CHAPTER-II

REVIEW OF RELATED LITERATURE

The study of relevant literature is an essential step to get a clear idea of what has been done with regard to the problem under study. Such a review brings about a deep and clear perspective of the overall field.

A serious and scholarly attempt has been made by the scholar to go through the related literature and a brief review of the study related to the present problem is described in this chapter.

The literature in any field forms the foundation upon which all feature work will be built. If we fail to build up on the foundation of knowledge provided by the review of literature, the researcher might miss some works already done on the same topic. The review of the literature has been classified under the following headings:

1. Studies on Survey of Physical fitness, Health Related Physical fitness and Normative studies.

2. Studies on Rural and Urban school boys on Physical fitness.

3. Studies on Physical Activities Programme

4. Summary of the Literature

1. Studies on survey of Physical fitness, health Related Physical fitness and Normative studies.

A National Plan of Physical Education and Recreation was prepared by the Central Advisory Board of Physical Education and Recreation. It suggested the following physical efficiency test items for boys and girls, of the age group 10 to 17.
Boys - Age Group 10 to 12

Test Items:
1. 50 Metres Run
2. High Jump
3. Long Jump
4. Cricket Ball Throw

Boys - Age Group 13 to 17

Test Items:
1. 100 Metres Run
2. High Jump
3. Long Jump
4. Cricket Ball Throw
5. Chin ups, Dands, and baithaks

Girls - Age Group 10 to 12

Test Items:
1. 50 Metres Run
2. Skipping - 30 Sec.
3. Ball Bouncing - 30 Sec
4. Cricket Ball Throw
5. Sit-ups (1 minute)

Girls - Age Group 13 to 17

Test Items:
1. 100 Metres Run
2. Long Jump
3. Cricket Ball Throw
4. Sit-ups - 30 Sec.

The All India Seminar on Physical Education Institutions recommended the motor ability test as prescribed on the National Plan to be conducted in schools all over the country to ascertain its validity and supply proper norms for various age groups. The seminar also recommended to achieve norms for Kraus Weber test and the Canadian Fitness tests.
The Central Board of Secondary Education took the lead in introducing physical education as an academic subject at school level. The Board appointed a committee with Shri S. D. Chopade as the Chairman to form a curriculum on physical education. Later it was introduced as a required common subject for Junior Secondary (ninth and tenth classes) and senior secondary education (eleventh and twelfth classes). The syllabi and courses (1980) For secondary school examination physical fitness play an important role in the curriculum of physical education, in addition to the various objectives of physical education. The physical fitness could be realised only through physical education activities.

There are no special periods allotted for physical fitness in the syllabus of the Central Board of Secondary Education. It is expected that the students would develop a certain amount of physical fitness through participation in other physical education activities. However, there is provision for assessing physical fitness. In the scheme of examination, a student is permitted to sit for examination at the end of class ten only if he has obtained grade 4 (fair) in health and physical education. Maximum of seventy five marks are allotted for physical education. Twenty marks are allotted for theory and fifty five marks for practical, out of which, ten marks are for fitness.

The battery A of NPED has been adapted as the standard test for evaluating physical fitness in classes ninth and tenth in the schools under the local norms. The battery A is an ad hoc norm. Therefore a computed norm on the basis of performance of comparable student group is needed. Though the scheme of required physical education got implemented over a number of years, yet no State Board of Education has taken up any research works for preparing suitable norms.

Thomas states that the Madras Physical Efficiency Test was constructed for Secondary school boys. The Physical ability of boys was assessed in five item tests comprising basic natural activities like 1) climbing 2) Jumping 3) Running 4) Running Long Jump 5) Running High Jump 6) 100 Metres run and
7) Throwing cricket Ball for distance. Only medically fit students were allowed to take part. Students were graded class I, class II and class III in each events and consolidated grading was given under “All round efficiency”. Thomas5 further adds that Bombay Achievement test prepared by P.M. Joseph was a very progressive type of test. The tests were conducted in 50 yards run for Elementary and Sub-Juniors, 75 yards run for Seniors, Jump and reach (vertical Jump test) ball throw for distance, pull-ups and running broad jump. Marks were allotted separately for each part (a) achievement tests (b) tests in physical activities and (c) attendance. The performances were converted into points by using a scoring table prescribed by him (Authors Guide).

Moorthy (1982) conducted a survey of minimum muscular fitness of school children of age groups six to eleven years and compared the influences of selected yogic exercises and physical exercises on them. In that study, 1000 children (571 boys and 429 girls) from second standard to seventh standard attended at three schools. Ninety boys and ninety girls from the total strength were randomly selected for experimental purposes. They were divided into there equal graph each group consists of Thirty subjects. They were divided in to three equal groups each group consists of thirty subjects Thirty boys and thirty girls were randomly allotted to Experimental Group – I (Physical exercises) Experimental Group–II (Yogic exercises) and Control group III The Experimental groups undergone the treatment for period of six weeks Whereas control group not involved any exercise programme other then their day to day activities. From the results of the study both experimental groups showed significant improvement after six weeks training when compared to control group. The percentage of improvement was seen much greater in yogic group than in physical exercise group.

Rajaguru (1990) conducted a survey of physical fitness on school boys age between eleven and sixteen years in Thanjavur and Pudukottai districts and the influence of selected weight training exercises on them. This study was designed to survey the physical fitness of high school boys age ranging from
eleven to sixteen years in Thanjavur and Pudukottai districts and the influence of selected weight training exercises on them. To achieve this purpose, four thousand, six hundred and eighteen boys from the above said districts were selected at random. For this study physical fitness variables were selected as a variable. To test the physical fitness of the boys the researcher used six test items namely Pull – ups for shoulder strength, Sit – ups for Abdominal muscular strength and Endurance, Shuttle run for agility, Standing broad Jump for power, 50 yard dash for speed and 600 yards run for cardio respiratory endurance. After collecting the data from the subjects re-analysed by using t-ratio statistical technique. On the basis of interpretations of data the following conclusions were drawn.

1. The selected weight training exercises had significantly improve the physical fitness level of below average subjects in all six items.

2. The selected weight training exercises two hands press high pull up, press behind the neck, triceps press, bench jump, jumping squat and step upon bench had improved the performance in all the physical fitness components namely speed, strength, agility, endurance Abdominal muscular strength and Endurance and cardio respiratory endurance.

Suresh (1993) conducted a study on the survey of health related physical fitness and cultural aspects of school boys of the age group between fourteen to sixteen years of Karnataka State. For the purpose of this study he has selected 1028 boys from Karnataka State at random. For this study following variables were selected.

Test 1 - Sit and reach for Flexibility
Test 2 - Sit ups for abdominal muscular endurance
Test 3 - Bent arm hang for shoulder muscular endurance
Test 4 - Shuttle run for running speed and agility
Test 5 - Harvard step test for cardio respiratory endurance
Test 6 - Body composition (skin fold measurement) sum of Biceps, Triceps, Sub scapular and Supra for body composition. To find out the cultural aspects, relation to the family, rural and urban background, interest of family and friends sports and games. T-test and analysis of variance was used.

No significant differences exist among rural and urban group in sit and reach for flexibility.

There was no significant difference exists among rural and urban in sit–ups for abdominal muscular endurance.

Significance between rural and urban group bent arm hang for shoulder muscular endurance. Harvard step test for cardio respiratory endurance. No significant differences are found in shuttle run for running speed and agility.

**Donely** (1959) surveyed the physical education programmes and facilities in secondary schools of Southerm Alaska. The evaluation of programmes and facilities were based on scores. It was found that maximum of the schools did not have the minimum facilities and physical activities programmes except few schools. When compared with recommended standard of secondary schools of Sourthern Alasks.

**Vijayakumar** (1993) conducted a survey of health related fitness and cultural aspects of school children of Kerala. For the purpose of this study he has selected 1000 school boys of age ranging from 14 to 17 years from the schools of five districts of Kerala both urban and rural. 1. Urban group consists of 642 Boys, 2. Rural group 358 boys. Health related physical fitness were administered and the social and cultural aspects of their parents. A questionnaire was also administered to each student. To find out the significant difference among the groups “t” test and “F” was applied. From the result of the study showed that there were no any statistical significance between rural and urban school boys in health related fitness.
James (1992) conducted a survey of physical fitness of higher secondary school boys age between sixteen and nineteen years at low, medium and high altitudes in Tamil Nadu. For the purpose of this study he has selected 315 school boys studying XI to XII standard from nine schools at low, medium and high altitudes for this survey, the scores made by these subjects at each level of altitudes was compared with other level of altitude. Physical fitness, emotional, social, spiritual and mental fitness tests were conducted. The data collected at different altitudes analysed by using one way analysis of variance (ANOVA). 1. The medium altitude students of the age 16 to 19 years performance better in pull ups and 50 yards run than low and high altitude students of same age group. 2. The same subjects at high altitude performed well in standing broad jump, 600 yards run walk than the low and medium altitude students. 3. They have done well at low altitude in shuttle run than the other two level of altitude.

Rajakumar Thangairasu (1993) conducted a survey of health related physical fitness and cultural aspects of school boys in the age group of 11 to 16 years in Madras District. For the purpose of this study she has selected 1700 school boys aged ranging 11 to 16 years from Madras city. The urban group consists of 507 boys and rural group 193 boys. To evaluate the performance of the boys in health related physical fitness a set of 6 selected test items were administered. A questionnaire was also administered to each student. For analyzing the data percentile score and “t” test were used to compare the fitness of rural and urban boys. For the significance difference with in among factors. One way analysis of variance was used, on the basis of statistical findings 1. There was significant difference between urban and rural boys in sit and reach for flexibility 2. There was no significant difference between urban and rural boys in sit ups for abdominal muscular endurance 3. There was significant difference between urban and rural boys in shuttle run for running speed and agility 4. There was significant difference between urban and rural boys in bent arm hang for arm and shoulder muscular endurance 5. There was significant difference between urban and rural boys in Harvard step test for cardio
respiratory endurance and health related physical fitness of school boys and there membership of school sports clubs. 6. There was significant difference exist among urban and rural boys in estimated body fat percentage also.

Balasubramanian (1993) conducted a survey and influence of selected physical and yogic exercise on low back pain of transport corporation employees in Madurai District. For the purpose of this study he has selected 30 low back pain patients aged 25 to 55 men, divided into two groups. Eight weeks treatment was given, Group A participated physical exercises, Group B participated yogasana exercises. Analysis of co-variance was applied to find out the significant differences among the groups. The result reveals that there was no significant difference between the yogasana group and physical exercise groups. 1. The physical exercise and yogasana significantly decrease the low back pain of aged people. 2. The decrease in pain probed that the obtained results are mainly on account of the influence of physical exercise and yogasanas. 3. There was significant decrease in the lock back pain when compared. 4. Some of the severe cases took more time for cure.

Joseph James (1990) conducted a survey of physical fitness of Kendriya Vidyalaya boys in Kerala State and the influence of acceleration sprints and hollow spirits on them. To achieve this purpose he selected 3500 boys from Kendriya Vidyalaya in Kerala and their age ranging from 11 to 16 years. AAPHER Youth Physical fitness test was selected to find out their physical fitness levels before and after the treatment of experiment variables. For this study the following tests were administred. 1. Pull – ups – Arm and shoulder strength 2. Sit – ups (flexed leg 60 sec) – To measure abdominal strength 3. Shuttle run (40 Yards) – To measure specific agility 4. Standing broad jump – To measure power 5. 50 yards sprint – To measure speed 6. 600 Yards run/walk – To measure endurance. For this study, ANOVA Statistical technique were used to analyse the data. On the basis of interpretation of data, the following conclusions were drawn. 1. The physical fitness level of the boys of Kendriya Vidyalaya in Kerala between eleven and sixteen years of age were
not similar. 2. Acceleration sprints and hollow points had significantly improved the physical fitness of high school boys. 3. The effect produced by acceleration sprints over the boys was significantly more than the effect produced by hollow sprints on the physical fitness of high school boys.

The AAHPER Test Battery have been used to evaluate fitness level of South African School children. For the purpose of the study 222 subjects were selected at random. Namely White (N = 98) coloured (N=92) and black (N=32) senior high school pupils. The result showed that White subjects scored higher on test of aerobic and an aerobic power and speed sit – ups. Black subjects were stronger than the other two groups. There were no significance differences between the subjects groups on tests of balance upper body endurance and agility. Male students were higher than the female students on all tests expect flexibility. It was felt that social and economic factors and the intensity of habitual physical activity played a significant role in the result of this study. *Goslin and Beuden* (1986)

*Sirijaruwong and Kosa* (2006) conducted a study to construct health-related physical fitness norms for students of Rajamangala University of Technology Thanyaburi. The population used in this research were 410 male and 460 female students who were studying in the first semester of academic year 2006 at Rajamangala University of Technology Thanyaburi. AAHPERD Health-Related Physical Fitness Test was used and conducted the following tests. Sit and Reach, One minute sit-up, 1.5 mile Run/Walk, and body mass index. The data were analyzed by mean, standard deviation, percentile norms was constructed based on percentile scores, the qualitative grading was used and prepared into five levels, namely excellent, good, moderate, low and poor. It was found that the health-related physical fitness norms for male and female students of Rajamangala University of Technology Thanyaburi by using physical fitness tests: body mass index, sit and reach, one minute sit-up and 1.5 mile run/walk were at moderate level. The researcher constructed health-related
physical fitness norms for students of Rajamangala University of Technology Thanyaburi according to the objectives.

Robson et al., (1978) conducted a study on a simple physical fitness test battery for elementary school children 152 boys and 150 girls of Kendriya vidyalaya, Gwalior, studying from grade one through five, acted as the subjects which were at random. All the subjects and assistants were oriented to the test battery comprising (1) 50 metres dash (2) 600 metres run/walk (3) straight leg sit ups (4) Vertical Jump (5) 4 x 10 metres shuttle run and (6) Modified Push Ups. The subjects were given practice in these items so that they were able to give the correct performance in each item. The Assistants were properly oriented to record measurements accurately so that mistakes could be avoided. The test items were administered to the subjects on two days allotting three items each day. After a day’s rest, the test items were administered again to the same students on the fourth and fifth day for finding out the reliability. The value of obtained was 0.87 which revealed that the subjects had achieved consistency of performance in the test items. The readings were taken during forenoon session. Norms were computed for the six physical fitness test items. The norms can be used for classifying the children into ability groups by assessing their physical fitness.

Reet Mohinder Singh (1986) prepared physical fitness norms for high school boys of Punjab State. Data were collected on five thousand subjects from various schools in the State. The test administered consisted of eight items i.e., standing broad jump, sit and reach test, agility run, knee bent sit-ups, 50 metres dash, push- up (chairs), cricket ball throw and 600 metres run-walk. The percentile norms for physical fitness tests were found to be valid and suitable to assess the physical fitness level of the high school boys of 12 to 15 years of age.

Resmussen (1970) conducted a study on South Dakota high School boys. For this study one school was selected to represent each region or section, the number of subjects selected from each school was in proportion to
the school enrolment. The AAHPER Youth Fitness Test was administered to 1000 South Dakota boys in grade 7 through 10. Norms were established by computing every fifth percentile. The scores of South Dakota boys were compared with those of national boys only on age. He found that the median scores of South Dakota boys at all age were higher than those for national boys on all items except the pull–ups, the shuttle run and the 50 yard dash.

**Busch (1970)** conducted a study on South Dakota high school girls. One School was selected to represent each region or section and the number of students selected from each school was in proportion to the school’s enrolment. 1000 South Dakota girls were selected as subjects from all the high schools from grade 7 through 10. AAHPER Youth Fitness test was administered. Norms were established by computing every fifth percentile. The scores of South Dakota girls were compared with those of National girls, using age only. The median scores of South Dakota girls were higher than those for national girls in all items except flexed–arm hand.

**Beckford (1976)** conducted a study to evaluate the physical fitness level of Navajo girls who were 14 to 16 years old. AAHPER Youth Fitness test was administered on the subjects selected from seven schools of the region to measure the physical fitness level. It was also established on the basis of scores obtained from test results from these Schools. These norms were compared to national norms found in the manual accompanying the AAHPER Youth Fitness test. The results of this study gave an indication of the overall fitness level of 14, 15 and 16 years old Navajo girls of the seven test items. The Navajo norms were below the national norms on 5 items and above on the softball throw and 600 yard run/walk.

**Patrick (1972)** had constructed a motor fitness test battery for girls in lower elementary grades. The items included in this test were Clarke’s strength composite, McCloy’s endurance ratio, leg extension and flexion, Well’s sit and reach, Dodging run, Base length wire stick balance, and vertical jump. It measured the essential components of motor fitness such as muscular strength,
muscular endurance, cardiovascular endurance, flexibility, agility, balance and power.

**Barnam** (1960) studied the AAHPER Youth Fitness test battery and administered the test to 78 girls in grade VIII at Mitchell Junior High School. The girls were classified by the Neilson – cozens Classification index and composed with national norms. The girls were above the average in sit-ups, standing broad jump, 600 yard run/walk, 50 yard dash and shuttle run but below in the soft ball throw and modified pull-ups. The differences were attributed to their physical education programmes.

**Elnashar** (1982) conducted a study on 399 males and 311 females aged 9 – 18 years enrolled in physical education classes in Fayoum, Egypt and were evaluated using the 6 item AAHPER Youth Fitness test. Comparison of 50% with American norms revealed that Egyptian sample was substantially below average fitness in both sexes across all age groups. Only pull-ups in males and flexed arm in females in the early age group were above the American Standard. Comparison between males and females revealed males significance superior across all ages even when age, height and weight were held constant by ANACOVA. An eight week physical fitness programme produced significant improvement in all tests in both sexes.

**Taddonio** (1982) conducted a study to compare the physical fitness of public school students from economically deprived areas with national norms. He also compared the physical fitness to public school students from high poverty area with those from low poverty area. The national norms were developed from the 1975 national survey of youth fitness. The AAHPER Youth Fitness test was used as the measures of physical fitness. The subjects 90 titles 1 eligible schools, 180 class rooms and 1080 students from 12 largest standard areas in the United State were taken for this study.

When statistical analysis involved, it was found that there was no difference in the physical fitness of boys and girls represented by 1975 national
norms. It was found that also there was no difference in physical fitness of boys or girls or high poverty areas and girls from low poverty areas.

**Sittmann** (1981) conducted a study to develop norms for North East Missouri State University students enrolled in the health and physical fitness concept classes. 372 male and 648 female subjects were tested for the sum of 6 skinfolds, predicted % fat, predicted VO2 max, grip strength, leg strength, back strength, vertical jump distance and vertical jump power. Means, standard deviations and range for all variables were calculated; classification was based on sex. Percentiles in increments of 5 were constructed for each variable in each classification.

**Elizabeth** (1960) prepared the norms for girls age 12, 13, 14 and 15 on the North Carolina AAHPER Tests. The norms were prepared for each of the five test items, sit-ups, side stepping, standing broad jump, modified pull-ups and squat thrusts. The sit-ups item provided differentiation on the percentile scale for each age group. The concentration of scores in the middle of the distribution for the side stepping test and the squat thrust test resulted in effective discrimination in the centre of the ranges for all age groups. The standing broad jump test provided the greatest ranges and the best differentiation of scores on the percentile scale for the age groups. The modified pull-ups tests failed to differentiate the lower end of the distribution for all age groups but did not discriminate above the 20th percentile.

**Walker** (1982) conducted research on 50 blacks and 50 white females 10th grade students were randomly selected and compared on the AAHPERD Youth Fitness test. The black students scored significantly higher (P 0.05) than the white students on leg power (M=44.6 % and 31.2 % respectively) and speed (M= 57.8 % and 30.1 % respectively). The white students performed significantly higher than the black students on abdominal strength (M = 31.5 % and 27. 7 % respectively). No other comparisons were significant.
Alston (1965) made a comparison between the performance of girls on the Virginia Physical Fitness test, AAHPERD Youth Physical Fitness test and North Carolina Physical Fitness Test. He found the correlations between the Virginia and the AAHPERD Test was 0.80. The mean difference gave essentially equivalent result for assessing physical fitness of high School.

Singh (1988) prepared physical fitness norms for high and higher secondary school boys of Jammu and Kashmir State. Data was collected on 4200 male students belongs to six to eleventh classes of age 13 to 19 years subjects randomly selected and they were administered the AAHPER Youth Fitness Test. Age wise norms were prepared in terms of Percentile scale, Hull Scale and T- Scale.

(1991) conducted a study on computation of norms for 12 minute run and walk among school boys. Data was collected on 1000 school boys belongs to sixth to tenth classes of age 13 to 15 years subjects were randomly selected and they were administered the Cooper’s 12 minutes Run/Walk test. Age wise norms were prepared in terms of Hull scale.

Callaway (1983) constructed a Percentile norms for Albama students in grade 1 – 9 based on both AAHPER Youth Fitness Test and AAHPER Health Related Fitness Test. The subjects were 2545 Albama boys and girls. Norms were constructed for each test item based on age and sex. The obtained mean performance on each test items were compared with national norms.

2. Studies on Rural and Urban school boys.

Albarwani et al. (2009) conducted a study the effects of overweight and leisure-time activities on maximal aerobic capacity (VO2max) in urban and rural Omani adolescents. For the purpose of the study A total of 529 (245 males, 284 females) adolescents, aged 15-16 years were randomly selected from segregated urban and rural schools. Maximal aerobic capacity was
estimated using the multistage 20-meter shuttle-run test. The body mass index (BMI) of urban boys and girls was significantly higher than that of rural boys and girls. Urban boys and girls spent significantly less weekly hours on sports activities and significantly more weekly hours on TV/computer games than their rural counterpart. Urban boys and girls achieved significantly less VO2max than rural boys and girls (44.2 and 33.0 vs. 48.3 and 38.6 mL/kg/min, respectively). Maximal aerobic capacity was negatively correlated with BMI in urban boys.

Joens Matre (2003) conducted study on Increasing prevalence of overweight in youth has been well chronicled, but less is known about the unique patterns and risks that may exist in rural and urban environments. A better understanding of possible rural–urban differences in physical activity profiles may facilitate the development of more targeted physical activity interventions. Participants (1,687 boys; 1,729 girls) were recruited from fourth, fifth, and sixth grade classes in schools from urban areas, small cities, and rural areas. Multilevel modeling analysis was used to examine rural–urban differences in physical activity and prevalence of overweight. Physical activity was assessed by self-report and body mass index was calculated from measured height and weight. Prevalence of overweight was higher among rural children (25%; \( P < .001 \)) than children from urban areas (19%) and small cities (17%). Urban children were the least active overall (Cohens’ \( d = -0.4 \)), particularly around lunchtime while at school (\( d = -0.9 \) to \(-1.1\)). Children from small cities reported the highest levels of physical activity. They Concluded that the results of this study suggest there are rural–urban differences in children's prevalence of overweight and physical activity even within a fairly homogenous Midwestern state.

Reyes (2003) examined a study on physical fitness of school children resident in an urban colonia and in a rural indigenous community in Oaxaca, southern Mexico, was compared. Two measures of performance-related fitness (standing long jump, 35-yard dash [32 m]) and four measures of health-related
fitness (grip strength, sit and reach, timed sit-ups, distance run) were taken on 355 rural (175 boys, 184 girls) and 324 urban (163 boys, 161 girls) school children, 6-13 years of age. Urban children were significantly taller and heavier than rural children. Absolute grip strength did not consistently differ between rural and urban children, but when adjusted for age and body size, strength was greater in rural children. Explosive power (standing long jump) and abdominal strength and endurance (timed sit-ups) were better in urban than in rural children without and with adjustment for age and body size. Urban-rural differences in running speed (dash) and flexibility (sit and reach) varied by age group and sex. Younger rural children and older urban girls performed better in the distance run, whereas older rural and urban boys did not differ in endurance. The size advantage of urban children does not necessarily translate into better levels of performance- and health-related physical fitness. The observed differences may be related to activity habits associated with school physical education and lifestyle in the respective communities.

Raudsepp et al. (2004) conducted a study to estimate the physical activity levels of Estonian primary school children. The subjects were 174 7- to 9-year-old children (83 boys and 91 girls). Physical activity was assessed by (a) parental seven-day physical activity recall and (b) Caltrac accelerometers (Hemokinetics Inc., Madison, WI). Caltrac accelerometers were worn between the hours of 8.00 a.m. and 8.00 p.m. during one school day and one weekend day and mean activity counts of the Caltrac score for the two days were calculated. According to the results of the seven-day activity recall, the moderate-to-vigorous physical activity (MVPA) levels of the boys were significantly (p<0.05) higher than the girls in all age groups. The 54.2 to 99.4 minutes (9-year-old girls and 7-year-old boys, respectively) of daily MVPA meet recent Physical Activity Guidelines for Adolescents. The results of the Caltrac monitoring indicated that there were no gender differences in the activity counts of 7-year-old children. However, the mean Caltrac scores of the boys were significantly higher than the girls in the 8- and 9-year-old groups. In
addition, the results indicated a significantly (p<0.05) higher level of MVPA in rural compared with urban schoolchildren. It was concluded that the level of MVPA of Estonian primary school children was sufficient to meet recent activity guidelines for adolescents. Boys were generally more physically active than girls of the same age.

**Bilinski et al. (2005)** conducted a study to explore the physical activity patterns of a group of rural children living in Saskatchewan, Canada. Of the 103 participants (aged 8-13 years), 53.7% met the national guideline for the amount of physical activity required to achieve optimal health benefits. Children's involvement in out of school organized physical activities, (e.g. baseball, soccer, dance) was associated with whether or not they met the guideline. There was no statistically significant association between the children's physical activity and their participation in physical activities in school, television watching behavior, or their parents educational levels. Results suggest that many rural children in Saskatchewan are not physically active enough for health benefits and several factors can potentially influence the physical activity of this group of children. Further exploration of such factors may assist families, communities, schools, and health professionals in promoting physical activity in this population.

**Eiben et al. (2005)** The authors present a comparison between urban and rural boys and girls based on their Hungarian National Growth and Physical Fitness Study, carried out in the whole territory Hungary. The sample investigated (N=39,035) contained 15% of the 3-18 year-old healthy boys and girls in Hungary. The anthropometric programme included 18 body measurements the physical fitness investigation used a battery of seven tests. Data were collected also about the family background, Urban boys and girls are taller, more robust, and stronger than their rural counterparts. Pubertal growth started in urban boys and girls appears about one-and-a-half year earlier, than in rural ones in width measurements. Urban boys and girls usually have higher means than the rural ones. Based on their skin folds, however, urban boys and
rural girls usually have more subcutaneous fat. These differences are the most pronounced during or at the end of puberty. The authors surveyed the different urban and rural socio-economic environmental factors, influencing children's growth and physical fitness, and they discuss the possible reasons of these differences.

**Shukla et al.** (1991) conducted a study on 120 sportswomen (60 urban and 60 rural) were included. They hailed from the States of Uttar Pradesh and Punjab. They participated in games like hockey, handball, cricket, kho-kho, athletics and voile ball. Urban, boys participated in international, State and national games, while rural boys participated inter-collegiate rural tournament, States and national games. Age group was varied between 13 to 22 years. For comparison, they were divided in three groups A (13 to 16 years), B (17-19 years) and C (above 19 years). Height and weight recorded, A A H PER test were employed which consisted of the following tests: Ball Throw (SBT), Situp (SU), Pushup (PU), Shuttle Run (SR), 50 yards dash (50 Y), Standing Board Jump (SBJ), and 600 yards dash (600 Y). The result revealed that in SBT the sportmen had very poor result indicating very low explosive capacity of the upper limb muscle. Further, the rural sportswomen were poor in shuttle run indicating minimum agility in them. The rural girls of A and B groups were observed to possess poor anaerobic muscle power as had been revealed by 50 yards dash run. The overall performance of the urban sportswomen was higher than the rural counterpart. On further analysis it has been observed that C group of urban sportswomen were comparatively superior in 50 Y SBJ, SR, Su, than those of lower age groups. Further, in Uttar Pradesh both rural and urban sportswomen were very efficient. The overall superiority of urban sportswomen than their rural counterpart might be attributed to better coaching and other facilities.

**Shamli** (2010) conducted a study to measure the physical activity and physiological fitness (cardiovascular fitness, body composition, flexibility, muscle strength and endurance) of 10th grade male students in the Al-Dhairah
region, Sultanate of Oman. The study sample consisted of 330 male students from rural and urban areas. The study used a physical activity survey to measure the physical activity and a test battery to measure the physiological fitness components (1 mile walk/run test; a skin fold of chest, abdominal, and thigh; sit and reach test; hand grip test; and one minute sit-ups). The results showed that body fat percentage (6.82:1:4.91) and muscle strength (38.15:1:7.60) of urban students were higher than rural students (body fat percentage 5.79:1:4.29, muscle strength 37.81:1:6.93). Rural respondents scored higher in flexibility (39.36:1:6.95), muscle endurance (40.03:1:7.64) and cardiovascular endurance (7.63:1:1.30) compared to urban students (flexibility 37.96:1:6.97, muscle endurance 39.78:1:7.67, cardiovascular endurance 8.03:1:1.77). The results showed significant difference in body fat percentage (p = 0.04), muscle endurance (p = 0.00), and cardiovascular endurance (p = 0.01) between participation in sports activities and physiological fitness components for the overall sample. The study recommends that a concerted effort be made by all parents, teachers, school administrators and the community to improve the general physical fitness of students on the whole.

Tismeas et al. (2005) conducted a study to investigate physical fitness in relation to fatness in urban and rural Greek children by means of allometric scaling. For the purpose of study 360 boys were selected at random. (189 urban and 171 rural; age 12.3±0.42 years) boys and 247 (125 urban and 122 rural; age 12.3±0.43 years) girls. The sample was highly representative (32–64%) of all 12 year old children registered in the prefecture of Trikala, Greece. All volunteers were assessed for BMI and % body fat, as well as sit and reach, basketball throw (BT), vertical jump (VJ), handgrip strength (HG), 40 m sprint, agility run, and 20 m shuttle run. To correct for possible associations between fatness and fitness, a single cause allometric scaling was employed using the natural logarithms (ln) of fitness parameters that were significantly correlated with the in body fat. Independent-samples t tests revealed that VJ (p<0.05) was significantly higher in boys living in urban settings compared to their rural
counterparts. Similarly, BT was found to be significantly better (p<0.05) in urban girls, whereas HG was significantly higher (p<0.05) in rural girls.

In conclusion (a) only three out of the 14 possible cases (seven fitness parameters for boys and seven for girls) were significantly different between urban and rural children, and (b) these differences were not uniformly distributed in children living in either urban or rural environments, it is concluded that the place of residence has no clear impact on physical fitness as studied herein.

3. Studies on physical activities programme

Aires et al. (2010) conducted a study was to analyze the relation between body mass index (BMI), Cardiorespiratory Fitness (CRF), and levels of physical activity (PA) from sedentary to very vigorous intensities, measured by accelerometry, in students from a middle and high school. This cross-sectional study included 111 children and adolescents, age 11 to 18 years. PA was assessed with an accelerometer for 7 consecutive days (1 minute epoch) using specific cut-points. PA components were derived using special written software (MAHUFFe). CRF was assessed by maximal multistage 20m shuttle run. T-test was used to test differences between BMI groups, Pearson's correlation, to analyze correlations between all variables and multinomial logistic regression, and to predict the value of BMI categories. This paper provides evidence that BMI was inversely and significantly correlated with CRF. Only CRF was correlated with Vigorous and Very Vigorous PA levels and total amount of PA. Children with Overweight/Obesity were less likely to perform more laps than normal weight counterparts. The total amount or intensity level of PA did not show any influence on BMI level.

Aires et al (2010) conducted a study to analyse whether changes in physical activity index (PAI), screen time (ST: television, computer) and body mass index (BMI) made a contribution to longitudinal changes in fitness of children and adolescents. Additionally, we analysed the interaction between
baseline fitness level and changes in fitness. This is a 3-year longitudinal study of 345 high school students aged 11-19 years. Students performed curl-ups, push-ups and 20-m shuttle run tests from Fitnessgram. PA and ST were evaluated using a standard questionnaire. Standardized scores of fitness tests were summed. Changes over time were calculated as Δ1 (2007 minus 2006), Δ2 (2008 minus 2007) and Δ3 (2008 minus 2006). From the results changes in PAI were positively and independently associated with changes in fitness in Δ1, Δ2 and Δ3. Changes in BMI were negatively associated with changes in fitness in Δ3. Participants highly fit at baseline were those who showed positive changes in PAI over Δ3, decreased changes in ST and had the lowest increase in BMI over 3 years compared with those low-fit at baseline.

**Aires et al (2010)** conducted a study to analyse whether Physical Activity Index (PAI), Physical Fitness, Screen Time (watching TV and computer use), Socio-economic Status and Commuting to School made a significant contribution to longitudinal changes in Body Mass Index (BMI) in youth. This longitudinal study was carried out over a period of 3 years with 345 students (147 boys) who were between 11 and 16 years old at the beginning of the study. Students were invited to perform tests from Fitnessgram Battery for Curl-Ups, Push-Ups, Back-Saver Sit and Reach, and 20m Shuttle-Run (CRF). Fitness tests were categorized in Healthy Zone (HZ) and Under Healthy Zone (UHZ), PAI in less active and active; Socio-economic Status, in low, middle and high education level, and Commuting in active and passive. BMI was corrected for age and gender meaning that we subtracted the age-and-sex-specific cut points for overweight. Corrected body mass index was used as dependent variable in a Linear Mixed Model. The main result was the strong positive and independent association of individuals with CRF performances UHZ with corrected body mass index. In conclusion, the results of this longitudinal study showed markedly an important relationship of lower fitness levels with the risk of being overweight/obese, in particular CRF and abdominal strength. © Georg Thieme Verlag KG Stuttgart · New York.
Anderson et al. (2009) examined the contribution of athletic identity and three key demographic variables to physical activity and sports team participation. Students in Grades 4-5 (n=391, mean age 9.9 years, range 8-13 years, collected in 2003) and Grades 7-8 (n=948, mean age 13.6 years, range 11-15 years, collected in 2002 and 2006) completed the 40-item Athletic Identity Questionnaire, which measures self-perceptions of athletic appearance; competence; importance of physical activity and sports; and encouragement for activity from parents, teachers, and friends. Hierarchic multiple regression analyses in 2008 assessed the effects of athletic identity, race/ethnicity group, gender, and overweight status on 7-day moderate-to-vigorous physical activity (MVPA) and organized sport team participation in each age group. In children and adolescents, the global score of athletic identity was independently, positively related to MVPA (p<0.0001, p<0.0001, respectively) and team participation (p<0.0001, p<0.0001, respectively), after controlling for demographic variables. More variance in MVPA was explained in children (23%) than in adolescents (5%), in contrast to team sports (5% in children, 15% in adolescents). In the subscale analyses, positive relationships for appearance, competence, importance, and parental encouragement persisted independent of demographic factors.

Barkley et al. (2009) studied during play children engage in short bouts of intense activity, much like interval training. This natural preference for interval-type activity may have important implications for prescribing the most motivating type of physical activity, but the motivation of children to be physically active in interval or continuous fashion has not yet been examined. In the present study, ventilatory threshold (VT) and VO2 peak were determined in boys (n = 16) and girls (n = 16) age 10 ± 1.3 years. Children sampled interval and continuous constant-load physical activity protocols on a cycle ergometer at 20% < VT on one day and 5% > VT on another day. The physical activity protocols were matched for energy expenditure. Children then completed an operant button pressing task using a progressive fixed ratio schedule to assess the relative reinforcing value (RRV) of interval versus
continuous physical activity. The number of button presses performed to gain access in interval or continuous physical activity and output maximum (Omax) were the primary outcome variables. Children performed more button presses (P < 0.005) and had a greater Omax (P < 0.005) when working to gain access to interval compared to continuous physical activity at intensities > VT and < VT. This suggests that interval-type physical activity was more reinforcing than continuous constant-load physical activity for children when exercising both > VT and < VT. Children likely participate in short-duration bouts of activity at a high-rate during natural play because it is more reinforcing than longer, continuous activity.

Baquet et al. (2009) conducted a study to analyse the effects of a high intensity aerobic training program on different components of physical fitness in adolescents aged 11 to 16 years. The subjects were divided into a high intensity (HI) group (243 girls and 260 boys) and a control group (21 girls and 27 boys). HI and C completed a weekly 3 hour physical education (PE) session. Before and after a 10 week period, the two groups performed the European physical fitness test battery (EUROFIT). During these 10 weeks HI spent one hour out of three at a specific PE session. These specific sessions consisted of short intermittent exercises (10 seconds) at 100 to 120% of maximal aerobic speed. They showed a significant influence on standing broad jump (2.9% p<0.05, F= 4.85), 20 meter shuttle run (3.8%, p=0.001, F = 23.21) and on the maximal distance covered over 7 min (7.6 % p<0.001, F=14.48). For C there was no improvement in EUROFIT performances. It was concluded that training at high intensity improves not only children’s aerobic fitness but also performance of standing broad jump. Well monitored, adequate intensive training is necessary for a more desirable functional development.

Bayer et al. (2008) investigated physical activity is an important determinant of energy balance. However, its impact on overweight/obesity has proved difficult to measure in pre-school children and few studies have found significant associations. A set of simple questions was used to distinguish pre-
school children with high and low physical activity, and the association of this classification with childhood overweight/obesity and performance in an established motor test was investigated. Survey, cross-sectional. Setting and subjects: Weight and height were measured in 12,556 children taking part in the obligatory school entrance health examination 2004-5 and 2005-6 in three urban and three rural Bavarian regions. Their parents were asked to answer a questionnaire with a set of questions on physical activity. The mean age of the children evaluated was 5.78 (sd 0.43) years, 6535 (52.1 %) were boys. Physically active children were less likely to be overweight (OR = 0.786, 95 % CI 0.687, 0.898) or obese (OR = 0.655, 95 % CI 0.506, 0.849) and achieved 6.7 (95 % CI 5.8, 7.7) % more jumps per 30 s than less active children in a motor test, adjusted for a number of potentially confounding variables. Classification of pre-school children as physically active or not, based on a small set of questions, revealed significant associations with overweight/obesity and a motor test. Once further validated, this classification might provide a valuable tool to assess the impact of physical activity on the risk of childhood overweight and obesity.

Beets et al. (2009) conducted a study that majority of children do not participate in sufficient amounts of daily, health-enhancing physical activity. One strategy to increase activity is to promote it within the after-school setting. Although promising, the effectiveness of this strategy is unclear. A systematic review was performed summarizing the research conducted to date regarding the effectiveness of after-school programs in increasing physical activity.: Databases, journals, and review articles were searched for articles published between 1980 and February 2008. Meta-analysis was conducted during July of 2008. Included articles had the following characteristics: findings specific to an after-school intervention in the school setting; subjects aged ≤18 years; an intervention component designed to promote physical activity; outcome measures of physical activity, related constructs, and/or physical fitness. Study outcomes were distilled into six domains: physical activity, physical fitness, body composition, blood lipids, psychosocial constructs, and sedentary
activities. Effect sizes (Hedge’s g) were calculated within and across studies for each domain, separately. Evidence synthesis: Of the 797 articles found, 13 unique articles describing findings from 11 after-school interventions were reviewed. Although physical activity was a primary component of all the tested interventions, only eight studies measured physical activity. From the six domains, positive effect sizes were demonstrated for physical activity (0.44 [95% CI=0.28-0.60]); physical fitness (0.16 [95% CI=0.01-0.30]); body composition (0.07 [95% CI=0.03-0.12]); and blood lipids (0.20 [95% CI=0.06-0.33]).

Bélanger et al. (2009) examined that a majority of youth do not attain the recommended levels of physical activity. To develop interventions that will be more efficient at enabling healthy levels of physical activity during adolescence, a better understanding is needed about which specific types of physical activity adolescents are more likely to sustain and when they tend to stop participating in each specific type of activity. From 1999 to 2005, 1276 adolescents, initially aged 12-13 years, completed a 7-day physical activity recall every 3 months during each of 5 years of secondary school. The prevalence of participation in each of 29 specific physical activities in each of Grades 7-11 was computed. Survival analyses were used to estimate when adolescents who reported each activity at baseline tended to discontinue the activity. All analyses were conducted in 2008. Results: The prevalence of participation in most activities declined over the 5 years; it did not increase for any activity. Within 2 years of baseline, the majority of adolescents discontinued participation in most activities in which they had reported participation at baseline. Sustained participation in a specific activity related both to its intensity (90%, 73%, and 40% of girls and 77%, 86%, and 60% of boys sustained participation in light-, moderate-, and vigorous-intensity activities, respectively) and its format (41% and 89% of girls and 69% and 90% of boys sustained participation in team and individual physical activities, respectively).
Berntsen et al. (2010) conducted a study to determine whether five months of guided active play in overweight or obese children and adolescents under multidisciplinary management for weight reduction leads to increased physical activity levels in leisure time, as well as changes in aerobic fitness and body composition. Sixty overweight or obese children and adolescents were randomly assigned to an intervention or control group. All participants received dietary advice and were encouraged to increase physical activity level. The intervention group additionally participated in 60-minute guided active play/physical activity twice a week for 5 months. Physical activity was recorded; aerobic fitness and body composition were measured at inclusion and after cessation of intervention. Physical activity level during weekend days was significantly higher for the intervention group compared with the controls after 5 months intervention (p=0.04). The mean reduction in percentage of body fat was 1.8% (95%CI: 0.6, 3.1) in the intervention group (p=0.04) and not significant among the controls (0.9 [-0.9, 2.7]). There was no change in aerobic fitness.

Cleland et al. (2009) examined the influence of childhood socioeconomic position (SEP) and social mobility on activity and fitness tracking from childhood into adulthood. In a prospective cohort of 2,185 Australian adults (aged 26-36 years), first examined in 1985 (at ages 7-15 years), self-reported physical activity and cardiorespiratory fitness (subsample only) were measured. SEP measures included retrospectively reported parental education (baseline) and own education (follow-up). There was little evidence of a relation between childhood SEP and activity tracking, but high childhood SEP (maternal education) was associated with a 59% increased likelihood of persistent fitness, and medium childhood SEP (paternal and parental education) was associated with a 33%-36% decreased likelihood of persistent fitness. Upward social mobility was associated with a greater likelihood of increasing activity (38%-49%) and fitness (90%), and persistently high SEP was associated with a greater likelihood of increasing activity (males: 58%) and fitness (males and females combined: 89%). In conclusion, persistently high
SEP and upward social mobility were associated with increases in activity and fitness from childhood to adulthood. Findings highlight socioeconomic differentials in activity and fitness patterns and suggest that improvements in education may represent a pathway through which physical activity levels can be increased and health benefits achieved.

Collard et al. (2010) investigated the effects of a school-based physical activity-related injury prevention program, called 'iPlay', on risk behavior and Neuromotor fitness. Methods: In this cluster randomized controlled trial 40 primary schools throughout the Netherlands were randomly assigned in an intervention (n = 20) or control group (n = 20). The study includes 2,210 children aged 10-12 years. The iPlay-intervention takes one school year and consists of a teacher manual, informative newsletters and posters, a website, and simple exercises to be carried out during physical education classes. Outcomes measures were self-reported injury preventing behavior, self-reported behavioral determinants (knowledge, attitude, social-influence, self-efficacy, and intention), and Neuromotor fitness. The iPlay-program was not able to significantly improve injury-preventing behavior. The program did significantly improve knowledge and attitude, two determinants of behavior. The effect of the intervention-program on behavior appeared to be significantly mediated by knowledge and attitude. Improved scores on attitude, social norm, self-efficacy and intention were significantly related to changes in injury preventing behavior. Furthermore, iPlay resulted in small non-significant improvements in Neuromotor fitness in favor of the intervention group.

Debate et al. (2009) conducted a study to find that the numerous physiological, psychological, and academic benefits of physical activity (PA), declines in PA levels among girls have been observed over the last decade. The purpose of this preliminary study was to assess the short-term changes pertaining to Girls on the Run and Girls on Track developmentally focused youth sport programs (DYS) on global self-esteem, body image, commitment to PA, and PA frequency. This preliminary study employed a Non
experimental, one-group, pre- and post intervention study design using a 29-item paper-and-pencil assessment tool (n = 1034). Paired sample t-tests from pre- to post intervention revealed statistically significant differences in self-esteem (p <.001), body size satisfaction (p <.001), and vigorous PA frequency (p <.001). Stratification by the number of times participating in the intervention revealed the greatest changes at first participation followed with continued improvements in self-esteem (p =.013) and body size satisfaction (p <.001) for those participating in a second time. Age differences were also observed between participants ≤10 years old and 11-15 years; in that significant improvements in commitment to PA (p =.003) were observed for the older girls.

Dobbins et al. (2009) evaluated The World Health Organization estimates that 1.9 million deaths worldwide are attributable to physical inactivity. Chronic diseases associated with physical inactivity include cancer, diabetes and coronary heart disease. The purpose of this systematic review is to summarize the evidence of the effectiveness of school-based interventions in promoting physical activity and fitness in children and adolescents. Search strategy: The search strategy included searching several databases. In addition, reference lists of included articles and background papers were reviewed for potentially relevant studies, as well as references from relevant Cochrane reviews. Primary authors of included studies were contacted as needed for additional information. Selection criteria: To be included, the intervention had to be relevant to public health practice, implemented, facilitated, or promoted by staff in local public health units, implemented in a school setting and aimed at increasing physical activity, report on outcomes for children and adolescents (aged 6 to 18 years), and use a prospective design with a control group. Data collection and analysis: Standardized tools were used by two independent reviewers to rate each study's methodological quality and for data extraction. Where discrepancies existed discussion occurred until consensus was reached. The results were summarized narratively due to wide variations in the populations, interventions evaluated and outcomes measured. Main results:
13,841 titles were identified and screened and 482 articles were retrieved. Multiple publications on the same project were combined and counted as one project, resulting in 395 distinct project accounts (studies). Of the 395 studies 104 were deemed relevant and of those, four were assessed as having strong methodological quality, 22 were of moderate quality and 78 were considered weak. In total 26 studies were included in the review. There is good evidence that school-based physical activity interventions have a positive impact on four of the nine outcome measures. Specifically positive effects were observed for duration of physical activity, television viewing, VO2 max, and blood cholesterol. Generally school-based interventions had no effect on leisure time physical activity rates, systolic and diastolic blood pressure, body mass index, and pulse rate. At a minimum, a combination of printed educational materials and changes to the school curriculum that promote physical activity result in positive effects. Authors' conclusions: Given that there are no harmful effects and that there is some evidence of positive effects on lifestyle behaviours and physical health status measures, ongoing physical activity promotion in schools is recommended at this time.

Deforche et al (2009) study that assess different aspects of physical fitness and physical activity in obese and non obese Flemish youth. A random sample of 3214 Flemish school children was selected and divided into an “obese” and “non obese” group based on body mass index and sum of skin folds. Physical fitness was assessed by the European physical fitness test battery. Physical activity was estimated by a modified version of the Backed Questionnaire. Obese subjects had inferior performance on all tests requiring propulsion or lifting of the body mass (standing broad jump, sit – ups, bent – arm hand, speed shuttle run, and endurance shuttle run) compared with their non obese counterparts (p<0.0001) both groups had similar levels of leisure – time physical activity; however, non obese boys had a higher sport index than their obese counterparts (p<0.05). Results of this study show that obese subjects had poorer performances on weight – bearing tasks, but did not have lower scores on all fitness components. To encourage adherence to physical
activity in obese youth, it is important that activities are tailored to their capabilities. Results suggest that weight-bearing activities should be limited at the start of an intervention with obese participants and alternative activities that really more on static strength used.

Gallotta et al. (2009) conducted a study to assess whether an enrichment of the co-ordinative demands of physical education (PE) during the curricular time may more efficiently improve co-ordinative abilities than the traditional PE program. One hundred and fifty-two middle school students aged 11-12 years were randomly assigned either to an experimental (n=77) or to a traditional (n=75) PE program lasting 5 months. The experimental intervention was structured in different modules focused on co-ordination abilities. Pre- and post-intervention tests assessed students fitness (1 mile run-walk, curl-up, flexed arm hang, trunk lift, sit and reach, 30 m run, standing long jump, basketball forward throw) and motor co-ordination abilities (four field tests of kinesthetic discrimination and response orientation ability). After the intervention period, both groups showed a significant increment in most fitness tests. However, only the experimental group showed a significant improvement or a significantly more pronounced improvement than the control group in co-ordinative performances. The results show that both experimental and traditional PE interventions lead to increase physical fitness levels, but only the experimental one also improves co-ordinative abilities. Thus, focusing on a multivariate PE approach linking co-ordination and fitness training seems to add quality to students' experiences without reducing their effectiveness in terms of physical fitness. © 2009 John Wiley & Sons A-S that independent school students outperformed students from the Catholic and government sectors on the selected tests for both boys and girls (p<0.0001). In the 20 m STR, the difference amounted to 0.28 – 0.43 SDs. In the print and jump test, independent school students were superior by 0.05 – 0.17 SDs. A proxy for socio-economic status (SES) schools consistently about 90% of the differences between sectors with high SES schools consistently outperforming low SEs schools. Nonetheless, even when SES was factored in, sectoral differences
remained significant. In so far as fitness is related to school activities, these findings raise equity concerns in Australian school physical education.

**Gaya et al.** (2009) examined that the elevated blood pressure (BP) has been reported in young people and seems to be associated with body mass index (BMI) and reduced physical activity (PA). This study sought to analyse the association of BP with BMI, PA intensity patterns and cardio respiratory fitness (CRF) in youth. A cross-sectional study was carried out including 66 boys (13.91±1.76) and 97 girls (14.02±1.71). Anthropometric characteristics, CRF and BP were assessed during school time and accelerometers were utilized to determine intensity of PA. The linear regression model, adjusted for age, sex and height, showed that higher values of BMI were associated (p≤0.05) with higher values of systolic blood pressure (SBP) (1.39; 95% CI: 0.56; 2.23) and diastolic blood pressure (DBP) (1.52; 95% CI: 0.68; 2.37). Additionally, SBP, but not DBP, was inversely associated (p≤0.05) with moderate PA (-0.25; 95% CI: -0.47; -0.02) and positively correlated with sedentary activities (0.04; 95% CI: 0.00; 0.08).

**Haga (2009)** found that Physical therapists often treat children with low motor competence. Earlier studies have demonstrated poor physical fitness outcomes and a reduced level of physical activity for these children compared with their peers with normal motor skills. The aim of this study was to examine how physical fitness developed over time in 2 groups of children those with a low level of competence in motor skills (low motor competence [LMC]), and those with a high level of competence in motor skills (high motor competence [HMC]). From an initial sample of 67 children, a group of 18 was identified as having HMC or LMC on the Movement Assessment Battery for Children and was selected for the present study. Eight children (3 girls and 5 boys) comprised the LMC group, and 10 children (4 girls and 6 boys) made up the HMC group. A longitudinal design was implemented, and physical fitness in the 2 groups was evaluated by measuring different fitness components over a period of 32 months. A mixed-effects analysis of variance revealed significant
main effects for group and for time but no group X time interaction effect. The LMC group performed less well on all physical fitness measures than the HMC group, and both groups scored significantly higher on the physical fitness test after a period of 32 months. The lack of a significant interaction effect indicated that the relative differences in physical fitness outcomes between the groups were relatively constant over time. This study was limited by the small sample size and lack of assessment of anthropometric variables and children's perceived self-efficacy.

Hastie et al. (2010) conducted a study to evaluate compares the aerobic fitness status of a sample of rural American and Russian children, and examines these findings in light of their out of school physical activity participation. In this study ten and eleven year old (N = 415) children from both countries completed a 15 m Progressive Aerobic Cardiovascular Endurance Run (PACER) fitness test, and following the test, the children scoring beyond the upper limit of the healthy fitness zone were interviewed with regard to their out-of-school participation in physical activity. From the results the Russian students achieved significantly higher scores than American students (P < .001), and males scored higher than females for both countries (P < .001). After examining the profiles of the students 3 apparent themes begin to emerge: Russian students walk to and from school; the students in both settings who achieve a superior fitness level participate in after school physical activity; after school activities for the American students appear to be more recreational orientated than the Russian students, who participate in structured training in sports clubs.

Herman et al. (2009) studied body mass index (BMI) has shown moderate to strong stability through childhood into adulthood, while physical activity (PA) tracks less well. Tracking studies have often had limited follow-up lengths. The aim was to investigate BMI and PA tracking over 22 years from youth to adulthood. Subjects included 374 participants aged 7 to 18 years in the 1981 Canada Fitness Survey, who were re-evaluated in 200204. The
stability of BMI and leisure-time PA energy expenditure (AEE) was assessed by inter-age correlations, maintenance of extreme quintiles and BMI status, and the prediction of adult overweight from youth BMI. BMI tracking was moderate to strong ($r=0.420.65$) in females, and moderate ($r=0.290.53$) in males. Approximately 38% and 42% of youth in the highest and lowest BMI quintiles, respectively, remained in these quintiles as adults. About 83% of overweight youth remained overweight as adults, while 85% of overweight adults were not overweight youth. Almost all healthy weight adults had been healthy weight youth. The odds of being overweight in adulthood was 6.2 times greater (95% CI: 2.217.2) in overweight compared with healthy weight youth. PA tracking over 22 years was low and non-significant, but moderate over the final 15 years. Only 16% and 18% of youth in the highest and lowest PA quintiles, respectively, remained in these quintiles as adults.

**Hong et al. (2009)** examined whether lifestyle factors such as dietary intake, physical activity (PA), and cardio/respiratory fitness (CRF) are associated with metabolic risk factors in Korean children. The purpose of the study was to investigate the relationships among those lifestyle-related modifiable factors and the clustering of metabolic risk factors in young Korean children. In a cross-sectional study, we studied 246 Korean children (mean SD; age: 12.6 0.5 years, BMI: 19.9 3.2kg/m2) who were recruited from local elementary schools. In the total study population, physical activity and CRF were inversely associated with metabolic risk factors including body fatness, blood pressures, blood lipids and glucose. Daily caloric intake and proportion of carbohydrates were positively associated with BMI and percent body fat only. Multivariate regression analyses showed that physical activity was independently and inversely associated with the clustering of metabolic risk factors, even after adjustments for age, sex, sexual maturation, dietary intake, and CRF. Overall, the current findings of the study suggest that physical activity rather than CRF and/or dietary intake is an independent predictor for the clustering of metabolic risk factors in Korean children.
Juan et al. (2010) examined the importance of individual and school factors as correlates of overall youth physical activity has been demonstrated by previous research, less is known about the relationship of these factors with specific patterns of physical activity during adolescence. Thus, the purpose of this study was to examine the association of selected individual and school factors with patterns of physical activity based on a sum index of physical activity in a population-based sample of Spanish adolescents. For the purpose of this study One thousand and eighty-four students aged 12 to 17 years completed a self-report survey once during school hours. In addition to participation in physical activity outside of school hours, the following variables were included in the analysis: gender, age, weight status, physical self-perceptions, evaluation of the school physical education experience, and type of school (public vs private). Multinomial logistic regression was used to model the associations among the variables and to calculate odd ratios (ORs) and 95% confidence intervals (CIs) for each pattern of physical activity. From the results the physical self-perceptions variable was the most consistent individual correlate of physical activity across participation patterns (ORs ranging from 4.29 to 1.88, CIs ranging from 2.16-8.54 to 1.10-3.21). Regarding the school variables included in this study, both were linked with participation in physical activity, but evaluation of the physical education experience showed the most consistent associations across activity patterns.

Kain et al. (2008) assessed the effectiveness of a school-based obesity prevention programme. Non-randomized controlled study. The intervention included activities in nutrition and physical activity, fully applied the first year and partially in the second one. Primary outcomes were BMI Z-score (BMIZ) and obesity prevalence; secondary outcomes were waist circumference and triceps skinfold thickness. Time effects were assessed by changes in BMI-related variables by gender and period (ANOVA and Tukey test), while intervention effects were determined by comparing changes in (i) obesity prevalence by gender and period (PROC GENMOD) and (ii) BMIZ according gender, age and period (PROC MIXED). Primary schools in the Chilean cities
of Casablanca (intervention group) and Quillota (control group). Subjects: One thousand seven hundred and fifty-nine children from three schools (intervention group) and 671 from one school (control group). Results: Over the two years, obesity prevalence and BMIZ declined significantly in the intervention group; from 17.0 % to 12.3 % and 14.1 % to 10.3 % in boys and girls, respectively, and from 0.62 to 0.53 and 0.64 to 0.58, respectively. In the control group, obesity remained stable at about 21 % and 15 %, while BMIZ increased significantly in the second year. BMIZ declined in both genders and all age categories in the intervention group during the first year (significant only in younger boys). No changes occurred during the summer, while during the second year, BMIZ increased in boys and girls from both groups (significant only in the younger control boys). Obesity declined significantly only in boys during the first year.

Knox et al (2009) found that Cardiovascular disease is the leading cause of mortality worldwide. Risk factors associated with cardiovascular disease have been shown to track from childhood through to adulthood. Previous school-based physical activity interventions have demonstrated modest improvements to cardiovascular disease risk factors by implementing extra-curricular activities or improving current physical education curriculum. Few have attempted to increase physical activity in class-room taught curriculum subjects. This study will outline a school-based cross-curricular physical activity intervention to combat cardiovascular disease risk factors in 11-14 year old children. A South Wales Valley school of low socio-economic status has been selected to take part. Participants from year eight (12-13 years) are to be assigned to an intervention group, with maturation-matched participants from years seven (11-12 years) and nine (13-14 years) assigned to a control group. A cross-curricular physical activity intervention will be implemented to increase activity by two hours a week for 18 weeks. Participants will briskly walk 3200 m twice weekly during curriculum lessons (60 minutes duration). With the exception of physical education, all curriculum subjects will participate, with each subject delivering four intervention lessons. The intervention will be
performed outdoors and on school premises. An indoor course of equal distance will be used during adverse weather conditions. Cardiovascular disease risk factors will be measured pre- and post-intervention for intervention and control groups. These will take place during physical education lessons and will include measures of stature, mass, waist, hip, and neck circumferences, together with skinfold measure's taken at four sites. Blood pressure will be measured, and fitness status assessed via the 20 m multi-stage fitness test. Questionnaires will be used to determine activity behaviour (physical activity questionnaire for adolescence), diet (seven day food diary) and maturation status. Fasting blood variables will include total cholesterol, low-density lipoprotein cholesterol, high density lipoprotein cholesterol, triglycerides, insulin, glucose, high-sensitivity C-reactive protein, interleukin-6, adiponectin, and fibrinogen. Motivational variables and psychological well-being will be assessed by questionnaire. Our study may prove to be a cost effective strategy to increase school time physical activity to combat cardiovascular disease risk factors in children.

Katzmarzyk, et. al. (2009) evaluated the relationship among television viewing time (TVTIME), physical activity, and health – related fitness in youth 9 – 18 years of age from the Quebec Family Study. The sample included 423 males 361 females 9-18 years of age from the greater Quebec city are. TVTIME, daily energy expenditure (EE) and moderate to vigorous physical activity (MVPA) were estimated. Four heath – related fitness variable were tested: knee extension strength, physical work capacity at 150 beats x min (-1), sit ups, and sum of skin folds. The body mass index (BMI) was also included. Relationships were assessed using correlations and analysis of covariance. Correlations between TVTIME and fitness variables physical work capacity at 150 beats x min (-1), sit ups, and sum of skin folds. The body mass index (BMI) was also included. Relationships were assessed using correlations and analysis of covariance. Correlations between TVTIME and fitness variables were also low and generally not significant, with no pattern by age and gender. Adolescents in the highest and lowest quartiles of TVTIME showed to consistent differences in EE, MVOPA and the four fitness items. Similarly,
adolescents in the highest and lowest quartiles of EE, MVOPA and each fitness item did not consistently differ in TVTIME.

**Koutedakis et al. (2009)** conducted to study State school physical education (PE) programmes are common throughout Greece. However, it is not known if the main objectives of the Freek PE curriculum are achieved. To assess the current national PE curriculum in relation to selected motor and cardiovascular health related fitness parameters. A sample of 84 Greek school boys (mean (SD) age 13.6 (0.3) years, height 160.7(8.6)c, weight 50(10.8) volunteered. Forty three indicated participation only in school PE classes and habitual free play (PE group). The remaining 41 were involved in extra curricular organized physical activities in addition to school PE and habitual free play (PE+group). The subjects underwent anthropometric, motor (flexibility, balance, standing broad jump, hand grip, sit ups, and plate tapping), and cardiovascular health related (percentage body fat, aerobic fitness, and physical activity) fitness assessment. Children in the PE group had inferior motor and cardiovascular health related fitness profile compared with those in the PE + group. Body fat (20.3(8.8) v 13.9 (3.5); p<0.001), aerobic fitness (34.7 (3.7)v 43.9 (4.2); p<0.001) and time spent in intensive physical activity (0.2(0.2) v 0.7 (0.3); p<0.001) showed the greatest differences between the two groups. In the pupils in the PE group, these were lower than the levels proposed to be necessary to combat future health risks. Adjustments for confounding variables showed a decrease in the significance of motor fitness, but not in cardiovascular health related parameters.

**Jannotti et al. (2009)** examined how adolescent physical activity (PA) and screen-based media sedentary behaviours (SBM) relate to psychological and social health and identify cross-national differences in these relationships. Associations were examined in five regions using two Health Behaviour in School-Aged Children (HBSC) countries from each. Results: Self-reported psychological and social health indices such as self-image, perceived health status, and Life Satisfaction were positively related to PA in all five regions
but, with a few exceptions, negatively related to SBM. Negative health indices such as health complaints and tobacco use were negatively related to PA but, with exceptions, positively related to SBM. Significant regional differences were present.

**Sveinsson et al.** (2009) the aim of this study was to examine the interrelationship between aerobic fitness, body composition, and physical activity in 9- and 15-year-olds. The 270 participants were randomly selected from 18 primary and secondary schools in Iceland. Aerobic fitness was assessed by a graded exercise test on a bicycle ergometer. Body composition was estimated via: logarithm of sum of four skinfolds (loge skinfolds), waist adjusted for height, and body mass index (BMI). Physical activity was measured with Actigraph activity monitors using total activity each day as the physical activity variable. Aerobic fitness was chosen as the primary outcome variable, body composition as the secondary variable, and physical activity as the tertiary variable.

All the full models explained a similar proportion of fitness variance for both age groups (45-65%). Among the 15-year-olds, loge skinfolds explained a significantly larger proportion of the fitness variance (54%) than waist adjusted for height (29%) and BMI (15%), but all the body composition variables explained a similar proportion of the fitness variance (35-42%) among the 9-year-olds. Physical activity explained a smaller proportion (0%) of the unadjusted variance in fitness for the 9-year-olds than for the 15-year-olds (19%). This group difference became non-significant (0% vs. 4%) when adjusting for loge skinfolds but remained significant when controlling for waist adjusted for height (0% vs. 15%) and BMI (0% vs. 18%). Gender differences in aerobic fitness after puberty can largely be explained by gender differences in loge skinfolds and physical activity. In conclusion, the interrelationship between fitness, body composition, physical activity, and gender is not the same among 9- and 15-year-olds.
Martin et al. (2009) conducted a study on inner city Hispanic American children's physical activity (PA) and cardiovascular fitness (CF) is rare. Furthermore, research examining theoretically grounded determinants of PA and CF is virtually nonexistent. Therefore, the purpose of our investigation was to evaluate the ability of the Theory of Planned Behavior (TPB) to predict Hispanic American children's self-reported moderate to vigorous physical activity (MVPA) and their CF. Children (N = 129, ages 9-12) completed questionnaires assessing the TPB constructs and MVPA and then participated in the Progressive Aerobic Cardiovascular Endurance Run (PACER) test. Multiple regression analyses provided moderate support for the ability of the TPB variables to predict MVPA as we accounted for 10% of the variance in MVPA and 32% of the variance in intention. The TPB variables and MVPA predicted 8% of the variance in CF. Mean values were encouraging as they indicated that most participants felt in control of their PA behavior, had positive attitudes, moderately strong intentions, and perceived support from significant others (i.e., parents, classmates, physical education teachers, and classroom teachers) for their physical activity engagement.

Malian et al. (1995) A two-fold approach was used to investigate the association between fatness and fitness of girls 7 to 17 years of age: first, age specific correlations between fatness and measures of health-related and motor fitness, and second, comparisons of fitness levels of girls classified as fat and lean. A representative sample of 6700 between 7 to 17 years was surveyed. Adiposity (fatness) was estimated as the sum of five skin folds (biceps, triceps, sub scapular, suprailiac, and medical calf). Physical fitness included health related items (step test, PWC 170, the sit and reach, sit – ups and leg lifts, flexed arm hang) and motor performance items (standing ling jump, vertical jump, arm pull strength, flamingo stand, shuttle run, plate tapping).

Age – specific partial correlations between fatness and each fitness items, controlling for stature and weight, were calculated. In addition, in each age group the fattest 5% (presumably the obese) and the leanest 5% were
compared on each fitness test. After controlling for stature and weight, subcutaneous fatness accounts for variable percentage of the variance in each fitness item. Estimates for health-related fitness items are: cardio respiratory endurance – step test (3% to 5%) and PWC 170 (0% to 3%) balance – flamingo stand (0% to 5%) speed and agility – shuttle run (2% to 12%) static strength – arm pull (4% to 12%) explosive strength-standing long jump/vertical jump (11% to 18%). At the extremes, the fattest girls have generally poorer levels of health – related and motor fitness.

Macera et al. (2009) conducted this study that 1996 Surgeon General’s Reports on Physical Activity and Health emphasized the health – related benefits of moderate-intensity physical activities, especially everyday activates. Unfortunately most surveillance systems in the U.S. primarily measure sports – related activities, particularly vigorous intensity sports. This report describes a new physical activity surveillance instrument designed to go beyond our current measures and include moderate – intensity everyday activities. Data were collected from a nationally representative sample of adults (n=5010). Questions were asked about occupational activity (mostly sitting; mostly walking; mostly heavy labour); walking for exercise, transportation, or any other reason; moderate intensity activities brisk walking, yard wor, vacuuming; vigorous – intensity activities (running, aerobics, heavy yard work); and strengthening activates (lifting weights, pull – ups, sit – ups). Questions included frequency and duration of activities. Respondents were defined as recommended if they participated in either moderate – intensity activates >/=30 min/day for >/=5 days/wk OR vigorous intensity activities >/=20 min/day for >/3 days/wk. Insufficient was defined as not meeting recommended levels while inactive was defined as no leisure – time activity. Overall 40% of adults were in a = the recommended groups, 44% were in the insufficient group and 16% were inactive. Among the 63% of the working adults who report mostly sitting at work, 39% were in the recommended group. These suggest that measuring only leisure – time physical activity may under represent the physical activity experience of many U.S. adults. Broadening the concept of
physical activity beyond traditional sports related vigorous “exercise” any provide a more accurate picture of the prevalence of health – related physical activity.

Nichol et al. (2009) conducted a study to examine relationships between school recreational environments and adolescent physical activity. In this study they used multilevel logistic regression, data from 7638 grade 6 to 10 students from 154 schools who participated in the 2005/06 Canadian Health Behaviour in School-Aged Children Survey were analyzed. Individual and cumulative effects of school policies, varsity and intramural athletics, presence and condition of fields, and condition of gymnasiums on students' self-reported physical activity (≥2 h/wk vs <2 h/wk) were examined. Moderate gradients in physical activity were observed according to number of recreational features and opportunities. Overall, students at schools with more recreational features and opportunities reported higher rates of class-time and free-time physical activity; this was strongest among high school students. Boys' rates of class-time physical activity were 1.53 (95% confidence interval (CI) = 1.12-1.80) times as high at high schools with the most recreational features as at schools with the fewest. Similarly, girls rates of free-time physical activity at school were 1.62 (95% CI: 0.96-2.21) times as high at high schools with the most opportunities and facilities as compared to schools with the fewest. Modest associations were observed between individual school characteristics and class-time and free-time physical activity. Conclusions Taken together, the cumulative effect of school recreational features may be more important than any one characteristic individually.

Powell et al. (2009) conducted a study on Nationwide epidemic of obesity may be due, in part, to declining levels of physical activity, raising the possibility that other components of health-related physical fitness may also be in decline. Few data are available to describe and monitor the physical fitness of children and youth. The Georgia Youth Fitness Assessment was conducted to assess health-related fitness in Georgia's fifth- and seventh-grade students,
provide a baseline against which future progress could be measured, and guide public and private leaders and decision makers. In the study A statewide probability sample of fifth- and seventh-grade students designed to enable grade-specific comparisons by gender, race/ethnicity, and urban/rural status was drawn. Measurements included aerobic capacity; body composition; and muscular strength, endurance, and flexibility. Physical activity during the most recent 3 days was assessed. The survey was conducted in 2006; the data were analyzed in 2007-2008. The result showed that ninety-three schools (86% response rate) and 5248 students (77% response rate) participated. Fifty-two percent of students did not meet the standard for healthy aerobic fitness; 23% did not meet the standard for muscular strength, endurance, and flexibility; 30% were outside the recommended range for BMI. Twenty-two percent did not achieve the recommended 60 minutes of daily moderate-to-vigorous physical activity. All subgroups (e.g., boys/girls, urban/rural) scored poorly.

**Chan et al.** (2003) The relationship between physical fitness, activity, and self-perceived fitness in adolescents in Hong Kong were investigated. Regular physical activity patterns, self perceptions of fitness, and health-related physical fitness were measured in 201 secondary school students (M age = 13.8 y). The battery of fitness tests measured cardio vascular capacity, flexibility, muscular strength, muscular endurance and body fat composition. The boys had a higher self-perception of their own fitness and exercised more outside school boys than the girls. Participation in physical activity was related to cardio vascular capacity, muscular strength and body composition. Linear regression analysis indicated that exercise activity and body composition explained a portion of variance in the subject self-perceived fitness. These findings highlight the connections between physical activity, fitness, and self-perception of fitness and consequently the need for understanding the concept for better health promotion strategies.

**Pianosi and Davis** conducted the study designed to examine the relationship among weight, asthma severity, physical activity and aerobic
fitness in children with asthma. Appropriate – weight, overweight, or obese defined by body mass activity. However, overweight or obese children reported greater limitation of physical activity. Sixty – four asthmatic children 8 to 12 years old (53% female) were assessed while attending a summer asthma camp. Measures included height and weight, spirometry, histamine bronchial provocation challenge, maximal aerobic power, and questionnaires to quantify habitual activity, perceived activity limitations due to asthma, perceived competence in physical activity, and attitudes toward physical activity. Asthma severity was to reduce the determined from Spirometric indices (forced expiratory volume during the first second) degree of airway hyperresponsiveness, and amount of medication prescribed. The result showed that there was no correlation between asthma severity and aerobic fitness. Only perceived competence at physical activity was found to have significant correlation with aerobic fitness. Their asthma impairment scores were higher than the scores of appropriate weight peers, although standard measures of pulmonary function were no difference among groups. The higher asthma severity scores were related to greater medication heeds in the overweight of obese children with asthma. In conclusion lower maximum aerobic power in asthmatic children is related more too how capable they perceived themselves than to asthma severity. Overweight asthmatic children experience greater limitation of physical activity and thus are prescribed more medication, although by standard measures of asthma severity, they are very similar to normal – weight peers with asthma. Efforts should be directed at understanding the reasons responsible for reduced exercise tolerance before escalating pharmacologic treatment.

Ridgers et al. (2009) The purpose of this study was to examine physical activity levels and patterns of physical activity across daily school recess periods, and the contribution of recess to daily physical activity. Ninety-eight children (61% boys) from three schools in Hungary had their physical activity quantified using uni-axial accelerometry every 5 s for three consecutive school days (Wednesday to Friday). The proportion of time spent in sedentary,
light, moderate-to-vigorous, and vigorous physical activity during 5 daily school recess periods was determined using existing age-appropriate cut-points. The relative contribution of recess to daily moderate-to-vigorous physical activity was also determined. Data were collected between May and October 2008. Boys engaged in significantly more light (30.6 ± 5.2%; 27.7 ± 5.1%), moderate-to-vigorous (24.9 ± 8.9%; 17.5 ± 5.2%) and vigorous physical activity (7.6 ± 4.7%; 4.3 ± 2.9%) than girls during recess. Girls (54.8 ± 8.1%) engaged in more sedentary activity than boys (44.5 ± 10.2%). Physical activity levels were generally similar across multiple recess periods. Recess contributed more moderate-to-vigorous physical activity towards weekday physical activity for boys (13.1%) than girls (10.8%).

Rimmer et al. (2004) conducted the study of effective of an exercise training program for 52 adults with Down syndrome (M age = 39.4 years) was evaluated. The training program consisted of cardiovascular (30 minutes) and strength exercise (15 minutes) for 12 weeks, 3 days a week for 45 minutes per session. Compared to control subjects, the training group improved significant in cardiovascular fitness and muscular strength endurance and had a slight but significant reduction in body weight. Greater effort must be made to promote increases in physical increase in physical activity participation among persons with Down syndrome and development disabilities in order potential health risk associated with low fitness and development disabilities in order to reduce the potential health risks associated with low fitness and sedentary behaviour.

Steele et al. (2009) conducted a study to examine associations between objectively measured PA and its subcomponents i.e., time spent at light-intensity PA, moderate-intensity PA (MPA), vigorous-intensity PA (VPA), and moderate-plus-vigorous-intensity PA (MVPA), independent of sedentary time, and self-reported leisure screen time (television and electronic game use) with indexes of adiposity in a population-based sample of British children. A cross-sectional study was conducted in 1862 UK children aged 9-10 y. PA and sedentary activity were measured by accelerometry, and indicators of adiposity
were waist circumference, body mass index (BMI), and fat mass index calculated from bioimpedance measurements. Screen time was assessed by self-report. We examined the associations between PA subcomponents and adiposity by multilevel linear models adjusted for birth weight, maternal BMI, energy intake, and sleep duration. Objectively measured sedentary time was positively associated with waist circumference (P = 0.04) and fat mass index (P = 0.05), independent of age and sex. However, this association was attenuated after adjustment for MVPA and other covariates. VPA (all P < 0.0001), combined MVPA (all P < 0.01), and total activity (counts/min) (all P < 0.001) were all inversely associated with each of the adiposity indexes, independent of sedentary time and other important covariates. Associations were weaker for MPA: P = 0.05, 0.87, and 0.1 for waist circumference, BMI, and fat mass index, respectively.

Stone et al. (2009) examined to explore the relationship between short, frequent activity bouts and children's health. Physical activity was recorded every 2 s by accelerometry (ActiGraph GT1M) for seven days in 47 boys (age 810 years). Summary activity measures and activity pattern characteristics (frequency, intensity and duration of ≥ 4 s [short] and ≥ 5 min [long] bouts of ≥ light [≥ LIGHT], ≥ moderate [≥ MOD], ≥ vigorous [≥ VIG], and ≥ hard [≥ HARD] intensity activity) were recorded. Microvascular function was assessed using laser Doppler perfusion imaging as the forearm skin blood flow response to the iontophoretic application of acetylcholine (endothelial dependent vasodilator) and sodium nitroprusside (endothelial independent vasodilator) at rest and following maximal exercise. Waist circumference, resting blood pressure and aerobic fitness (O2peak) were measured. The intensity of short and long ≥ LIGHT bouts and the frequency of short and long ≥MOD bouts were correlated with waist circumference (r = -0.42 to -0.52, p < 0.01) and O2peak (r = 0.42 to 0.47, p < 0.01), but not when scaled for lean body mass. The frequency of short and long ≥LIGHT bouts were associated with change in endothelial function from rest to post-exercise (r = 0.34 to 0.55, p < 0.05). No relationships were evident between blood pressure and activity.
Kenzie et al. (1993) examined the relationship between barbital physical activity and components of health – related physical fitness in children. Cross – sectional survey with correlation analysis: Seven public elementary schools in as suburban southern California city, Five hundred twenty-eight healthy fourth – grade children (274 boys and 254 girls), 85% of whom were non-Hispanic whites. Ninety-eight percent of eligible students participated. Results of six measures of physical activity in children (monitoring by accelerometer, parent report and child self – reports of weekdays activity, weekend activity, and summer involvement in activity classes habitual physical activity was examined relation to measures of five components of health – related fitness: the mile run, skin fold tests, pull – ups and the sit – ups and reach test. The physical activity index was significantly associated with all five fitness components. The canonical correlation was 29

Thompson et al. (2010) made an activity to know that benefits of physical activity for reducing obesity and related chronic diseases are well known. The need for more family-based interventions to increase physical activity is frequently cited in the literature; however, little is known about if and how families are physically active together, and what factors might influence family-based participation in regular physical activity. This study examined the types of activities (physical and sedentary) engaged in as a family and explored parents' perceptions of the importance, frequency, nature and barriers to family physical activity. For the purpose of this study semi-structured telephone interviews were conducted with 30 parents (26 female, four male) of 10- to 11-year-old schoolchildren who attended either low, middle or high socio-economic status schools in Bristol, UK. Interviews were transcribed verbatim, anonymized and analysed using conventional content analysis. From the results the majority of parents rated family engagement in physical activity as important, and identified benefits such as increased parent-child communication, spending time together, enjoyment, enhanced mental health, weight control and physical fitness. Despite these benefits most parents reported their families did little or no physical activity together as a family unit.
during the week, and any activities performed together were usually sedentary in nature. They reported increased family physical activity on the weekends but rarely including the full family unit simultaneously. Parents in two-parent households commonly paired off with one or more children because of complexities of schedules. Commonly reported barriers were busy lifestyles, diverse ages and interests of children and adults, bad weather, and lack of access to facilities, transportation and money to support activities.

Trudeau et al. (2003) conducted a study to investigate the tracking of selected aspects of physical fitness (peak handgrip force, sit ups, aerobic fitness and blood pressure) from childhood to adulthood. The investigation studied a randomly selected sub group from the original participants in the Tois Rivieres growth and Development Study, 95 women (57 experimental and 38 control) and 96 men (56 experimental and 40 control). During their primary-school education, experimental had received 40 minutes per week. Data were gathered when subjects were 10-12 years old (baseline) and during follow-up around the age of 35 years. Tracking between 10, 11,12 and 35 years of age was assessed by correlation analysis. In females the tracking of grip strength increased from the interval 10-35 to the intervals 11-35 and 12-35 years of age (r=0.54 to 0.69 and 0.67, respectively all P < 0.001). In males, the tracking of grip strength was less consistent, but also increased over the same intervals to become significant for the correlation between 12 and 35 years of age (r=0.32, P < 0.05) tracking for sit-ups also increased from 0.29 to 0.38 for females and from 0.23 to 0.54 for males. The tracking of PWC 170/kg between 11 and 35 years was significant but low in females (r=0.24) as well as in males (r=0.34). The ability of childhood blood pressure to predict adult values was low in females (r=0.24 for diastolic, ns; and r=0.26 for systolic, P< 0.05) and absent in males. Presumably because some of the influence of the added physical education was education was lost by adulthood, the tracking of PWC 170/kg and grip strength was weaker for experimental than for control subject. In conclusion, data from ups in both sexes. The tracking of grip strength was moderately high in females
but less consistent in males. This may reflect the larger influence of sex hormones on the muscle strength of males at puberty.

Walther et al. (2009) To examined whether additional school exercise lessons would result in improved peak oxygen uptake (primary end point) and body mass index-standard deviation score, motor and coordinative abilities, circulating progenitor cells, and high-density lipoprotein cholesterol (major secondary end points). Seven sixth-grade classes (182 children, aged 11.1±0.7 years) were randomized to an intervention group (4 classes with 109 students) with daily school exercise lessons for 1 year and a control group (3 classes with 73 students) with regular school sports twice weekly. The significant effects of intervention estimated from ANCOVA adjusted for intraclass correlation were the following: increase of peak \( \text{\textit{\text{O}}}_2 \) (3.7 mL/kg per minute; 95% confidence interval, 0.3 to 7.2) and increase of circulating progenitor cells evaluated by flow cytometry (97 cells per 1×10 leukocytes; 95% confidence interval, 13 to 181). No significant difference was seen for body mass index-standard deviation score (-0.08; 95% confidence interval,-0.28 to 0.13); however, there was a trend to reduction of the prevalence of overweight and obese children in the intervention group (from 12.8% to 7.3%). No treatment effect was seen for motor and coordinative abilities (4; 95% confidence interval,-1 to 8) and high-density lipoprotein cholesterol (0.03 mmol/L; 95% confidence interval,-0.08 to 0.14).

Williams (2009) To assess the dose-response relationship of vigorous physical activity (running distance, km•d) or cardio respiratory fitness (meters-per-second pace during a 10-km footrace) to the risk for incident glaucoma. For the purpose of study participant-reported, physician-diagnosed incident glaucoma was compared with distance run per week and 10-km footrace performance in a cohort of 29,854 male runners without diabetes followed prospectively for 7.7 yr. The survival analyses were adjusted for age, hypertension, current and past cigarette use, and intakes of meat, fish, fruit, and alcohol. Two hundred incident glaucoma cases were reported during follow-
up. The risk for reported glaucoma decreased 37% per meter per second increment in a 10-km race performance (P = 0.005). Relative to the least fit men (i.e., slowest, ≤3.5 m•s), the risk for incident-reported glaucoma declined 29% in those who ran 3.6-4.0 m•s (P = 0.06), 54% for those who ran 4.1-4.5 m•s (P = 0.001), 51% for those who ran 4.6-5.0 m•s (P = 0.04), and glaucoma was nonexistent among the 781 men who exceeded 5.0 m•s (P = 0.03). The risk for incident, reported glaucoma decreased 5% per kilometer per day run at baseline (P = 0.04), which remained significant when adjusted for the 10-km race performance (5% reduction per kilometer per day, P = 0.04), and both body mass index and race performance (P = 0.04). Baseline hypertension was unrelated to the incident glaucoma.

Sengstock (1966) investigated to find out the mentally retarded boys differed from intellectually normal boys in physical fitness. Thirty educable mentally retarded boys were matched with thirty normal boys of comparable chronological age and another group of thirty boys of comparable mental age. All groups took the AAHPER youth fitness test battery. In analysing the group test score it was found that the mean performance of the mentally retarded boys was almost mid way between the mean performance of the two normal groups.

Leshkevitch et al. (1982) studied the influence of sequence of exercises in training undertakings in the development of physical foundations of speed, strength and endurance in young sportsmen. Three groups of boys 12 – 14 years were given physical training for four times a week for 3 months to determine the effect of sequence of exercise. It was observed that changes were noted in speed, strength and endurance.

Amusa et al. (1983) conducted a study to find out the physical fitness status of the University of Ibadan female members of staff, especially as it results to the level of participations awareness of the health problems due to inactivity, early exposure and influence of physical exercise, economic status and the influence of education. A total of 200 female made up of 100 non Academic members of staff responded to questions bulk around the above
objective. The result indicated that half of the respondents had not engaged in any form of physical activities. 75.7 percent indicated that they had early exposure to physical exercise. The education as well as economic factors contributed to some of the subjects continued participation in physical exercise.

Paul (1975) compared two groups of third grade children. One group of which used the first ten minutes of each physical education period of five days per week for special exercises utilizing the horizontal ladder positive push-ups. The gains made by the experimental group were significantly superior to the control group for push ups, chinning and for pushing and pulling strength.

Fabricus (1964) contrasted the physical fitness development of fourth grade boys and girls who participated in regular elementary school physical education curriculum while the addition of selected calisthenics in his study. Physical fitness was measured by the Oregon motor fitness test. In each class period three minutes and nine seconds were spent the added calisthenics. The classes met four times a week, result showed that both groups improved the physical fitness significantly.

Krahenbuho et al. (1997) The Purpose of the investigation was to explore the validity of using timed distance runs as predictor of cardiorespiratory fitness in young untrained children. Maximal oxygen consumption and performance in runs of 549, 1207 and 1609 meters (600 yards, ¾ mile and 1 mile) were compared in 38 children in eight years of age. Males were found to exceed females on VO2 max and possessed significantly faster times in the 1207 and 1609 meter runs. The females exhibited greater six – sit skinfold totals. The 1609 meter run proved to be the best predictor of VO2 max (m1/kg) in males. However, none of the three distances was acceptable for females.

Tomkinson et al. (2003) collected data on the performance fitness of 50,385 Australian students aged between 12 and 15 years were used to determine whether students differed in Physical fitness according to school sector (independent vs Government vs Catholic). Students were tested between
1995 and 2001 as part of the Australian Sports Commission’s Talent Search Programme. The results of the 20 shuttle run (20 m SRT), vertical jump and 40 m sprint tests were selected as being representative of aerobic, explosive and anaerobic performance. All results were expressed as age – and gender – specific z – scores.

**Trzcinska et al.** (2008) The aim of this work is to estimate the frequency of overweight and obesity phenomena among 6-7 y. o. rural and urban children and to assess physical fitness and body posture of these girls and boys against a background of peers. The researches were conducted on 524 children: 279 boys and 245 girls from village and city. The used methods were: anthropometric measurements (body height and mass), simple physical fitness tests, the examination of body posture, poll technique and basic statistical methods. Altogether 9.9% of children from examined group are burdened with overweight or obesity. The analysis shows that this phenomenon is more typical for boys than for girls and that the frequency of overweight and obesity is similar in rural and urban environment. Generally socio-economic and educational status of their families is an average or moderately profitable, in most. The physical fitness level of these children is lower as against a group of peers. Crooked knees, deeper lordosis curve, emphasized stomach and buttocks, platypodia and flat - crooked feet occur more often than among the rest 6-7 y.o. examined girls and boys.

**Dollman et al.** (2002) The aim of this study was to compare urban and rural South Australian primary schoolchildren on measures of anthropometry, fitness, and environmental mediators of physical activity. The sample was comprised of 445 urban and 205 rural boys and 423 urban and 158 rural girls, all age 10-11 yrs at the time of testing. After controlling for socioeconomic status and ethnicity, rural girls and boys were faster over 1.6 k than their urban counterparts while rural girls were also faster over 50 m. Rural residence independently predicted participation in organized activity, increasing involvement in club sport, and decreasing involvement in school sport. Rural
children reported a greater likelihood of participating in two or more physical education classes per week. It is evident that urban and rural South Australia differ in ways which impact on fitness and physical activity patterns of upper primary age children.

**Kriemler et al.** (2010) To assess the effectiveness of a school based physical activity programme during one school year on physical and psychological health in young schoolchildren. Cluster randomized controlled trial. 28 classes from 15 elementary schools in Switzerland randomly selected and assigned in a 4:3 ratio to an intervention (n=16) or control arm (n=12) after stratification for grade (first and fifth grade), from August 2005 to June 2006. : 540 children, of whom 502 consented and presented at baseline. Children in the intervention arm (n=297) received a multi-component physical activity programme that included structuring the three existing physical education lessons each week and adding two additional lessons a week, daily short activity breaks, and physical activity homework. Children (n=205) and parents in the control group were not informed of an intervention group. For most outcome measures, the assessors were blinded. Primary outcome measures included body fat (sum of four skinfolds), aerobic fitness (shuttle run test), physical activity (accelerometry), and quality of life (questionnaires). Secondary outcome measures included body mass index and cardiovascular risk score (average z score of waist circumference, mean blood pressure, blood glucose, inverted high density lipoprotein cholesterol, and triglycerides). 498 children completed the baseline and follow-up assessments (mean age 6.9 (SD 0.3) years for first grade, 11.1 (0.5) years for fifth grade). After adjustment for grade, sex, baseline values, and clustering within classes, children in the intervention arm compared with controls showed more negative changes in the z score of the sum of four skinfolds (-0.12, 95 % confidence interval -0.21 to -0.03; P=0.009). Likewise, their z scores for aerobic fitness increased more favourably (0.17, 0.01 to 0.32; P=0.04), as did those for moderate-vigorous physical activity in school (1.19, 0.78 to 1.60; P<0.001), all day moderate-vigorous physical activity (0.44, 0.05 to 0.82; P=0.03), and total physical
activity in school (0.92, 0.35 to 1.50; P=0.003). Z scores for overall daily physical activity (0.21, -0.21 to 0.63) and physical quality of life (0.42, -1.23 to 2.06) as well as psychological quality of life (0.59, -0.85 to 2.03) did not change significantly.

**Lambert et al. (2009)** The aim of this study was to determine the effects of physical activity on systemic blood pressure (BP) and early markers of atherosclerosis in pre-pubertal obese children. Background: Hypertension and endothelial dysfunction are premature complications of obesity. We performed a 3-month randomized controlled trial with a modified crossover design: 44 pre-pubertal obese children (age 8.9 ± 1.5 years) were randomly assigned (1:1) to an exercise (n = 22) or a control group (n = 22). We recruited 22 lean children (age 8.5 ± 1.5 years) for baseline comparison. The exercise group trained 60 min 3 times/week during 3 months, whereas control subjects remained relatively inactive. Then, both groups trained twice/week during 3 months. We assessed changes at 3 and 6 months in office and 24-h BP, arterial intima-media thickness (IMT) and stiffness, endothelial function (flow-mediated dilation), body mass index (BMI), body fat, cardiorespiratory fitness (maximal oxygen consumption [VO2max]), physical activity, and biological markers. Results: Obese children had higher BP, arterial stiffness, body weight, BMI, abdominal fat, insulin resistance indexes, and C-reactive protein levels, and lower flow-mediated dilation, VO2max, physical activity, and high-density lipoprotein cholesterol levels than lean subjects. At 3 months, we observed significant changes in 24-h systolic BP (exercise -6.9 ± 13.5 mm Hg vs. control 3.8 ± 7.9 mm Hg, -0.8 ± 1.5 standard deviation score [SDS] vs. 0.4 ± 0.8 SDS), diastolic BP (-0.5 ± 1.0 SDS vs. 0 ± 1.4 SDS), hypertension rate (-12% vs. -1%), office BP, BMI z-score, abdominal fat, and VO2max. At 6 months, change differences in arterial stiffness and IMT were significant.

**Morrow Jr. and Ede (2009)** Statewide physical fitness testing is gaining popularity in the United States because of increased childhood obesity levels, the relations between physical fitness and academic performance, and
the hypothesized relations between adult characteristics and childhood physical activity, physical fitness, and health behaviors. Large-scale physical fitness testing can be fraught with problems unless properly planned and conducted. Legislators, administrators, teachers, and parents should consider the following 10 essential issues when conducting large-scale physical fitness testing: purpose of testing, proper planning, training, quality of the data, reporting, support, costs, interpretation, programmatic matters, and policies and politics.

**Tsubaki et al.** (2009) To determine the relationship between maximum power relative to body weight (Pmax-rel) and the aging process, and to indicate the target values of improvement of motor function in Japanese individuals. In 410 physically active Japanese subjects (7-79 years) with no impairment of daily activities were performed counter-movement jumps. We evaluated the correlation between age and Pmax-rel, mean Pmax-rel by age group, and the percentage Esslinger Fitness Index score relative to 100% for same-age Europeans (%EFI), by gender. Age and Pmax-rel were correlated in both males aged <18 and ≥18 years old (both p<0.01) and females aged <18 and ≥18 years old (both p<0.01). Pmax-rel declined gradually with age, reaching 53.5% of the peak in subjects in their 70s. There was no significant difference in %EFI scores in most age groups.

**Siedentop** (2009) Schools must play a central role in combating the prevalence of overweight and obesity among children and youths. This cannot be achieved without more robust policy and funding programs at both federal and state levels. Reviews of meta-analyses were used to assess the efficacy of improving PA/MVPA through interventions in school physical education programs. Individual research studies were reviewed to assess the efficacy of improving PA/MVPA in preschool settings, recess, and classroom activity breaks. Legislation at the federal and state levels was reviewed along with surveillance and accountability mechanisms at the state level. Physical education interventions produce improvements in PA/MVPA if protocols relating to use of time are followed. PA/MVPA in recess can be increased
through careful planning for attractive activity opportunities on carefully designed playgrounds. Classroom activity breaks provide important PA/MVPA daily and improve student on-task behavior.

**Thompson et al.** (2009) This paper reports on physical activity of students in grades 3, 7, and 11 from two surveillance studies (from 2001 and 2005). Randomly selected students (Study1 n = 1730; Study2 n = 2341) from randomly selected schools in Nova Scotia participated. Physical activity was measured for seven consecutive days using Actigraph accelerometers. Descriptive statistics were calculated for moderate, hard, and very hard intensity, and total minutes of physical activity. Between study, grade, and sex differences were determined using invariable Analyses of Variance. Students in Study2 were significantly less active (mean [SD] = 531.0 [392.3] min/week) than Study1 (662.2 [495.1] min/week). Girls were significantly less active (525.4 [419.1] min/week) than boys (657.1 [460.3] min/week). Students in grade 11 were significantly less active (225.2 [171.1] min/week) than students in grade 7 (457.5 [227.2] min/week) who were significantly less active than students in grade 3 (1038.4 [387.6] min/week). A significant study-grade interaction indicated that compared to students in grades 7 and 11, the level of physical activity in students in grade 3 was considerably lower in Study2 compared to Study1.

**Arvidsson et al.** (2009) To investigate physical activity, sports participation and aerobic fitness in children who have undergone surgery for congenital heart defects. Subjects and methods: Children who had undergone surgery for congenital heart defects and healthy controls in the Gothenburg area were invited to participate in the study. All participants were aged 9-11 or 14-16 years. The activity monitor ActiReg was used to assess physical activity. Participants were interviewed about their participation in sports and performed a maximal exercise test on a bicycle with measured oxygen uptake. Results: A total of 32 and 25 patients, and 61 and 45 controls, in the two age-groups were included, respectively. The patients had a wide range of severity of congenital
heart defects. The physical activity level was similar in the patients and the controls. The rate of sports participation was high for both patients and controls; 80-94% of all participants took part in sports at least once a week. The majority of the patients were considered to have at least a moderate level of aerobic fitness. Conclusions: Although children who have undergone surgery for congenital heart defects have a similar level of physical activity compared with that of healthy children, some of them may require support to participate in exercise and vigorous physical activity.

Trudeau et al. (2009) The purpose of this study was to examine the possible influence of childhood physical fitness on physical activity level and some of its psychosocial determinants as an adult. Childhood (age 10-12 years) data from the longitudinal Trois-Rivières Growth and Development Study (body mass index, Physical Work Capacity (PWC170)), number of sit-ups/min, left + right hands grip strength) were correlated with adult data (age 35.0 ± 0.3 years) for physical activity (PA) level, attitude toward PA, intention to exercise, perceived barriers to exercise and support of an active lifestyle by significant others. No significant relationships between childhood physical fitness and adulthood PA were found. Although the sample size is relatively small, our data suggest that the preadolescent physical fitness level has no measurable impact on adult habitual PA, attitudes toward PA, intentions to exercise, perceived barriers to exercise or support from the individual's entourage.

4. Summary of the Literature

The review of the literature helped the investigator to spot out relevant topics and variables. Further the literature helped the investigator to frame the suitable hypothesis leading to the problems. The latest literature also helped the investigator to support his findings with regard to the problem. Further the literature collected in the study will also help the research scholar
understanding in the similar areas. The reviews were presented under the three sections such as survey, physical fitness norms and status of physical fitness (n-29) physical fitness between Rural and Urban (n-09) physical activities programme on physical and physiological variables (n-60) with chronological and alphabetical order. All the research studies were presented in the section proves that norms based on age and sex, physical fitness variation between rural and urban school boys and physical activities programme contribute significantly for better development of selected depended variables.

The research studies reviewed are from many journals available in the website, such as www.pubmed.gov.websites etc., It is also observed from the review of the literature that only few research studies are related normative studies and few studies related Rural and Urban. School boys where as in the case of intensive physical activities programme conducted in many countries. But there is no study conducted in India.

This inference has motivated the research scholar to find out the influence of intensive physical activity programme on physical fitness variables along with the survey of physical fitness among the school boys of the Rayalaseema Region of Andhara Pradesh. The review of literature helped the researcher from the methodological point of view too. It was learnt that most of the research study cited in this chapter on content analysis and experimental design as the appropriate methods for finding out the lapses and remediation.