity (Vopt) at which Pmax was obtained were determined. Lower limb muscle mass (LMM) was evaluated by means of dual X-ray absorptiometry. Following training, Pmax increased even when muscle mass change due to the growth process was taken into account (Pmax
The increase in Fopt was principally responsible for such an improvement since no alteration was noticed for Vopt after training. As for Pmax, Fopt was still greater following training when LMM was taken into account (p < 0.01). Furthermore, no changes were noticed for CG for all variables evaluated during the anaerobic test after the study period. Differences between TG and CG regarding Pmax and Fopt were obtained after training only. In conclusion this study highlights the effectiveness of an aerobic training programme to improve the maximal power during short-term exercise in prepubertal children.

Marcos et al. (1997), discussed on the effects of aerobic training on heart rate. Regular physical exercise is an important factor to reduce the indexes of cardiovascular and all causes morbimortality. However, there is, apparently, additional and independent benefits of the regular practice of physical exercise and the improvement of the level of aerobic condition. Heart rate (HR) is mediated primarily by the direct activity of the autonomic nervous system (ANS), specifically through the sympathetic and parasympathetic branches activities over the sinus node autorhythmicity, with predominance of the vagal activity (parasympathetic) at rest, that is progressively inhibited since the onset of the exercise. The HR behavior has been widely studied during different conditions and protocols associated to the exercise. A reduction of the cardiac vagal tone (parasympathetic function) and consequently a diminished HR variability in rest, independently of the
protocol of measurement used, is related to an autonomic dysfunction, chronic-degenerative diseases and increased mortality risk. Individuals with high levels of aerobic condition have a lower resting HR, along with a larger parasympathetic activity or smaller sympathetic activity, but it is not necessarily a direct consequence of the exercise training, as long as other inherent adaptations to the aerobic conditioning can influence the resting HR. The HR response in the onset of the exercise represents the integrity of the vagus nerve, and the HR recovery on the post-exercise transient also denotes important prognostic information; by the way, individuals that have a slow HR recovery in the first minute post-exercise have increased mortality risk. In conclusion, the physiological mechanisms modulating HR during or after an exercise program are not totally clear, and further studies are needed.

**Mendes et al., (2010),** explore the effects of aerobic training on psychosocial morbidity and symptoms in asthmatic patients, Asthma symptoms reduce patient’s daily activities, impair health-related quality of life (HRQoL) and increase reports of anxiety and depression that seem to be related to a decrease in asthma control. Aerobic exercise training is known to improve aerobic fitness and reduce dyspnea; however, its effect in reducing psychological distress and symptoms remains poorly understood. It was evaluated the role of an aerobic training program in improving HRQoL (primary aim) and reducing psychological distress and asthma symptoms (secondary aims) for moderate or severe persistent asthmatic patients. One
hundred and one patients randomly assigned to either control (CG) or aerobic training (TG) groups were studied during the period between medical consultations. Patients in CG (educational program+breathing exercises; N=51) and TG (educational program+breathing exercises+aerobic training; N=50) were followed twice a week during a 3-month period. HRQoL and levels of anxiety as well as depression were quantified before and after treatment. Asthma symptoms were evaluated monthly. At 3 months, the domains (physical limitations, frequency of symptoms and psychosocial) and total scores of HRQoL significantly improved only in the TG (p<0.001); the number of asthma symptom-free days as well as anxiety and depression levels also significantly improved (p<0.001). In addition, a linear relationship between improvement in aerobic capacity and the days without asthma symptoms was observed (r=0.47; p<0.01). Our results suggest that aerobic training can play an important role in the clinical management of patients with persistent asthma and may be especially useful for patients with higher degrees of psychosocial distress.

Sigal, (2001), assess incremental effects of combined aerobic and resistance training compared with either type of exercise alone. Objective: To determine the effects of aerobic training alone, resistance training alone, and combined exercise training on hemoglobin A1c values in patients with type 2 diabetes. Design: Randomized, controlled trial. Setting: 8 community-based facilities. Patients: 251 adults age 39 to 70 years with type 2 diabetes. A negative result on a stress test or clearance by a cardiologist, and adherence to exercise
during a 4-week run-in period, were required before randomization. Interventions: Aerobic training, resistance training, or both types of exercise (combined exercise training). A sedentary control group was included. Exercise training was performed 3 times weekly for 22 weeks (weeks 5 to 26 of the study). The primary outcome was the change in hemoglobin A1c value at 6 months. Secondary outcomes were changes in body composition, plasma lipid values, and blood pressure. Results: The absolute change in the hemoglobin A1c value in the combined exercise training group compared with the control group was −0.51 percentage point (95% CI, −0.87 to −0.14) in the aerobic training group and −0.38 percentage point (CI, −0.72 to −0.22) in the resistance training group. Combined exercise training resulted in an additional change in the hemoglobin A1c value of −0.46 percentage point (CI, −0.83 to −0.09) compared with aerobic training alone and −0.59 percentage point (CI, −0.95 to −0.23) compared with resistance training alone. Changes in blood pressure and lipid values did not statistically significantly differ among groups. Adverse events were more common in the exercise groups. The generalizability of the results to patients who are less adherent to exercise programs is uncertain. The participants were not blinded, and the total duration of exercise was greater in the combined exercise training group than in the aerobic and resistance training groups. Either aerobic or resistance training alone improves glycemic control in type 2 diabetes, but the improvements are greatest with combined aerobic and resistance training.
Knapen, et al., (2005), assessed the effects of aerobic exercise on various psychological dimensions, including well-being. The first objective of this study was to compare the changes in physical self-concept, global self-esteem, depression and anxiety after participation in one of two 16-week psychomotor therapy programs for nonpsychotic psychiatric inpatients. The second objective was to study the relationship between changes in these variables. One hundred and ninety-nine inpatients were randomly assigned to either a personalized psychomotor fitness program, consisting of aerobic exercise and weight training, or a general program of psychomotor therapy, consisting of different forms of physical exercises and relaxation training. Physical self-concept was evaluated using the Dutch version of the physical self-perception profile at baseline, after 8 weeks, and after completion of the 16-week interventions. At the same time points, additional variables of global self-esteem, depression and anxiety were assessed by means of the Rosenberg self-esteem inventory, the Beck depression inventory and the trait anxiety inventory, respectively. After 16 weeks, both groups showed significant improvements in all outcome measures (p values ranged from 0.01 to < 0.0001), with no between-group differences. In both groups, the improvement in physical self-concept was correlated with increased global self-esteem and decreased depression and anxiety levels (p < 0.01). The results suggest that both psychomotor therapy programs are equally effective in enhancing physical self-concept. The relationship between improvements in physical self-concept and
enhancements in global self-esteem, depression and anxiety supports the potential role of the physical self-concept in the recovery process of depressed and anxious psychiatric inpatients.

**Whelton et al., (2002),** determine the effect of aerobic exercise on blood pressure. Data Sources: English-language articles published before September 2001. Fifty four randomized, controlled trials (2419 participants) whose intervention and control groups differed only in aerobic exercise. Using a standardized protocol and data extraction form, three of the investigators independently abstracted data on study design, sample size, participant characteristics, type of intervention, follow-up duration, and treatment outcomes. In a random-effects model, data from each trial were pooled and weighted by the inverse of the total variance. Aerobic exercise was associated with a significant reduction in mean systolic and diastolic blood pressure (−3.84 mm Hg [95% CI, −4.97 to −2.72 mm Hg] and −2.58 mm Hg [CI, −3.35 to −1.81 mm Hg], respectively). A reduction in blood pressure was associated with aerobic exercise in hypertensive participants and normotensive participants and in overweight participants and normal-weight participants. Aerobic exercise reduces blood pressure in both hypertensive and normotensive persons. An increase in aerobic physical activity should be considered an important component of lifestyle modification for prevention and treatment of high blood pressure.

**Larose et al., (2010),** evaluated the effects of aerobic exercise training (A group), resistance exercise training (R group), combined
aerobic and resistance training (A + R group), and sedentary lifestyle (C group) on cardio respiratory fitness and muscular strength in individuals with T2DM. Two hundred and fifty-one participants in the Diabetes Aerobic and Resistance Exercise trial were randomly allocated to A, R, A + R, or C. Peak oxygen consumption (V·O₂peak), workload, and treadmill time were determined after maximal exercise testing at 0 and 6 months. Muscular strength was measured as the eight-repetition maximum on the leg press, bench press, and seated row. Responses were compared between younger (aged 39–54 yr) and older (aged 55–70 yr) adults and between sexes. Results: V·O₂peak improved by 1.73 and 1.93 mL O₂·kg⁻¹·min⁻¹ with A and A + R, respectively, compared with C (P < 0.05). Strength improvements were significant after A + R and R on the leg press (A + R: 48%, R: 65%), bench press (A + R: 38%, R: 57%), and seated row (A + R: 33%, R: 41%; P < 0.05). There was no main effect of age or sex on training performance outcomes. There was, however, a tendency for older participants to increase V·O₂peak more with A + R (+1.5 mL O₂·kg⁻¹·min⁻¹) than with A only (+0.7 mL O₂·kg⁻¹·min⁻¹).

Conclusions: Combined training did not provide additional benefits nor did it mitigate improvements in fitness in younger subjects compared with aerobic and resistance training alone. In older subjects, there was a trend to greater aerobic fitness gains with A + R versus A alone.

Selamoglu et al., (2000), investigated the effects of aerobic and anaerobic training on serum lipid peroxidation levels and on
antioxidant enzyme activities. Long distance runners for aerobic training group, and wrestlers for anaerobic training group were chosen. Non-sporting men were used as control group. When the aerobic power was compared; indirect VO$_2$max of long-distance runners were found higher than wrestlers and control group (p<0.001, p<0.001). When lipid peroxidation levels were compared; levels of the thiobarbituric acid reactive substances (TBARS) of long distance runners were found to be lower than those in the control group (p<0.05), but similar to those found in wrestlers. Comparison of antioxidant enzyme activities in erythrocytes show that there were no significant difference among the groups in superoxide dismutase enzyme activities, but glutathione peroxidase (GPx) activity of long distance runners was higher than that measured in wrestlers (p<0.05). These results suggest that aerobic training increased in erythrocytes GPx activity with a subsequent decrease in plasma TBARS levels but anaerobic training had no effect on this process.

Details of above reviews collected based on the independent variables and presented in the table in year vice.

<table>
<thead>
<tr>
<th>Year</th>
<th>Physical Education Programme</th>
<th>Handball Drill</th>
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