1. 18.2 Aerobics

Aerobics is an effective physical exercise which is often done according to music. Aerobic exercise is a repetitive activity that you do long enough and hard enough to challenge your heart and lungs. (Jimmy Thomas 1988).

1. 18.3 Dance

The word 'dance' refers to conscious and purposeful rhythmic physical activity, usually of sufficient intensity to increase some degree of respiratory and circulatory function. . (Jacky Sorensen 1997).

1. 18.4 Aerobic Dancing

Aerobic dancing is a fun way to get fit. It combines fat burning aerobic movements, muscle-building exercises and stretching into routines that are performed to music. (Sorensen 1992)

1.18.5 Cardio Respiratory Endurance

It is the ability of heart, lungs and circulatory system to supply oxygen to working muscles efficiently. (Heyward 2010)

1.18.6 Flexibility

Flexibility is the range of motion around a joint. Good flexibility in the joints can help prevent injuries through all stages of life (Johnson and Melson 1988).

1.18.7 Muscular Strength Endurance

Muscular strength endurance is the ability of the muscle to exert force during an activity the key to making your muscles stronger is working them against resistance, whether that is from weights or gravity (Mathews 1981).

1.18.8 Stress

'Stress is defined as a stimulus event of sufficient severity to produce disequilibrium in the homeostasis of physiological systems.' Stress results when something causes the body to behave as if it were under attack (Albert V. Carvon 1980).

1.18.9 Anxiety

Anxiety is a complex emotional state characterized by a general fear of fore bonding usually accompanied by tension. It often has to do with inter personal relation social situation and feeling of rejection and insecurity and usually a part of anxiety. (Lewelly and Blucker, 1979).

1.18.10 Self – Confidence

A person's belief that he or she can succeed, ie. Self - confidence is usually specific to particular tasks but some people seem to display it in a wide range of activities. In sport, it has long been thought of as an important determinant of performance. It tends to be self – generating, confident athletes set themselves difficult training goals and preserve until they have achieved them. (Albert V. Carvon 1980)

1.18.11 Blood Glucose

The blood glucose level is the amount of glucose (sugar) present in the blood of the human or animal (Mc Ardle & Katch, 1991).

1.18.12 Low Density Lipoprotein

Low Density Lipoprotein is the major cholesterol carrying lipoprotein. Elevated LDL levels herald a strong predisposition to coronary heart diseases, stroke and peripheral vascular disease. (Mc Ardle & Katch, 1991)

1.22.13 High Density Lipoprotein

High density Lipoproteins comprise the smallest portion of lipoproteins and the largest quantity of protein. These High Density Lipoproteins may be associated with a lower risk of heart disease. (Mc Ardle & Katch, 1991)

1.18.14 Independent Variables

"Main variable is one under consideration that is manipulated by the researcher with subjects randomly assigned to various groups or testing conditions". (Jenson 1979).

1.18.15 Dependent Variables

"A dependent variable is that condition that is observed and measured that is expected to be affected in some way as a result of the manipulation of independent variable" (Morehouse, 1975).

CHAPTER-II
REVIEW OF RELATED LITERATURE

The review of related literature is a crucial aspect of planning a study, the object of which is to justify the rationale behind a study. It provides an overview of historical perspective, development, deviations and new departures of research in that area and also guides to identify the methods appropriate to the present problem under investigation. The review of related literature is instrumental in the selection of topic, formulation of hypothesis and detective reasoning leading to the problem. It helps to get a clear idea and supports the findings with regard to the problem under study, Thirumalaisamy, (1997).

2.1 STUDIES ON AEROBIC DANCING

Zaletel P, Gabrilo G, Perić M. (2013) conducted a study on effects of contemporary aerobics programmes (dance aerobics, step aerobics, aqua aerobics etc.). The studies are grouped according to their characteristics (sample of subjects, variables of interest, study design, effects, etc.). Motor abilities and physiological variables were selected. The training period for this study was 8 to12 weeks. They found that there was a positive training effect on motor-endurance.

VidhyaSree (2012) conducted a study on the effects of aerobic dance and pranayama on selected physiological variables. To achieve this purpose, 90 girls were selected from St. Joseph's College, Cuddalore. The age group of the subjects ranged between 18 to 20 years. The subjects were divided into three groups and each group consisted of thirty subjects. The two experimental groups were subjected to two different training programmes, namely aerobic dance and pranayama and the third group acted as control group. The data on the selected variables were collected before and after the

training period. Findings show that all these variables significantly improved among experimental group more than the control group.

Mahendran (2011) conducted a study on the effect of 12 weeks aerobic exercises on selected health related physical fitness and physiological variables among adolescents. Thirty healthy, untrained school boys were selected from Sengunthar Higher Secondary School in Thuraiyur, Trichy and their age ranged from 12 to 15 years. The subjects were equally divided into two groups namely control and experimental group. He concluded that Muscular Strength and Flexibility shows a significant improvement due to the twelve weeks training.

Promoth (2010) conducted a study on the effect of step aerobics training on selected physical and physiological variables of physical education students. Thirty female students were selected from St. Joseph Physical Education College, Moolamattum in Kerala. Fifteen female students were assigned the role of experimental group and another 15 female students were assigned to that of control group. Their age ranged from 20 to 24 years. The experimental group was progressively introduced to the practice of step aerobics. The results, in general, support the theory that step aerobics had significant effects on selected physical and physiological variables which improved significantly among the experimental group i.e., flexibility and $VO_{2\ max}$ and no significant changes were seen among the members of the control group.

Ravikumar. (2009) conducted a study on the effect of selected yogic practices and aerobic exercises on somato type components and its relationship with health related physical fitness and biochemical variables. Forty-five college male students were selected randomly from the Government boys' hostel, Lawspet, Puducherry. Their age ranges from 18 to 25 years. They were divided into three groups namely control group, yogic

group and aerobic group. The yogic group and the aerobic group underwent a training period of 5 days a week for fourteen weeks. The variables muscular strength and flexibility was selected. He found muscular strength and flexibility significantly improved after yogic practices and aerobic exercise group than the control group.

Toy (2008) conducted a study on the effect of aerobic dance training on Vo2 Max and Body Composition in early middle aged women. Twenty subjects were selected for experimental group (No: 10) and control group (No: 10) for this study. The experimental group underwent twelve weeks aerobic dance training. The control group which has not undergone any training. The selected variable was vo2 max measure from the study. After twelve weeks of aerobic dance training, a significant improvement was shown in vo2 max. This study highlights that systematic aerobic dance training helps to increase the physical and cardio respiratory fitness among middle aged women.

Koutedakis Y, Hukam H, Metsios G.et.al.,((2007) conducted a study on the effects of three months of aerobic and strength training on selected performance- and fitness-related parameters in modern dance students. The sample consisted of 32 men and women (age 19 +/- 22 years) who were randomly assigned into exercise (n = 19) and control (n = 13) groups. They concluded that the exercise programme was effective in improving the flexibility among the selected adults.

Viskić-Stalec N, Stalec J, Katić R, Podvorac D, Katović D. (2007) conducted a study on the impact of special programmed physical education including dance, aerobics and rhythmic gymnastics on the development of motor and functional abilities and morphological characteristics of female fourth grade high schools in Zagreb. A total sample of 220 high school students aged between 16-18 years were divided into two groups: experimental group of 115 students attending the programme composed of dance

structures and aerobics, and control group of 105 students attending classic programme of physical education. The results showed the experimental programme significantly influencing the development of flexibility of the experimental group than the control group.

Chia-Lin Li, PhD; Hsu-Min Tseng, PhD; Rou-Fang Tseng, MS; Shwn-Jen Lee, PhD (2006) conducted a study on the effects of aerobic exercise intervention with goals of improving health-related physical fitness among selected adults. Fifty four subjects were selected from high – Tech Company at Taiwan. The subjects were divided into two groups namely the control and the experimental group. The subjects in exercise group participated in a 12 weeks aerobic exercise programme, while control group did not undergo any training programme rather than their routine work. They concluded that the subjects in the exercise group had significantly showed more improvement in abdominal muscle strength than the subjects in the control group.

Tiken,L., Kosana,K., Joy, A.K. and Inaobi. T. (2002), conducted a study on the influence of specific yoga and aerobic exercise on physical fitness of SAI (NERC IMPHAL) STC Athletes. 30 boys and 30 girls from SAI NERC Imphal were divided into two groups according to their mean age and height of 17.5 years and 15 years and 172.8 cms and 156.4 cms respectively. Training was given twice a week for four months.. It was concluded that both yoga and aerobic exercises were effective in developing physical fitness and in yoga and aerobic exercise groups, boys were found superior to girls group in sit and reach (flexibility) and 50 yards (speed).

Ramesh Reddy (2002) conducted a study on the effects of yogasanas and aerobic dance on selected motor fitness components among girl students. For this study 75 girl students of 11 and 12 years age of Andhra Pradesh School, Hasanparthy, Warangal,

Andhra Pradesh were the subjects. The subjects were divided into three groups namely control, yogasana and aerobic dance groups. Yogasanas and aerobic dance groups have undergone training in yogasanas and aerobic dance respectively for 12 weeks. Results revealed that both yogasanas and aerobic dance groups had shown significant improvement after training with respect to speed, agility, flexibility and cardio-respiratory endurance.

2.2 STUDIES ON YOGIC PRACTICES

Tracy BL, Hart CE. (2013) conducted a study on the effects of yoga on general physical fitness, despite the widespread participation in this form of exercise. Twenty one young healthy adults were selected as subjects with the age group of 29 ± 6 years.. Yoga subjects exhibited increased strength, increased shoulder flexibility when compared with control group. There were no changes in handgrip strength or maximal aerobic fitness. In summary, this short-term yoga training protocol produced beneficial changes in musculoskeletal fitness that was specific to the training stimulus.

Sultana.D. (2011), conducted a study on the effect of twelve weeks yogic practices on selected physiological variables on female students in Pondicherry university. For the concerned study, a total of 30 subjects were selected and they were divided into two groups, viz experimental (N-15) and control group (N-15). The experimental group practiced selected yoga asana, suryanamaskar, meditation and pranayama. It was concluded that there are significant changes in the four selected variables due to yoga practice.

Bharatha priya and Gopinath(2011) conducted a study on the effect of yogic practice on flexibility among school boys. Forty subjects were selected from A.R.R

Matriculation Higher Secondary School and their age ranged from 15 to17 years. The subjects were divided into two groups namely the control and the experimental group. The experimental group underwent selected 'asanas' and 'pranayama' for five days per week for twelve weeks. Finding of flexibility shows significant improvement due to the twelve weeks yogic practice when compared to the control group.

Komathi and Kalimuthu (2011) conducted a study on the effect of yogic practices on abdominal strength among school boys. Forty subjects were selected from A.R.R Matriculation Higher Secondary School and their age ranged from 15 to17years. The subjects were divided into two groups namely the control and the experimental group. The experimental group underwent selected asanas and pranayama for five days per week for twelve weeks. Finding of abdominal strength shows a significant improvement due to the twelve weeks yogic practice when compared to the control group.

Manimakalai and Chitra (2011) conducted a study on the effect of yogasana practice on flexibility among Annamalai University Women Students. Thirty healthy, untrained female subjects were selected from Annamalai University in various departments and their age ranged from 18 to 25 years. The subjects were divided into two groups namely the control and the experimental group. The experimental group underwent selected asanas for five days per week for eight weeks. Finding of flexibility shows significant improvement due to the eight weeks yogic practice when compared to the control group.

Yogaraj (2011) conducted a study on the effects of varied packages of yogic practice on selected bio chemical variables of men's college students. To achieve this purpose 90 men students were selected from Rajus college, Rajapalayam, Tamilnadu as subjects. Their age ranged from 18-25 years. They were divided into three equal groups

of 30 subjects each and assigned to experimental group-I, experimental group-II and control group. In a week, the experimental group I underwent first package of yogic practice (asana, meditation); experimental group II underwent second package of yogic practice (asana, meditation, pranayama) and control group was not given any specific training. All the subjects underwent three areas of test namely cholesterol, Low Density Lipoprotein, High Density Lipoprotein. They were assessed before and after the training of twelve weeks. The study revealed that the above said criterian variables significantly improved due to the influence of varied packages of yogic practices of men's college students.

Sekar babu and Kulothugan(2011) conducted a study on the effect of yogic practices on selected physiological variables of men hockey players. Thirty hockey men players were selected from Annamalai University, Chidambaram and their age ranged from 18 to 25 years. The subjects were divided into two groups namely the control and the experimental group. The experimental group underwent forty five minutes selected asanas and pranayama practice five classes per week for eight weeks. The study showed yogic practices group significantly improved, breath holding time and significantly decreased resting pulse rate when compared to the control group.

Sultana (2011) conducted a study on the effects of yoga practice on dominate hand grip strength of female students. Forty female subjects were selected from various Departments in Pondicherry University and their age ranged from 18 to 25 years. The subjects were divided into four groups' namely Right nostril breathing group (Asanas and Suriya Bhedana), Left nostril (Asanas and Chandra Bhedana), Alternate nostril breathing group (Asanas and Nadisudhi) and control group. The experimental group underwent selected asanas and pranayama practice for ten days. The results of pre-test and post-test

were compared with by using Analysis of Co-variance. The three groups which practiced yoga significantly improved hand grip strength, Alternate nostril breathing group (Asanas and Nadisudhi) has improved better when compared to other groups.

Neethi and Chidambara Raja(2011) conducted a study on the effect of yogic practices and physical exercises on muscular strength self - concept and blood pressure. Forty five healthy, untrained female subjects were selected from various Departments of Annamalai University and their age ranged from 18 to 25 years. The selected subjects were equally divided into three groups. Group I underwent yoga practices, group II underwent physical exercises and group III acted as a control group. The experimental groups underwent their training programme for five days per week for eight weeks. The yogic practices group and physical exercises group on muscular strength, significantly improved when compared with the control group.

Sukhdev Singh, Vishaw Gaurav and Ved Parkash (2011) conducted a study on the effects of 6-weeks nadi-shodhana pranayama training on cardio-pulmonary parameters. A group of 30 male healthy subjects were selected from the Department of Physical Education (T), Guru Nanak Dev University, Amritsar (Punjab, India); subjects aged 18 – 24 years, volunteered to participate in the study. The subjects were divided into two groups, one control and experimental group. The experimental groups were subjected to 'Nadi-shodhana' pranayama programme for 6 weeks which consisted of daily sessions, lasting for 30 min. The result reveals there was significant difference among the two groups. 'Nadi-Shodhana' pranayama training programme was recommended to improve vital capacity and control heart rate which contributed to enhance health status.

Punithavathi (2010) conducted a study on the effects of aerobic exercises and yogic practices on selected physical, physiological and biochemical variables among school

girls. 45 girls were selected from St. Joseph's of Cluny Higher Secondary School, Pondicherry. The age group of the subjects ranged between 14 to 18 years. The subjects were divided into three groups and each group consisted of fifteen subjects. The two experimental groups underwent two different training programmes namely aerobic exercises and yogic practice. Findings show that all these variables have significantly improved among experimental group than the control group.

James Zahariah (2010) conducted a study on the "Effects of selected asanas on serum cholesterol and functions of adrenal gland in college women". To achieve this purpose women college student were randomly selected from Alagappa University. Serum cholesterol and Adrenal Gland was chosen as criterion variables. All the dependent variables were assessed before and after the training period of 8 weeks. The study revealed that the serum cholesterol and functions of Adrenal Gland was significantly improved due to influence of selected asana practice.

Saroja M (2010) conducted a study on the effect of yogic practice and walking on selected physical, physiological and biochemical variables among aged people. For this study 30 men students were selected from Vallal Alagappar Walker Club, Karaikudi, and their age ranged from 45-55 years. They were divided into three equal groups namely yogic practice group, walking group and control group. The study showed that there was a significant effect in weight, resting pulse rate and cholesterol level due to the influence of yoga practice and walking among aged people. When compared there was a significant improvement through the yoga practice.

Vaz W.L (2010) conducted a study on the effect of nostril dominance Yogic exercise programme on different cardio respiratory variables. Twenty one athletes of L.N.C.P.E Gwalior were selected and divided randomly into four groups namely right

nostril dominance group, left nostril dominance group, both nostril dominance group and control group. Further they were evaluated after six weeks of training on selected cardio respiratory endurance, heart rate and respiratory rate by applying t-test at 0.05 level of significance. The findings show yogic breathing training is a potential tool that significantly affects cardio respiratory parameters mentioned above. The study will be useful future researchers too since it has come up with primary quantitative data to support its objectives.

Shenbagavalli (2010) conducted a study on the effects of Gymnastics Exercises and Yoga Exercises on College students on selected physical performance, physiological and Bio-chemical variables in this study. The subjects selected for this study was 90 women college students divided into three groups, control group, yoga exercise group and gymnastic exercise group. The age group of the subject was 18 to 21 years to assess the effects of 12 weeks training for gymnastics and Yogic exercise programme. The result showed that the gymnastic exercise and yogic exercise brought significant improvement among the women college students on all variables except in diastolic blood pressure.

Kasundra (2010) conducted a study on the impact of pranayama training on selected components of blood. For the present study, Subjects selected were B.A Students studying in Mahadev Desai Grem Seva Mahavidyalaya. Randomly 30 students were selected for the study and then they were divided into two equal groups randomly which consists of 15 subjects each belonging to one experimental and one control group. A Group was exposed to pranayama and group B was control group. Experimental group participated in pranayama training for eight weeks. The variables and test items selected for the present study were cholesterol Blood glucose hemoglobin, WBC, RBC and Platelets. This study revealed a significant difference in pre test and post test of

experimental groups of selected blood components of i.e. cholesterol, Blood glucose, Hemoglobin, WBC, RBC and Platelets. The study showed that Pranayama training has an impact on select components of blood.

Chidambara Raja (2010) conducted a study on the effect of yogic practice and physical fitness on flexibility, anxiety and blood pressure. Forty five subjects, working women in various Faculties of Annamalai University in the age group of 35 to 40 years were selected. They were divided into three equal groups each group consisted of fifteen subjects. Group I underwent yoga practice, group II underwent physical exercises and group III acted as control group. The training period for this study was five days a week for eight weeks. After training these variables have significantly improved among experimental group than the control group.

CHAPTER III
METHODOLOGY

3.1 INTRODUCTION

This chapter describes in detail the procedures adopted for selection of subjects, experiment variables, pilot study, experiment design, procedure, training programme, criterion measures, reliability of data, test administration, collection of data and statistical treatment of data involved in the study.

3.2 SELECTION OF SUBJECTS:

The study was designed to find out the effects of aerobic dancing and yogic practices on selected health related fitness, psychological and bio-chemical variables among women college students. For this purpose sixty women college students from APA Arts College for Women, Palani, Tamilnadu were selected at random as subjects and their age was between 18 to 25 years.

3.3 EXPERIMENTAL DESIGN:

The study was formulated as pre and post test random group design, in which sixty students were divided into three equal groups. The experimental group – 1 (n=20 AD group) underwent aerobic dancing, the experimental group – 2 (n=20 YP group) underwent yogic practices, and group –3 served as control group (n = 20 CG) who did not undergo any specific training.

3.4 SELECTION OF VARIABLES

Based on the relevant literature reviewed and in accordance with views of professional experts in physical education, the following health related fitness and psychological and biochemical variables were selected.

3.4.1 Independent Variables

"Main variable is one under consideration that is manipulated by the researcher with subjects randomly assigned to various groups or testing conditions".(Jenson 1979) In the study, two different training approaches were adopted as independent variables, i.e., Aerobic Dancing (AD) and Yogic Practice (YP).

3.4.2 Dependent Variables

"A dependent variable is that condition that is observed and measured that is expected to be affected in some way as a result of the manipulation of independent variable" (Morehouse 1975). The following Health Related Fitness, Psychological and Biochemical variables were selected as dependent variables. They were listed as follows Flexibility, Cardio Respiratory Endurance, Muscular Strength Endurance, Stress, Anxiety, Self confidence, Blood sugar, High density lipoprotein and Low density lipoprotein.

3.5 CRITERION MEASURES

By going through literature and in consultation with the professional experts, the following variables were selected as the criterion measures in this study for testing the hypothesis, the criterion measures adopted for the studies measuring the Health related fitness, Psychological and Bio-chemical variables are given below.

3.5.1 Cardio Respiratory Endurance

Cardio respiratory endurance was measured by using 12 min run/walk test. The unit of the measurement was recorded in meters.

3.5.2 Flexibility

Flexibility was measured by using sit and reach test. The unit of the measurement was in centimeter.

3.5.3 Muscular Strength Endurance

The muscular strength endurance was measured by using modified sit-ups and unit of the measurement recorded in numbers.

3.5.4 Stress

The level of stress was assessed by questionnaire standardized by Shailendra Singh.

3.5.5 Anxiety

The level of anxiety was assessed by Questionnaire prepared by Spielberger R.L. Gorsuch and R.E. Lushers.

3.5.6 Self Confidence

The level of self confidence was assessed by Agnilotry Self – Confidence Inventory (ASCI).

3.5.7 Blood Sugar

Blood Sugar was estimated colorimetrically by O-toluidine method as described by Winckers and Jacobs, 1971.The unit of the measurement was mg/dl.

3.5.8 Low Density Lipoprotein

The level of low density lipoprotein was measured by Enzymatic Colorimetric method. The unit of the measurement was mg/dl.

3.5.9 High Density Lipoprotein

The level of High density lipoprotein was measured by Enzymatic Colorimetric method. The unit of the measurement was mg/dl.

3.6 ORIENTATION OF SUBJECTS

Before collection of data, the subjects were oriented about the purpose of the study. The investigator explained the testing procedure of the selected dependent variables. The students had experienced these testing procedures several times before the commencement of the experiment.

3.7 RELIABILITY OF THE DATA:

Reliability was established by test and retest process. Test and retest method was followed in order to establish the reliability of data by using two groups each with five subjects. All the variables selected in the present study were tested twice for the subjects by the same person under similar conditions. The intra class co-efficient correlation was used to find out the reliability of the data. The reliable value for the selected criterion variables were found as flexibility (0.91), cardio respiratory endurance (0.94), muscular

strength endurance (0.92), stress (0.95), anxiety (0.97), self confidence (0.91), blood sugar (0.96), high density lipoprotein (0.97) and low density lipoprotein (0.96) respectively.

3.8 INSTRUMENT RELIABILITY:

Instrument such as Stop watches, measuring steel tape, cone were used for this study. All instruments were in good working condition. Their calibrations were tested and found to be accurate enough to serve the purpose of the study.

3.9 SUBJECT RELIABILITY:

The subject reliability was established by test-retest method. Five subjects were selected in Arulmigu Palani Andavar Arts College for Women, Palani, Tamilnadu, India and they were tested twice by the same tester under similar conditions on each criterion variable. The intra class correlation was used to find out the subjects reliability with test-retest scores on each criterion variable separately.

3.10 COMPETENCY OF THE TESTER:

The investigator learned the procedures and methods to handle and operate the instruments to administer the test. The investigator herself using stopwatches and steel tape took measurements. Services of qualified assistants were used for taking other measurements. Baumgartner and Jackson (1991) have opined that the repeated measurement of the individual on the same test was a univariate, not a bivariate situation. It is distribution of a single variable. Hence, it makes sense, and it is fit enough to use univariate statistics, like the intra-class correlation co-efficient.

3.11 COLLECTION OF DATA:

Aerobic dancing and Yogic practices were given as per the training schedule of five days per week of twelve weeks. The pre and post test data on the selected criterion variables were collected by administering the test as per the standardized procedures before and after the twelve weeks of the training programme.

3.12 ADMINISTRATION OF TESTS

3.12.1 Flexibility (Sit and Reach Test)

Purpose: To measure the abdomen, lower back and hamstring musculoskeletal function. **Equipments and Facilities**: The test apparatus consisted of a specially constructed box (30 cm by 30 cm by 53 cm) with a measuring scale where 23 centimeters was at the level of the feet. **Procedure**: The subject was made to sit on the floor with subject's hips, back and head against a wall, legs fully extended, and the bottom of subject's feet against the sit- and – reach box. To perform the test, the subject extended the arms forward, with hands placed on top of each other and reached forward as far as possible without letting the hips, back, or head come off the wall. The examiner should then slide the reach indicator touché the tips of the subject's finger. The subject's head and back came off the wall and he gradually reached forward three times, the third time stretching forward as far as possible on the indicator (scale), holding the final position for at least two seconds. She was sure that during the test the backs of the knees were kept flat against the floor. **Scoring**: Four trials were given to each subject. The score was the farthest point reached by the subject and recorded to the nearest centimeter.

3.12.2 Cardio Respiratory Endurance (Cooper's Twelve Minutes Run/Walk)

Purpose: The purpose of the timed distance run is to measure maximal function and endurance of the cardio respiratory system. **Facilities and Equipments**: The test was administered in a 400 meters track. A stop watch with calibration of 1/10 seconds, a whistle, score sheet and pencils were used to administer the test. **Procedure**: Cooper's Twelve Minutes run test was administered with the help of qualified testers. For this test, a 400 metres track was prepared with marking at every tenth meter. The investigator and the testers serve as the lap scorers. The subjects were asked to stand on the starting line and drawn at the finish line of the 400 metres track, and they were given instructions to cover as much distance as possible by running. They were instructed to continue the run till the final whistle. The race was started with a whistle, and at the end of the twelfth minute, again the whistle was blown. The number of minutes left was announced to the subjects every minute. At the twelfth minute, a whistle was blown and the subjects stopped instantly and stood on the spot. **Scoring:** The distance covered by each in twelve minutes was recorded to the nearest tenth meter. The distance covered by the subjects was used as a measure of cardio respiratory endurance.

3.12.3 Muscular Strength Endurance (Modified Sit-Ups)

Purpose: The purpose of the sit-up test is to measure strength and endurance of abdominal muscles. Facilities and Equipments: any large flat area (preferably indoors). A stopwatch and exercise mat or a piece of carpet. **Procedure**: Students are positioned on their backs with legs flexed at the knees, fee flat on the floor, and the heels 12 to 18 inches from the buttocks. The arms should be crossed and in contact with chest with the hands on opposite shoulders. The hands must remain in contact with the shoulders during the complete curl. The head should be tucked (curled) with the chin to chest. A partner

holds the feet on the floor and counts the number of correctly executed sit-ups. On the signal to begin, the student's curls to a sitting position until the forearms touch the thigh. One sit-up is complete when the midback makes contact with the testing surface on the down portion. The student is instructed to execute as many sit-ups as possible in 60 seconds. A signal to stop should be given at the end of 60 seconds. **Scoring**: The number of successfully completed sit-ups in one minute is recorded as score.

3.12.4 Stress (Questionnaire)

To assess the stress among the students, the investigator adopted the scale developed and standardized by Shailendra Singh. The original scale was modified, and again validated by the investigator.The scale consists of forty items covering the aspects such as college climate teaching learning process, curriculum, student-parent Relationship. Student-Peer group Relationship, future Career, Economic Factors, Student Potential, Physique, Style and Study workload are included. The items in the scale are designed to study the Psychological, Psychological and Behavioral reactions.The scale is indented to measure the stress of the students in scores 3,2,1,0 for the responses such as Extreme Stress, More Stress, Slight Stress and No Stress respectively for all the items. The students had to place a tick at the appropriate column. With the help of the total scores, each individual's level of stress score has been calculated for analysis.

The Reliability of the stress scale was established by adopting two methods *viz.* Cronbach Alpha (a) and Test-retest(r). The validity of the scales has been established by taking the root of r ($\sqrt{r}$).