

**EFFECT OF PROPRIOCEPTIVE NEUROMUSCULAR
FACILITATION, PILATE AND BALLET EXERCISES ON
PHYSICAL FITNESS AND OPTIMUM HEALTH OF
SCHOOL STUDENTS**

A

Thesis

Submitted to



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By

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DECLARATION

I hereby declare that the thesis entitled “**Effect of Proprioceptive Neuromuscular Facilitation, Pilate and Ballet Exercises on Physical Fitness and Optimum Health of School Students**” submitted for the Doctor of Philosophy in Physical Education degree is entirely my original work and all ideas and references have been duly acknowledged. It does not contain any work for the award of any other degree or diploma.

Date: 7/7/ 2017

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CERTIFICATE

I certify that Ms. Loveleen Bala has prepared her thesis entitled “**Effect of Proprioceptive Neuromuscular Facilitation, Pilate and Ballet Exercises on Physical Fitness and Optimum Health of School Students**” for the award of Ph.D. degree of Lovely Professional University, under my guidance. She has carried out the work at the School of Physical Education, Lovely Professional University, Phagwara, Punjab.

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ABSTRACT

The objective of the study was to investigate the effect of Proprioceptive Neuromuscular Facilitation (PNF), Pilate and Ballet Exercises on Physical Fitness and Optimum Health of school students. Proprioceptive Neuromuscular Facilitation (PNF), Pilate and Ballet Exercises were considered as independent variable and Physical Fitness and Optimum Health were considered as dependent variable in this research work. One hundred and fifty school boys and girls between the age group of 11 to 14 years old were the sample of the study selected through the purposive random sampling technique from Amritsar district, Punjab, India. There were five experimental groups, Group 1: Proprioceptive Neuromuscular Facilitation (PNF training program), Group2: Pilate (Pilate training program) Group 3: Ballet (Ballet training program) Group 4: Composite (Combination of three training programs) Group 5: Control (no treatment was given), each experimental group have thirty subjects (N=15 boys and N=15 girls). Experimental group performed their training program for six months, 40 minute in a day and four days in a week. Physical fitness was measured by Johnson and Nelson physical fitness test battery and optimum health was measured by self-made standardized questionnaire. To discover the difference between pre-test scores and post-test scores on physical fitness and optimum health in all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilate, Ballet, Composite and Control) ANCOVA (Analysis of Co-variance) was conducted as the statistical technique along with Post Hoc Test at 0.95 level of confidence on SPSS 21.0. the results of the investigation shows significant difference in post-test scores on Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance variable of physical fitness and optimum health of school students taking different type of treatments as Proprioceptive Neuromuscular Facilitation, Pilate, Ballet, Composite when compare to control group.

In conclusion the present study discovered that 40 minutes PNF, Pilate and Ballet training, four days in a week can improve the physical fitness level and optimum health status of school students with the age of 11 to 14 years old.

Keywords: *Proprioceptive Neuromuscular Facilitation Exercises, Pilate Exercises, Ballet Exercises, Physical Fitness, Optimum Health, School Students.*

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Loveleen Bala

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LIST OF ABBREVIATIONS

S.N.	ABBREVIATION	FULL FORM
1.	PNF	Proprioceptive Neuromuscular Facilitation
2.	ROM	Range of Motion

DEDICATED

TO

MY FATHER

Chapter-I

INTRODUCTION

Chapter-II
REVIEWS
OF
LITERATURE

Chapter-III
RESEARCH
METHODOLOGY

Chapter-IV
RESULTS
AND
INTERPRETATIONS

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SUMMARY,
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CHAPTER-1

INTRODUCTION

Healthy life is a treasure that every entity should strive to build up and try to sustain throughout their life and regular physical activity is a great source to improve health psychologically as well as physiologically. Each individual should develop a habit of maintaining their good health and physical fitness level from their childhood, which will facilitate them throughout their life and help them in creating healthy environment all around. If they will be fit the nation will augment progressively. Bates (2006) revealed that regular physical activity for children have so many benefits and have great impacts on their physiological and psychological aspect of health. Daily workout helps to diminish the risk of chronic disease, obesity and improve cognitive function and academic performance as well as enhanced body image and self-esteem among children. Regular physical activity has very dynamic effects on psychological variable on 11 to 21 years old adolescents (Calfas & Taylor 1994). Keays and Allison (1995) studied that daily basis physical movement has constructive results on school student's academic achievements like memory, observation, problem solving skills, decision making and also generous improvements in attitude, obedience, behaviors and creativeness. Physical activity deals with bodily function and movements. Caspersen et. al. (1985) "physical activity is set of bodily movements generated by the skeletal and muscular system of the human body that results in energy expenditure and it can be divided on the nature of work i.e. occupational, sports, conditioning, household or other activities". The literature sustained that daily physical activity is very mandatory for the all over development of the growing children. Growth and development will take place in an adequate manner by doing daily physical workout. Now days there are so many factors that are affecting the health status of the children in terms of bad eating habits, lack of physical work, luxurious lifestyle, polluted environment and much use of electronic gaming etc. These factors cause many health related issues i.e. obesity, postural deformities, diabetes, stress, depression and tantrums etc. Lack of physical activity creates so many health problems among them obesity is the most leading health related issue in all over the world. A report by the Health Minister of India, J.P. Nadda presented on the obesity in Rajya Sabha that Punjab is the most leading state has the maximum figure of obese people followed by Kerela and Delhi in India (NDTV 2016). So there is a massive requirement to focus on these issues by

espousing the different type of recreational or any other training programs which is related to physical activity in to the present curriculum of children to overcome this issue which arises very quickly in the society. It is quite clear that the proceedings of the homeland is depends upon the healthy children and youngsters for this they need to concentrate on their optimum health status as well as on their physical fitness level by adapting physical doings in their daily routine with the help of different type of exercises or recreational activity programs in the school. School programs are essential and effective for the prevention of the childhood obesity (Veugelers & Fitzgerald 2005).

1.1 OPTIMUM HEALTH

A healthy human being has a fit body along with sound mind in the absence of any disease. A fit individual performed his day to day work actively without any disturbance and fatigue. The World Health Organization (1948) explained health as a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. In a physiological sense good health defined as the state in which all the body functions acts perfectly, freedom from the mental and physical discomfort along with body pains (Dash 2008). The Optimum Health considered as the balance among the entire health characteristics. Vasseghi (2011) says that optimum health is independence from boundaries, limitations and restrictions across all the dimensions of physical, mental, emotional and spiritual. The dimensions of Optimum Health depend upon each other, as they are interlinked. If any interruption occurred in any aspect of health, it will leads to health related issues. A person might be look healthy by their physical appearance but we cannot say that the person is healthy apart from his physical appearance rest of the dimensions of health should have to function soundly. According to Donnell (2009) “Optimal health is dynamic constancy in all the aspects of health like physical, emotional, social, spiritual and intellectual health”. Optimum health and physical fitness can be achieved by doing regular physical activity and good eating habits. When all aspects of health work properly without any disturbance and dis-ease in the absence of diseases that state of health considered as Optimum health.

"A sound mind lives in a sound body"

According to this popular an ancient adage by Thales (624-536 BC) if a person has physically fit and attractive graceful body then his all intellectual powers develops and functions firmly. Now a day's life becomes very busy and a few people can claim to have a

sound mind and sound body with the help of regular physical activity in their daily schedule with nutritious intakes. People are getting conscious about their physical appearance and establishing healthy habits. People concentrate on their body development that directly deals with their physical fitness which is the essential aspect of health. Health can be enhanced by improving physical fitness level and it deals with our daily deeds or routine, which vary according to the nature of activities performed by an entity.

1.2 PHYSICAL FITNESS

Physical fitness performs essential function in the daily performance by an individual. Consequently, it is fundamental characteristic of physical health. Physical fitness deals with the performance of daily physical work or tasks without any fatigue and all the systems of the body performed their work efficiently in the absence of stress or strain. Clarke (1971) found that physical fitness is the capability to bear everyday activities without extreme exhaustion and with enough energy in reserve for emergencies. The World Health Organization (1968) clarify the term “Physical Fitness” as the capacity to carry out muscular work pleasingly under precise circumstances and may be assessed by the degree of extended movements or the magnitude, period and type of the maximum exercise that a subject can survive. Generally physical fitness depends upon the nature of activity done by an individual i.e. a sportsmen required completely different kind of physical fitness level as compare to a normal layman, on the other hand a child required different type of physical fitness level as compare to adult and older. Every individual have different kind of tasks in their daily routine and their physical fitness level depends upon their work. Physical fitness divided into health related fitness or skill related fitness (Caspersen et. al., 1985). According to Corbin et. al, (2000) “Health-related physical fitness includes such components of physical fitness which directly deals with superior health i.e. body composition, cardiovascular fitness, flexibility, muscular endurance, and strength on the other hand skill-related physical fitness Includes such essentials of physical fitness that directly deals with superior performance in sports i.e. agility, balance, coordination, power, speed and reaction time. Physical fitness can be considered as performance of the lungs, heart and muscles, which affect our physical ability.

Exercise can be defined as a subset of bodily movements that is prepared and designed for the development and maintenance of physical fitness level of an individual (Caspersen et. al., 1985). To build up the physical fitness level there are several types of exercises, which have been developed or came into existence according to the demand of an

individual and scenario, which helps to keep them physically fit, healthy and well being. Proprioceptive neuromuscular facilitation (PNF), Pilates and Ballet exercises are one of these exercises which were developed for the different reasons. PNF and Pilate exercises were developed for the patient's recovery or rehabilitation and ballet exercises were developed for the dancers to perform ballet dance form. But nowadays these exercises have been used as fitness mean on the basis of their scientific results as literature has shown and can helps to attain physical fitness of the school children as well as in sports and normal layman's life. One can achieve all over development by doing regular physical activity in their day to day routine.

1.3 PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION

The Proprioceptive Neuromuscular Facilitation stretching techniques are very effective and useful for increasing active and passive joint's range of motion along with muscular strength and endurance, dynamic stability commonly used in therapeutic treatments. These patterns or techniques were developed by Dr. Herman Kabat, Margaret Knott and Dorothy E. Voss in the 1940's and 1950's. These are the diagonal patterns of movement with maximum resistance to remind motor responses and facilitate neuromuscular junction to work efficiently or improve the neuromuscular control and function by performing these patterns. These patterns have been used as a rehabilitation program for patients suffering from musculoskeletal conditions (Kisner, 2002). These patterns of movement are diagonal and spiral in nature and increase the response of the neuromuscular mechanism for better recovery. Basically PNF patterns performed in flexion or extension and the terminology used as Diagonal 1 flexion or extension as D1 and Diagonal 2 flexion or extension as D2 of the upper and lower extremities (Gardiner, 2003). Basically these patterns used to stimulate the sensory receptors which are present in the muscle and provide ease in neuromuscular junction to perform any movement. Kabat (1950) Proprioceptive Neuromuscular Facilitation concept developed for the treatment of the patient. Its fundamental philosophy based upon that every human being has an unused existing potential including those with disabilities. According to the Susan et. al. (2008) the philosophy of the PNF is the optimistic approach with no pain along with attainable tasks and set up for success, functional approach includes treatment on the body structure by motor learning with active participation of the subject. These patterns have been performed with appropriate or optimal resistance along with commands given by the therapist according to the level of patient. Scifers (2004) found that Proprioceptive Neuromuscular Facilitation focuses on stretching and functional movement. This technique

helps to develop the muscular strength, endurance, joint stability, mobility, neuromuscular control and coordination which aimed to improve the overall functional ability of the subject. According to Sharman et. al. (2006) PNF patterns are usually used to enhance active and passive range of motion by performed once or twice per week in the athletic and clinical environments.

1.4 PILATE EXERCISE

Pilates is a form physical movement that was designed to stretch, strengthen and balance the body and rehabilitate the injury as PNF was designed for. Pilate was invented by German physical therapist Joseph H. Pilates in the 1930's and 1940's in United States as a mean to get hospital patients in World War I can perform exercises to improve their muscle strength and develop their stretching ability. He planned a program to support them in their recovery period. Joseph Pilate started his pilate studio in New York city in 1926 with dancers, athletes and businessman and become very popular in dance community because of the beneficial effects of the training and he called his work "The Art of Contrology". Pilates have many health related benefits by doing regular practice and rehabilitate from injuries and improve overall health and wellness. Pilate training build up body muscles, generate body awareness, Leads to easier and more agile movements on the basis of simple to complex movements, Improves flexibility, make stronger powerhouse the abdominal or core, Improves overall body posture of an individual. Pilate helps to connect the mind and the body so that the body can perform their regular task without any disturbance. The principles of pilate considered as the control over breathing, improves concentration, control over body movements, create strong, flexible and stable center the powerhouse, precise movements and flowing movements (Page, 2011). Pilates was initially popular with dancers and other performers for muscle toning, because these exercises are completely focused on muscle strength, balancing ability of the subjects. It is also used in today's sports training program, because this exercise program is very effective and helps to achieve the higher level sports performance which is the aim of every sportsmen as well country to produce best performers. It improves the physical fitness through various means like free hand exercises, and equipment based exercises. According to Karter (2001) Pilate helps to improve flexibility, balance, strength of the muscles, coordination, good posture, reduce stress, rejuvenate the energy of the body, reduce fatigue, relive from chronic pain and creates the connection between mind and body. On the basis of its scientific benefits this training method become more popular in sports as well. Bertolla (2007) studied the significant effect of pilate training

method on flexibility of 20 sub indoor soccer players. Tolnai et. al (2016) revealed the physical and psychological benefits of 60 minute pilate training once a week in sedentary women. This training program improves skeleton muscle mass, flexibility, balance, improves the powerhouse strength and body awareness. This method is very effective in rehabilitation program. Patti (2015) evaluated that pilate method helps to reduce the chronic low back pain by improving muscular strength, endurance and posture.

1.5 BALLET EXERCISE

Ballet exercises are the form of exercises which performed with partner or without partner to express the emotions with different types of body movements as jump turns and lifts with free hand movements. The term “BALLET” comes from the Italian verb “ballere” which means to dance. In Renaissance period ballet was origin and King Louis XIV established the first ballet school in 1667 “The Academie Royale de Danse” (Shook, 1977). There are basic seven arms and hand movements and five standing foot positions to perform ballet dance form and the bar which is attached with wall is a fundamental element in ballet training to develop the basics. Each class will generally begin with a series of exercises by using the bar for warming up the body, which helps to develop the technique and prepare the dancer for more difficult movements. (Green & Denzler, 1998). Ballet dance helps to promote good posture, burn the excess calories, communicate our sense of well being through motion or movement and establish the awareness of body. It helps to develop the physical and mental aspects of the child and improve the capacity of brain to respond sharply a variety of stimuli. It helps to develop the social aspect as well by supporting and cooperating with each other and improves the communication skill in ballet class. Ballet class makes the person disciplined and become popular as a mean of physical fitness. These exercises stimulate a connection between brain and body that helps to do best in all activities and improves focus, lower stress, stimulates intellectually and more agile to change directions with stability, superior balance and a greater range of motion (Paskevaska, 1997). Ballet exercises have been introduced for the dancers but these exercises are now used in sports like football, rhythmic gymnastics, artistic gymnastics, acrobatics and skating etc.

Proprioceptive Neuromuscular Facilitation (PNF), Pilates and Ballet Exercises have been invented for different reasons but nowadays on the basis of the scientific benefits of these exercises have been used in sports training program for the higher sports achievement as well as in normal layman’s life for being healthy and in the field of rehabilitation it has great impact on patient’s recovery. These exercises improve the basic physical fitness of the

subject. Exercise program deals with physical activity and regular physical activity in daily routine play very important role for the overall development of the school students and 11 to 14 year is a growing and developmental phase of the children and exercises plays very important role for the overall development of the school students. School students will be the great sports person because they are the roots of sports performance, if their physical fitness and health developed in an efficient way in school days they will represent the country at international level by their performance. In school curriculum exercises have been used to make school students physically fit and mentally strong. Proprioceptive neuromuscular facilitation (PNF), Pilates and Ballet exercises are the mean of physical fitness and research studies have shown that these exercises have great impact on the overall development of an individual. On the basic nature of these exercises, these are very easy to adapt and in ballet exercises music will also use during the training session, which will create interest among students. PNF, pilates and ballet exercises are different from each other and have fruitful effect on overall development of an individual.

1.6 SIGNIFICANCE

Regular exercise and physical activity for the school student is the primary key for their good health and well-being. Physical activity and good eating habits improves the physical fitness level and optimum health status of the school going children. By following these mean growth and development can take place in efficient way, so that their learning can improve and creates healthy behaviors along with physiological and psychological development among school students. Veugelers & Fitzgerald (2005) studied that school based healthy eating and physical activity programs reduces the risk of obesity and diseases in children, increases learning and help to set up healthy behaviors among children throughout their life. A report on obesity given by health minister of India in 2016 that obesity is the serious issue in the present days and Punjab state has the maximum number of obese people in the in the country. On the basis of this report there is a great need to check the health status of the upcoming generation. This study includes free hand exercises for school students. No equipment requires for these exercises so these exercises are not much expensive and a school also can adopt these exercise program in their school curriculum for morning physical activity period and in sports period. Exercise in the morning has a great effect on the psychological well being of the school students (Barbar, 2012).

- The findings of the study may add to existing knowledge in the area of physical fitness and optimum health status of the school students and will be beneficial for the school authority to recognize the health status level of their children.
- It will enable the physical educationists to recognize the physical fitness level and optimum health status of the school students and set up a program to improve in a systematic manner in their sports activity period and get the feedback.
- The findings of the study also will see the effect of PNF, Pilate, Ballet and Composite training programs on their physical fitness and optimum health status of school students.
- On the basis of review of literature the present study will cover the age gap from 11 to 14 years because these exercises have been mostly conducted on the adults and older very few research studies have been found on children.
- These exercises mostly conducted for rehabilitation purpose on patients but this present study conducted on healthy school students to see the effect of these exercises on their physical fitness and optimum health.
- The study will further highlight on the importance and benefits of 40 minutes regular exercise on their physical fitness and optimum health level on school children with age of 11 to 14 years.

1.7 STATEMENT OF THE PROBLEM

The purpose of the present study is examines the effect of proprioceptive neuromuscular facilitation, pilates and ballet exercises on physical fitness level and optimum health status of school students. The PNF and Pilate exercises came into existence only for rehabilitation purpose for patients and ballet exercise used by the dancers for their performance and some studies has shown that ballet exercises also used as the rehabilitation mean as mention in chapter 2, but this present study measure the effect of these three types of exercises on physical fitness level and optimum health status on healthy school going students with the age of 11 to 14 years old. Physical fitness and optimum health are the variables which can improve with help of regular physical exercises. The examiner had made an attempt to find out the effect of these exercises on physical fitness and optimum health of school students by keeping in mind the above factors. Therefore the investigator has selected a research problem stated as *“The Effect of Proprioceptive Neuromuscular Facilitation, Pilates and Ballet Exercises on Physical Fitness and Optimum Health of School Students.”*

1.8 OBJECTIVES

1. To explore the effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance variable of Physical Fitness on post-test scores of school students.
2. To examine the effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Optimum Health on post-test scores of school students.

1.9 HYPOTHESES

On the basis of literature following hypothesis has been made:

1. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Arms Strength variable of Physical Fitness on post-test scores of school students.
2. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Flexibility variable of Physical Fitness on post-test scores of school students.
3. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Abdominal Strength variable of Physical Fitness on post-test scores of school students.
4. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Speed variable of Physical Fitness on post-test scores of school students.
5. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Agility variable of Physical Fitness on post-test scores of school students.
6. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Static Balance variable of Physical Fitness on post-test scores of school students.
7. There exists significant effect of different type of treatments (PNF, Pilates, Ballet and Composite training program) on Optimum Health on post-test scores of school students.

1.10 OPERATIONAL DEFINITIONS

- Proprioceptive neuromuscular facilitation: These are the stretching techniques which used to provide ease in the stimulation of the sensory receptors present in the muscle and improve the functioning between muscle and nerve cells (Nervous system). It helps to enhance both active and passive range of motion of the joints.
- Pilate: Pilate is a form of exercise designed to stretch, strengthen and balance the body.
- Ballet: Ballet is a free hand form of dance movements performing with grace including jumps, turns and lifts.
- Physical fitness: To perform the regular tasks without any disturbance with ample energy. There are two category of physical fitness:
 - ❖ Health related physical fitness
 - Balance: Balance is the capacity to stay in control of body movement.
 - ❖ Skill related physical fitness
 - Flexibility: it is joints ability to move freely through a full and normal range of motion.
 - Speed: it is the ability to cover the maximum distance in minimum possible time.
 - Strength: it is a force produced by muscle against a resistance in one maximum effort.
 - Agility: it is the ability to act speedily against any signal in minimum possible time.
- Optimum health: it is the balance among all the dimension of health as physical health, mental health, social health, emotion health and spiritual health of an individual.
- School student: One who is enrolled or attends classes at a school or institute.

1.11 DELIMITATIONS

- The study was delimited to school students only.
- Both genders school girls and boys were the sample of the study.
- Only 11 to 14 years old school girls and boys were the representatives of the study.

- Due to the experimental study the sample was delimited to Amritsar (Punjab) district only.
- The experiment lasted for six months (26 weeks and 3 days, from 20th July 2015 to 21th January 2016) four days in a week and training session lasted for 40 minutes in a day.
- No treatment was imparted to control group.

1.12 LIMITATIONS

- Questionnaire based research has its own limitations. The response given by the subject may be sometime influenced or bias may be considered as a limitation of this study.
- The daily activities at home and school cannot be under the control of investigator.
- Intake of regular meal may be considered as the limitations.

1.13 CHAPTER SUMMARY

Regular exercises are very effective for child's growth and developmental phase. Healthy children make healthy environment and healthy environment make healthy society, which is the basic foundation of the developed country. In today's lifestyle many health hazards arises dreadful impact on the health. Polluted environment, bad eating habits, luxurious lifestyle, stress of work, use of electronics like phone, computer, lack of physical activity in busy life are many factor which gives negative impact on health of a child as well as on every individual. These factors generate number of diseases like obesity which is very common in children and that is responsible for so many diseases like hypertension, diabetes, bad posture, body image, depression, anxiety and stress etc. which literature has supported. Daily exercise is very important for overall development of a child. If we focused on their childhood period and make them to understand the importance of daily exercise in their daily routine along with good eating habits they can develop good habits throughout their life span. They live healthy disease-free life and school is the most important part of every child's life which plays very essential role to develop their habits which children carry throughout their life. Every child spends so much time in school and learns so many things psychologically and physiologically as well. In a schools there are number of activities present in the school curriculum program like in extracurricular activities: cooking classes, sports activity, dance and drama classes, singing classes, crafting and drawing classes etc. which focused for the all over development. The literature has shown the significant effect of regular physical activity on physical and mental development. There are many exercises training program and

recreational activities to engage the children physically and mentally and create the interest among the children. The literature has supported that the practice of exercises training program improves the physical fitness (joint range of motion, stability, muscular strength, speed, flexibility, agility, cardiovascular endurance, stamina and strength of the muscles, balance) level of a child and makes them strong psychologically.

PNF, Pilate and Ballet exercises came into existence for different reasons as we see PNF and Pilate developed to the speedy recovery for the patients and ballet exercises for dancers to develop the muscular strength, flexibility and improves the balance and enhance the wholesome physical fitness.

The significance of the study shows the research gap and the contribution of the current study as the study may add to existing knowledge in the area of physical fitness and optimum health status of the school students and will be beneficial for the school authority to recognize the health status level of their children. It will enable the physical educationists to recognize the physical fitness level and optimum health status of the school students and set up a program to improve in a systematic manner in their sports activity period and get the feedback. The findings of the study also will see the effect of PNF, Pilate, Ballet and Composite training programs on their physical fitness and optimum health status of school students. On the basis of review of literature the present study will cover the age gap from 11 to 14 years because these exercises have been mostly conducted on the adults and older very few research studies have been found on children. These exercises mostly conducted for rehabilitation purpose on patients but this present study conducted on healthy school students to see the effect of these exercises on their physical fitness and optimum health. The study will further highlight on the importance and benefits of 40 minutes regular exercise on their physical fitness and optimum health level on school children with age of 11 to 14 years.

The objective of the study was to explore the effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance variable of Physical Fitness and optimum health on post-test scores of school students.

Keeping in mind the objectives of the study there were some delimitations and limitations of the study while experiment was conducted as the study was delimited to school students only with both genders boys and girls with the age of 11 to 14 years old from the district of Amritsar (Punjab). The experiment lasted for six months (26 weeks and 3 days, from 20th July 2015 to 21th January 2016) four days in a week and training session lasted for 40 minutes in a day and no treatment was imparted to control group. The questionnaire based research

has its own limitations. The response given by the subject may be sometime influenced or bias may be considered as a limitation of this study. The daily activities at home and school cannot be under the control of investigator along with the intake of regular meal may be considered as the limitations.

CHAPTER-2

REVIEW OF LITERATURE

A literature review is an authenticated report of the literature relevant to a particular field. It is the whole summary about the present research problem, which is present in the form of Books, Reports, Dissertation, Journals, Newspapers, Internet, Thesis and Published Articles etc. Review of literature helps me to get a concrete frame to understand how much work has been done in the previous years and what still remains to be done. The research gaps were recognized on the basis of a careful review of previous studies on related area as well as the objectives and hypothesis of the study were framed. The present reviews based upon the effect of PNF, pilate and ballet exercises on physical fitness and optimum health.

Present research studies have been classified as follows:

2.1 Studies on Proprioceptive Neuromuscular Facilitation

2.2 Studies on Pilate

2.3 Studies on Ballet

2.1 STUDIES ON PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION:

Yıldırım et al. (2016) examined the effect of the static stretching, PNF stretching and Mulligan technique of stretching to measure the range of motion of on hip flexion on 40 subjects with bilateral hamstring tightness. In this research there were four groups: 1. static stretching, 2. PNF stretching, 3. Mulligan traction straight leg raise (TSLR) technique, and control group. The experimental groups performed the training program for four weeks. The findings of the study revealed that all the three training program significantly improved the range of motion of hip flexion.

Young et al. (2015) revealed the effects of PNF integration pattern and Swiss ball training on balance and back pain on randomly selected 48 elderly patients with chronic low back pain divided into two groups. 24 subjects in each group PNF integration pattern group and Swiss ball training group. The experiment was last for 6 weeks (30 minutes per day, three times a week). Results of the study revealed that PNF integration pattern training improved the balance ability of elderly patients with chronic low back pain.

Asuman et al. (2015) measured the effect of proprioceptive neuromuscular facilitation and static stretching techniques on jumping performance and flexibility on randomly selected 96 non-athletic individuals in two groups: PNF (N= 45) and static stretching (N=51). They performed the training sessions for three times a week, for four weeks. Results indicate the significant difference between the pre and post scores of long board jump, vertical jump and flexibility in the both groups.

Cesario et al. (2014) revealed the effect of PNF and strength training to gain muscle strength in elderly 17 women divided into two groups as PNF Group n=9 and Weight Training Group n=8 aged over 60. They performed training for three times a week for three months and concluded that the PNF and Weight training groups have an average improvement in muscle strength: brachial biceps, quadriceps and grip, but among both groups only PNF group improved statistically significant and better but no statistically significant difference observed in both groups.

Balamurugan & Kannadasan (2013) evaluated the effect of static stretching, PNF and selected yoga asana on flexibility and reaction time on 30 obese men aged between 25 to 35 years. In this study there were three groups Static Stretching (N=10), PNF (N=10) and selected Yogasanas (N=10) performed 12 weeks training program. The findings of the study found that all the three training program showed significant difference in relation to flexibility and reaction time.

Tanvi et al. (2013) studied the effect of PNF on muscle endurance, functional performance on post-partum lumbo-pelvic pain and to compare it with lumbo-pelvic stabilization exercises on 27 females with age group of 20-35. Group A (N=14) performed lumbo-pelvic stabilization exercises and Group B (N=13) performed PNF training for 4 weeks. The results of the research showed that in both experimental groups improvement found in trunk muscle endurance, pain and functional ability in women with post partum lumbo-pelvic pain, but lumbo-pelvic stabilization exercises training program found better than PNF training program.

Pereira & Goncalves (2012) examined the effect of PNF exercise program on balance, knee extension and flexion isometric torque, and knee extension rate of force development on 14 older faller subjects age of 60 years were assigned into two groups: Group 1. Control group (n=7) and Group 2. PNF training (n=7). The treatment was performed for 10 weeks

for three times per week by the participants. Pre and post test were assessed before and after the training program in relation to their balance, knee extension and flexion isometric torque, and knee extension rate of force development around the knee. The outcome of the study concluded that balance and knee extension torque were improved in experimental group and no improvements were found in control group.

Zarghami et al. (2012) find out the effect of PNF exercises on the range of hip flexion motion with randomly selected 24 non-athletes women from Tabriz Islamic Azad University between the ages of 28-42 years, assigned into two groups as experimental and control. The whole experiment was lasted for 7 weeks, three times in a week for 45-minute per session and the findings of the study revealed the significant difference in experimental and control groups in relation to flexibility of hip flexion range of motion.

Hojatallah et al. (2012) measured the effects of the PNF stretching on feet explosive power and agility of 40 female students randomly separated into 1. Experimental group (N=20) participate in PNF stretching program and 2. Control group (N=20) did not participate in any training program for three times per week for eight weeks and after warm-up at least two minutes. The findings of the research showed the significant improvements in PNF training in relation to feet explosive power but no significant difference was found in agility.

Rubini et al. (2011) measured the effect of static and PNF techniques on hip adductor flexibility with 45 female ballet dancers assigned to three groups: 1. PNF, 2. Static and 3. Control. The both experimental groups (PNF and Static) performed four sets of 30 second stretching with an interval of 30 seconds between sets and the control group remains the same. Maximal range of motion was measured before and immediately after the experiment. Eventually the study conclude that the PNF and Static stretch training techniques were equally effective for immediately increasing flexibility of the hip adductor muscles in female ballet dancers.

Daneshmandi et al. (2011) revealed the effect of PNF and static stretching techniques on knee range of motion among 19 males with the mean age of 35 ± 5 years were randomly divided into two groups. Nine subjects were in static exercises group and ten subjects were in PNF exercises group which consisted total 12 sessions of 20 minutes. Results revealed that

both experimental groups showed significant difference on the range of motion of the knee joint and no significant difference found in both training programs.

Rashad & El-Agamy (2010) compared two different methods of stretching on improvement of range of motion and muscular strength between 72 volleyball, basket ball and swimming players with age of 11 to 13 (n=44, Juniors) and 20 to 33 (n=28, Seniors) years, categorized into four experimental groups. The first and second experimental groups included 44 junior in the volleyball, basketball and swimming activities performed PNF Training and the third and fourth experimental groups included 28 senior players in the volleyball and basketball activities performed static stretching exercises for 12 weeks in three days per week. The findings of the study calculated that PNF training is better than Static stretching training program to improve range of motions and muscular strength in juniors more than seniors.

Nagarwal et al. (2010) studied the effect of two PNF stretching techniques: Hold Relax and Contract Relax- Antagonist Contract for improving the flexibility of hamstring muscles on 45 healthy male subjects. In this research there were three groups as 1. PNF hold relax stretch 2. PNF contract relax- antagonist contract 3. Control, each group has 15 subjects. The experimental group performed their training program three times a week for three weeks and the findings of the study revealed that both techniques are effective in the improvement of hamstring muscle flexibility.

Moreira et al. (2009) studied to verify the effects of cryotherapy and PNF hold-relax technique on muscle strength at the flexor and extensor muscles of the knee on 18 women aged 18 to 24 divided into two groups of cryotherapy and PNF the hold-relax technique. Before and after one session of either technique subjects were submitted to isokinetic evaluation. The comparison of both techniques PNF hold relax technique considered better than cryotherapy on knee muscle peak torque.

Kofotolis & Kellis (2006) investigated the effects of two PNF techniques on 86 women with chronic low back pain with the age of 40 to measure their muscle endurance, flexibility, and functional performance, randomly assigned into three groups: 1. rhythmic stabilization training, 2. combination of isotonic exercises and control group. The time period of the training program was 4 weeks. Static and dynamic trunk muscle endurance, lumbar mobility and back pain intensity were measured before and at the end of 4 and 8 weeks after

training and concluded that the both training program of PNF demonstrated significant improvements in lumbar mobility, static and dynamic muscle endurance and oswestry index measurements.

Mayer et al. (2005) evaluated the effect of PNF stretching on flexibility in division three 20 female collegiate soccer players aged 18 to 22 years with convenience sampling and divided in to two groups 10 subjects in each group. The whole experiment performed for three times per week for three week. In this experiment the control group performed self-stretching and other group performed PNF stretching. The results of the study showed the significant difference in PNF and Control group in relation to their hamstring muscle flexibility.

Ferber et al. (2002) evaluated the effect of PNF stretch techniques on older adults. Three PNF stretch techniques: static stretch, contract-relax and agonist contract relax were applied on twenty six older adults aged 50–75 years. The subjects were tested for knee extension range of motion and knee flexor activation. The results indicated that PNF stretch techniques can increase range of motion of knee joint in older adults.

Feland et al. (2001) revealed the effect of PNF and static stretching on hamstring flexibility in senior athletes with sample size of 97 among them 66 were male and 31 were female between the age of 55 to 79 years, randomly selected for this study. There were three groups: Group 1. PNF (n=40), Group 2. Static Stretch (n=38) and Group 3. Control (n=19). Hamstring flexibility was measured with goniometer prior and after one repetition of stretching lasting for 32 seconds. Results revealed that there is significant difference found in pre test and post test in both training programs and PNF stretch appeared the most beneficial than static stretch on flexibility of hamstrings muscle.

Cornelius & Hamm (1988) studied the effect of PNF flexibility techniques on arterial blood pressure on 60 men. In this study there were three groups N = 20 men each group. Each group performed one of three PNF techniques and that the benefits of stretching may balance the risk of high arterial blood pressure.

Lucas & Koslow (1984) studied the effect of static, dynamic, and PNF stretching techniques on the flexibility on 63 college women divided into three groups. The experimental groups were received treatment for 7 weeks, 3 days a week. The subjects were measured before the treatment begun as pre test after 11 days of the treatment as post test 1

and after 21 days of the treatment as post test 2. The results of the study revealed that all the three training methods significantly improve the flexibility of hamstring gastrocnemius muscles.

2.2 STUDIES ON PILATE:

Roh (2016) examined the effect of 12 weeks pilate training on wellness in the elderly with the sample of 88 (N= 63 female and 26 male) aged 65. The experimental group performed 50 minute Pilate training for three sessions in a week for twelve weeks and findings revealed that significant improvements found in physical, social, emotional and spiritual wellness.

Kiber et al. (2016) studied the effect of pilates mat exercises on dynamic and static balance, hamstring flexibility, abdominal muscle activity and endurance among 47 healthy adult females randomly assigned into two groups: Training Group (N=23) participated into pilates training program and Control Group continued daily activities (N=24). The experiment was lasted for eight weeks, twice a week for one hour. At the end of the research it was revealed that 8 weeks pilate training program have advantageous effect on static balance, flexibility, abdominal muscle endurance, abdominal and lumbar muscle activity.

Oliveira et al. (2016) studied the effect of pilates training on isokenetic muscular strength of elbow flexor and extensor muscles and function of upper limb of 30 older women divided into two groups, experimental (n=15) and Control (n=15). The pilate group performed training for twice in a week for twelve weeks and the conclusion of the study indicate that there was significant difference found in relation to their isokenetic muscular strength of elbow flexor and extensor muscles and function of upper limb when compare to control group.

Barker et al. (2015) revealed the effect of pilates training on balance and falls in older adults and for this purpose six studies have been reviewed in this research and the findings of the study concluded that pilates training significantly improve the balance and risk factor for falls in older adults when compare to control groups.

Hyun et al. (2014) measured the effect of mat based pilates and unstable support surface exercises on static and dynamic balance among 40 elderly females with age group of 65 or above equally into two groups. They performed their assigned training program for three times per week for 12 weeks for 40 minutes each session. The conclusion of the study

revealed that both training program showed significant effects on the static and dynamic balance and pilates mat training is safer than exercise on an unstable base of support.

Parekh et al. (2014) evaluated the effect of polymetric and pilates training on muscular strength and components of jumping on randomly selected 30 volleyball players equally divided into two groups with received polymetric and pilates training program three sessions in one week for six weeks and results concluded that both training programs were showed improvements in relation to agility, vertical jump height, the Block jump, and the attack jump.

Vieria et al. (2013) revealed the influence of pilate training on quality of life with the sample of 74 subjects divided into three groups Group 1: practitioner up to three months, Group 2: practitioner more than one year and Group 3: ex-practitioners. The quality of life was measured by self administered questionnaire and data was analyzed by ANOVA. Results discovered that group 3 showed better results in physical function, general health and mental health.

Yooa et al. (2013) investigated the effect of pilate mat exercises on physical strength and lumber muscle strength with 31 elderly women divided into two groups: experimental group (N=17) and control group (N=14) participated into twelve weeks training program for three times a week. The results of the study showed the significant improvements in physical strength and lumber muscle strength when compare to control group.

Arslanoglu et al. (2013) studied the effect of pilate mat work exercises on the physiological parameters and cardiovascular risk factors of middle aged 20 women. The treatment group (N=10) received training, 45 minutes in a day for 8 weeks and control group (N=10) no treatment was given. The findings of the research showed significant improvements in relation to flexibility, hand-grip, sit-up scores and back strength and body fat percentage, systolic blood pressure and high density lipoprotein decreased.

Mikalacki et al. (2013) revealed the effect of pilates exercises on the flexibility of 60 women with the age of 35-40 years divided into two groups as experimental (N=38) and control group (N=22). The experiment was lasted for 6 months, twice a week. The conclusion of the study was showed statistically significant differences in seated hamstring stretch, standing hamstring stretch and the flex with a bat between the both groups.

Amorim et al. (2011) assessed the effect of mat based pilates exercises on muscular strength and balance on 12 female and 3 male ballet dancers, divided in to experimental (N=8) and control groups (N=7). The experimental group received pilates training programme for 11 weeks. Results revealed significant effect on muscular strength and no significant differences were obtained in balance.

Ferreira et al. (2011) measured effect of mat based pilates exercises on life satisfaction, physical self-concept and health status on 62 healthy adult women with the age of 25 to 55 years, divided into treatment group (N=38) and control group (N=24). The treatment group were received pilate training twice per week, 60-minutes per session, for six months. The sample was assessed before the treatment as pre test, after three months as post test 1 and after six months as post test 2. Results concluded no significant effect found in pre test and post test 1 among the both groups in relation to their life satisfaction, perception of appreciation by other people, perception of physical appearance, perception of functionality, total physical self concept and perception of health status. But there were significant improvements found in pre test and post test 2 as well as post test 1 and post test 2 in relation to their life satisfaction, perception of appreciation by other people, perception of physical appearance, perception of functionality, total physical self concept and perception of health status.

Hassan & Amin (2011) examined the impact of pilates exercises program on the serotonin hormone and some physical fitness variables and the degree of depression on 10 battered women. They were performed pilates training program for twelve weeks. Findings of the research revealed that there were significant differences found in pre test and post test of the experimental group. There were found reduction of the depression degree, improvement in muscle strength, muscular endurance and flexibility.

Irez et al. (2011) assessed that can piates training improved dynamic balance, flexibility, reaction time and muscle strength as well as reduce the number of falls among 60 older women over the age of 65 years divided into experimental (N=30) and Control Group (N=30). Volunteers participated into 12 weeks pilates training program for one hour, three times per week. Dynamic balance, flexibility, reaction time and muscle strength were improved in the experimental group when compared to the control group and reduced the number of falls.

El-Sayed et al. (2010) evaluated the effect of pilates exercises on muscular strength and components of jump on 20 volleyball players with the age of 18 to 20 years. The whole treatment was lasted for six weeks for four days in a week. The results of the study showed the improvements in muscular strength of legs, components jump as well as in the attack and defense timing among volleyball players.

Ali et al. (2010) assessed the effect of pilates exercises on blood pressure and selective physical fitness components on 30 sedentary overweight females from Isfahan University. There were two groups in the study as experimental and control fifteen subjects in each group. Treatment group participated one hour training in a day, three times in a week for eight weeks. The findings of the study concluded that there were improvements in systolic and diastolic blood pressure, percentage of total body fat, handgrip, flexibility, aerobic power, abdominal endurance and waist circumference when compared to control group.

Caldwell et al. (2009) studied the effect of pilate and taiji quan training on psychological and physiological performance with one semester training of pilate and taiji quan training and results revealed that both trainings improves self-efficacy, sleep quality, mood, strength and balance.

Johnson et al. (2007) studied the effect of pilate training on dynamic balance on 34 healthy adults divided into two groups as treatment group (N=17) and control group (N=17). They have participated in 10 pilates based exercise training sessions and after the training sessions the results of the study showed significant difference in dynamic balance.

Sekendiz et al. (2007) measured the effect of pilate training on trunk strength, endurance and flexibility on randomly selected 38 adult females. The experimental group (N=21) performed pilate training for approximately 45 minutes in a day, thrice a week over one year along with control group (N=17). The findings of the study revealed that there were significant changes in abdominal and lower back strength, posterior trunk flexibility and abdominal muscular endurance when compared to control group.

English & Howe (2007) examined the effect of pilates exercises on trunk strength, postural stability and throwing velocity with 3 college baseball pitchers. The results revealed that pilates training improved the performance in double leg lowering, star excursion balance tests, and throwing speed in college baseball pitchers.

Thoma et al. (2006) measured the acute effect of mat based pilates exercises on flexibility of lower extremities joints among older (n=16, age=65-76 years old) and adult (n=18, age= 24-35 years old) females. Both group performed 5five mat based pilates exercise for twenty time alternately for each leg. The conclusion indicated that mat based pilates training improve the lower extremity flexibility of joints among both older and younger group females significantly.

Segal et al. (2004) revealed the effects of pilates training on flexibility and body composition and health status with 47 (45=female, 2= male) subjects participated in pilates training program lasted for six months, one time per week, one hour per session. The data was collected after two months for six months with pre test (pre test1-post test-2, 3, 4). The results of the study revealed that there were significant improvement found from baseline to post test 2, 3, 4, in relation to flexibility and no significant difference found in body composition parameters and health status.

2.3 STUDIES ON BALLET:

Notarnicola et. al. (2014) studied the effect of teaching with or without mirror on balance in young female ballet students with 64 dancers age between 9 to 10 years were the sample of this study among them 32 subjects performed their ballet training with mirror and 32 subjects performed their training program without mirror for 6 months. The findings of the study revealed that mirror does not perform any improvement in static balance when compare to other group but ballet training improves the static balance of the ballet dancers.

Houston & Mcgill (2013) investigated a mixed-methods study into ballet for people living with parkinson disease. In this research total 24 subjects were participated with the age of 60 to 82 among them only 6 subjects were completed the balance, stability and posture measurements and these parameters were measured with the Fullerton Advanced Balance Scale and a plumb line analysis and rest of the participants were observed by interview (n=14) and dairy (n=4). The results of the investigation found improvements in balance and stability but there was no improvement found in posture after participated in the 12 weeks dance training.

Tsimaras et al. (2010) investigated the effect of a traditional dance training program on the physical fitness to measure the aerobic capacity and muscle strength with 23 adults with hearing loss and separated into two groups. The experimental group (N=13, 6 male and

7 female) received traditional dance training for twelve weeks and other group did not get any training during the period of this study as control group(N=10, 5 male and 5 female). The conclusion of the study revealed that the traditional dance training improved the physical fitness (Cardiovascular) level of experimental group adult's with hearing loss.

Keogh et al. (2009) studied the physical benefits of dancing on healthy older adults with 15 training and 3 cross-sectional studies and the conclusion of the research revealed that older adults can significantly improve their aerobic power, lower body muscle endurance, muscular strength, flexibility, balance, agility, and gait with dancing exercises on the other side research also suggested that dancing may be improve muscle power and lower body bone mineral content, as well as reduces the prevalence of falls and cardiovascular health risks.

Redding et al. (2009) examined the effect of dance specific fitness training program and its impact on pedagogic practices as well as on dance performance with 171 undergraduate contemporary dancers, as experimental group (n=86) and control group (n=85), performed ninety minute training for one year. The results of the study showed the improvements in physiological parameters (aerobic, anaerobic capacity) and vertical jump performance when compare to control.

Guidette et al. (2007) measured the exercise intensities during a ballet lesson on 39 female adolescents ballet dancers with different technical ability, aged 13 to 16 years old, divided into three groups as: low level (n=13), intermediate level (n=14) and high level (n=12). The results of the study revealed that low level group ballet dancers have low fitness level in relation to oxygen uptake at individual ventilator threshold, the individual anaerobic threshold and maximal oxygen uptake when compare to intermediate and high level groups.

Long et al. (2004) studied the effect of ballet exercises and stretches on range of motion, strength, and gait on a child with neurological deficits. The subject was a nine-year old male who sustained a traumatic brain injury at the age of two when struck by a vehicle. A stretching and strengthening program using ballet techniques was designed for twice in a week for 45-minute sessions over six weeks duration and the findings of the study found the improvements in 23 out of 24 variables analyzed as well as on range of motion and muscle strength.

Livanelioglu et al. (1998) investigated to the effect of classical ballet training on the lumbar region of 80 young ballet dancers in relation to their muscle strength, lumbar mobility, muscle tightness, spinal deviation and depth of lordosis. In this study there were two groups one group (N=40, Female dancers) received ballet training and other group is control group (N=4, non-dancers females). The results showed that there is no difference was found in muscle strength and ballet training has significant improvements on the musculoskeletal structures of the lumbar region between the both groups.

Ray et al. (2001) observed the effect of yogic training on physical and mental health on 54 young trainees with the age of 20-25 years were randomly separated in two groups i.e. yoga (N= 23 male, 5 female) and control (N= 21 males and 5 females). Experimental group performed yoga practice for initial 5 months and from the 6th to 10th month of training both groups performed the yogic practices. The results of the study revealed that there were improvements found in physiological and psychological parameters after yogic practices.

2.4 CHAPTER SUMMARY

This chapter presents the review section related to the literature and allows the investigator to find out the research gap. The review started with the effect of PNF training on physical fitness and optimum health followed by pilate and ballet training.

2.1 Studies on PNF: Studies by *Yildirim et. al. (2016)*; *Asuman et. al. (2015)*; *Balamurugan & P.Kannadasan (2013)*; *Young et. al. (2015)*; *Asuman et. al. (2015)*; *Cesario et. al. (2014)*; *Tanvi et. al (2013)*; *Pereira and Goncalves (2012)*; *Zarghami et. al. (2012)*; *Hojatallah et. al (2012)*; *Rubini et. al. (2011)*; *Daneshmandi et. al. (2011)*; *Rashad and El-Agamy (2010)*; *Nagarwal et. al. (2010)*; *Moreira et. al (2009)*; *Kofotolis & Kellis (2006)*; *Mayer et. al, (2005)*; *Ferber et. al (2002)*; *Feland et. al (2001)*; *Cornelius & Hamm (1995)*; *Lucas & Koslow (1984)* find out that PNF training can improve the flexibility, muscular strength, endurance, balance (Static and Dynamic) , agility, reaction time, balance the blood pressure, reduces pain in back and pelvic.

2.2 Studies on pilate: Pilate training improves the physical fitness (static balance, flexibility, abdominal and forearms muscle strength and endurance, agility, reaction time) and optimum health (physical function, general health, mental health, physical wellness, social wellness, emotional wellness and spiritual wellness) status and reduces the chance of fall in older adults, reduces the body fat percentage, body mass index, control the systolic blood pressure and life satisfaction, perception of appreciation by other people, perception of physical appearance, perception of functionality, total physical self concept and perception of health

status by Roh (2016); Kiber et al. (2016); Oliveira et al. (2016); Barker et al. (2015); Hyun et al. (2014); Parekh et al. (2014); Viera et al. (2013); Yoo et al. (2013); Arslanoglu et al. (2013); Mikalacki et al. (2013); Amorim et al. (2011); Ferreira et al. (2011); Hassan & Amin (2011); Irez et al. (2011); El-Sayed et al. (2010); Ali et al. (2010); Caldwell et al. (2009); Johnson et al. (2007); Sekendiz et al. (2007); English & Howe (2007); Thoma et al. (2006); Segal et al. (2004).

2.3 Studies on ballet: ballet training is a great mean to develop balance, stability, muscular strength flexibility, cardiovascular fitness, aerobic, anaerobic capacity, vertical jump performance and VO₂ max by Notarnicola et al. (2014); Houston & McGill (2013); Tsimaras et al. (2010); Keogh et al. (2009); Redding et al. (2009); Guidette et al. (2007); Long et al. (2004), Livanelioglu et al. (1998).

From the above mention various studies have been found on PNF, pilates and ballet exercises to improve the physical fitness (flexibility, agility, muscular strength, dynamic and static balance, abdominal and arms strength) and optimum health (physical, mental, social, emotional general health) status. These studies help me to find out the research gap and frame the objectives and hypothesis of the study as mention in chapter 1.

CHAPTER-3

RESEARCH METHODOLOGY

The chapter represents the research methodology includes a brief description of the research design, selection of school and sample, tool for data collection, test items, procedure and administration of the test items, procedure of the PNF, pilate, ballet and composite training program and finally the statistical analysis has been explained and adopted for the current research problem to achieve the objectives.

3.1 RESEARCH DESIGN, METHODOLOGY AND SAMPLING TECHNIQUE:

An experimental research design as the pre-post test randomized research design from true experiment research design was chosen to achieve the objectives of the current study. The study was comprised with three exercises training programs to access the effect of PNF, Pilate and Ballet exercises on Physical Fitness and Optimum Health of school students along with Composite training and Control. The sample was selected from the three schools 1: DAV Public School, 2: Bhavan's SL Public School, 3: Prabhakar Sen Sec School from Amritsar district with age group up to 11 to 14 years old girls and boys. Total 150 school students were the sample of this study selected through the purposive random sampling technique divided into five groups: Group 1: PNF (PNF training program), Group 2: Pilates (Pilates exercise training program), Group 3: Ballet (Ballet exercise training program), Group 4: Composite Group (Combination of three exercise training programs) and 5: Control Group. In each group there were thirty subjects (15 girls and 15 boys). Pre-test was taken by the researcher before the experiment and each group was performed specified exercises program for six months. Post-test was conducted by the researcher at the end of the six months training program. The training session was lasted for 40 minutes in a week for four days. On the basis of three different training programs along with composite and control, researcher has observed the effect of different type of trainings (PNF, Pilate, Ballet, Composite training) on Physical Fitness (Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance) and Optimum Health status.

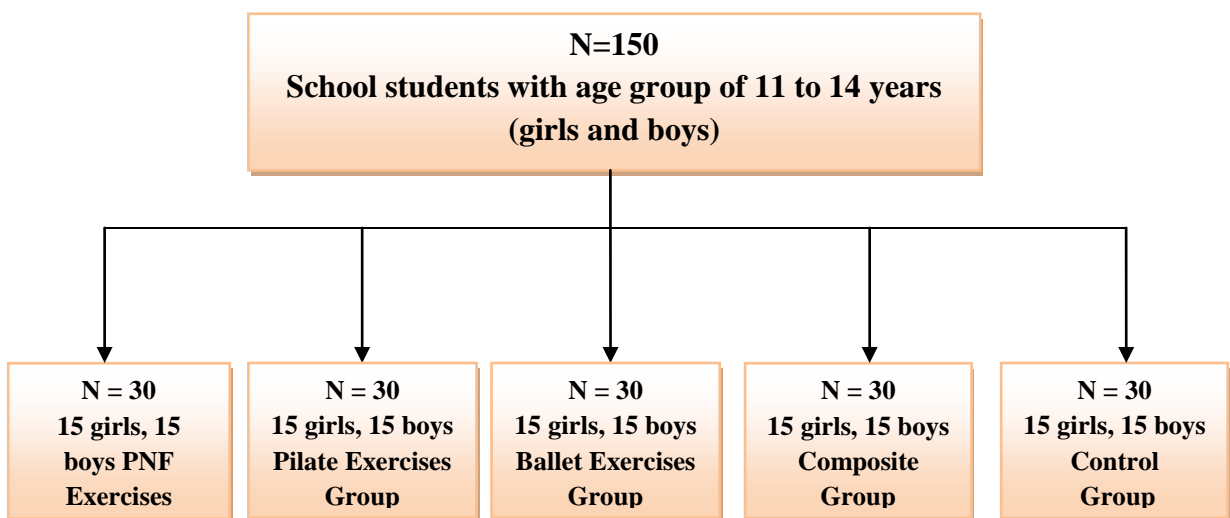
3.2 SELECTION OF SCHOOLS:

For the selection of the schools the investigator initially confirmed the criteria from the school authorities as the availability of adequate timing because each experimental class lasted for 40 minutes, the adequate infrastructure required for the experiment and data collection (grounds, indoor hall), equipments (Mats, horizontal bar, running area etc. for experiment and data collection) and list down ten schools from Amritsar district, Punjab. With the help of simple random sampling technique only three schools (DAV Public School, Bhavan's SL Public School, Prabhakar Sen Sec School) were selected as the sample of the study because of the availability of the timing in the school. The permission letters from the school authority have been attached in appendix. In this present research work there were five experimental groups and each group allotted to the school with simple random sampling technique.

3.3 SELECTION OF SUBJECTS AS SAMPLE:

In initial stage for the selection of the sample total forty subjects were taken for each experimental group among them twenty were boys and twenty were girls. The investigator conducted twelve minutes run test by Johnson and Nelson, standardized for 11 to 14 years old school girls and boys to set the homogeneity among groups. Those subjects were considered as the sample of the study that cleared the twelve minute run and total thirty subjects among them fifteen were girls and fifteen were boys selected as the sample with simple random sampling technique.

Sampling Frame



3.4 TOOLS OF THE STUDY:

The following tools were used for data collection:

1. Johnson and Nelson Physical Fitness test
2. Self-made standardized Optimum Health Scale for Optimum Health Status

3.5 SELECTION OF TEST ITEMS:

Physical Fitness Test items were used for data collection through Johnson and Nelson Physical Fitness Test, standardized for 11 to 14 years old school students. On the basis of review of literature as mention in the chapter 2, the requirement of the current study and the availability of the standardized test items for 11 to 14 years old school students, only six test items were selected for the assessment of physical fitness. Cruz et. al (2014) measured the flexibility, agility, anaerobic power, endurance and lower limb power as the physical fitness variables.

Following is the test items selected for the study on physical fitness and optimum health:

SN	Test Items	Measure	Author & Year of construction
1.	Chin-ups for boys	Arm Strength	Johnson, B.L. and Nalson, J.K, 1966
2.	Modified push ups for girl	Arms strength	Johnson, B.L. and Nalson, J.K,1977
3.	Sit and reach test	Flexibility	Johnson, B.L. and Nalson, J.K, 1977
4.	Bent Knee Sit-ups	Abdominal Strength	Johnson, B.L. and Nalson, J.K, 1976
5.	Fifty Yard Dash	Speed	Johnson, B.L. and Nalson, J.K, 1972
6.	Shuttle Run	Agility	Johnson, B.L. and Nalson, J.K, 1966
7.	Stork Stand Balance	Static Balance	Johnson, B.L. and Nalson, J.K. 1976
8.	Optimum Health Scale	Optimum Health	Dr. Pravin Kumar, Loveleen Bala, 4 May 2016

3.6 PROCEDURE FOR ADMINISTRATION OF THE TEST ITEMS

In this segment the procedure of administration of test items have been explained along with their purpose, reliability, validity, objectivity, related equipments, direction and scoring process of each test item for physical fitness and self made standardized optimum health scale. The descriptions of each test item have been given very briefly along with figures in this section. Each test item has a standard procedure to administrate the physical fitness test and optimum health questionnaire have been given to the subjects for filling as described in 3.6.8.

3.6.1 Chin-ups for boys (Arms Strength)

Purpose: To measure the arms and shoulder girdle strength and endurance of the subject.

Age Level: Ten through college and satisfactory for boys only.

Reliability: The reliability of this test is .87 found.

Validity: This test has been accepted for this face validity.

Objectivity: The objectivity of this test is .99 found.

Equipment: Horizontal bar 1^{1/2} inches in diameter and raised to a height so that the tallest performer cannot touch the ground from the hanging position. If standard equipment is not available, a piece of pipe and the rungs of ladder can be used.

Direction: The performer should be in hanging position on the bar with both hands without touching the ground and pull his body upward until the chin is over the bar. After each chin-up he should return to the fully extended hanging position the exercise should be repeated as many times as possible.

Scoring: The scoring is considered as the numbers of chin-ups completed by the performer.



Figure-3-1

3.6.2 Modified pushups for girls (Arms Strength)

Purpose: To measure the endurance and strength of arms and shoulder girdle.

Age Level: Ten through college and satisfactory for girls only.

Reliability: The reliability of this test is .93 found.

Validity: The validity has been reported as high as .72 with the Rogers Short Index (58).

Equipment: A mat on the floor.

Direction: The performer lies on the floor on her stomach and bent her both knees at right angles and hands should be placed on the floor, the performer lowers her body to the floor until the chest touches, and then she pushes back to the starting position. The exercise is continued for as many repetitions as possible without rest. The body must not sag but maintain a straight line throughout the trail.

Scoring: The score is the correct push-ups executed. The score is terminated if the performer stops to rest, if chest does not touch the floor or in case of arms are not completely extended on an execution, the trail does not count.



Figure-3.2

3.6.3 Modified Sit and reach test (Flexibility)

Purpose: To measure the flexibility of the hamstring muscles of the legs.

Age Level: Six through college and satisfactory for boys & girls.

Reliability: The reliability is .94 found.

Validity: Face validity was accepted for this test.

Objectivity: The objectivity was .99 found.

Equipment: Flexo-meter.

Direction: The subject sits on the floor by stretch his legs forward side and the case of the flexo-meter place on the both feet. When subject is ready he will try to touch his feet with both hands with straight knees. Take the reading at the near edge of the flexo-measure case.

Scoring: The three trails were given to the subjects and best measure is recorded as the score of the subject.



Figure-3.3

3.6.4 Bent Knee Sit-ups (Abdominal Strength)

Purpose: To measure the abdominal muscle endurance and strength.

Age Level: Ten through college and satisfactory for boys & girls.

Reliability: The reliability is .94 found.

Validity: Face validity was accepted for this test.

Objectivity: The objectivity was .98 found.

Equipment: A mat and a yardstick.

Direction: Subject lies over the mat on his back and flexes his both knees over the yardstick while sliding his heels as close to his seat as possible. The yardstick should be held tightly under the knees until the performer is instructed to slowly slide his feet forward. At the point where the yardstick drops to the mat, the tester mark the heel line and seat line to indicate how far the feet should remain from the seat during the bent knee sit-up exercise. The performer should interlace the fingers behind the neck and perform sit-ups alternating the left elbow touch of the inside right knee and a right elbow touch of the inside left knee. The exercises should be repeated as many times as possible.

Scoring: The total number of repetitions is recorded for the score. However, repetitions should not be counted when finger tips do not maintain contact behind the head, when the knees are not touched, or when the performer pushes the floor with the elbow.



Figure-3.4

3.6.5 Fifty Yard Dash (Speed)

Purpose: To measure the speed of the subject.

Age Level: Six through seventeen and satisfactory for boys & girls.

Validity: Face validity was accepted.

Reliability: .88

Equipment: 2 stopwatches or a watch with split second timer is needed. A suitable running area to allow the fifty meter dash plus extension for stopping is also required.

Direction: The subject stand behind the starting line as initial point and instructed to start with standing start. The subject start running on hearing the commands “Are you ready?” and “Go!” on the command of go the starter fall down his arm and timer will start at the finish line. The subject runs as fast as possible across the 50 meter with greatest effort. Two subjects can run at the same time from a starting position.

Scoring: The elapse time from the starting line to finish line is measure in seconds (to the nearest tenth of a second).



Figure-3.5

3.6.6 Shuttle Run (Agility)

Purpose: To measure Agility of the subject.

Age Level: This test was suitable for age of nine through college and satisfactory for both boys & girls.

Reliability: .87

Equipment: Marking tape, stop watch, two blocks of woods (2" X 2" X 4").

Direction: On the signal "go" subject run to the blocks, picks up one block, proceeds to the starting line and put down the block at the back of the starting line again the subject repeats the process with the second wood block. Subject can have rest between two trails.

Scoring: The score for each performer is the length of time required to complete the course.



Figure-3.6

3.6.7. Stork Balance Test (Static Balance)

Purpose: To measured the Static Balance of the subject.

Age Level: This test was suitable for ten through college and satisfactory for both boys & girls.

Reliability: The Reliability is .87 was found.

Validity: Face validity was accepted for this test.

Objectivity: The Objectivity was .99 found.

Equipment: One Stopwatch and a wristwatch with a second hand.

Direction: The subject stand in erect position on his both foot. On signal the subject stand on his strong foot as the dominant leg and place his other foot on the inside of the supporting knee and place the both hands on his waist. On a signal, the subject raises the heel from the floor and maintains the balance as long as possible without moving and fumbling the ball of the foot from its initial position or not letting the heel touch the floor.

Scoring: The three trails were given to the subjects and best time was recorded as the score of the subject.



Figure-3.7

3.6.8. Optimum Health Questionnaire Self-made and Standardized (Optimum Health)

Purpose: To measured the Optimum Health Status of the subject.

Age Level: This test was suitable for 11 to 14 years old school student and satisfactory for both boys & girls.

Reliability: The Reliability is .80 was found.

Validity: Content validity was accepted for this test.

Equipment: Questionnaire with 45 test items.

Direction: This is likert type five point scale, which have five dimensions as Physical Health, Mental Health, Social Health, Emotional Health and Spiritual Health. This questionnaire includes 45 test items. In this questionnaire there is one statement and each statement have five options as 1. Strongly Agree 2. Agree 3. Undecided 4. Disagree and 5. Strongly Disagree. To fill this questionnaire the subject has to read each statement carefully and tick on one option among five as per his preference.

Scoring: Questionnaire includes positive and negative test items. Positive test items scoring is 5,4,3,2,1 and negative test items scoring procedure is 1,2,3,4,5. The total of 45 test items will compare with the standardized norms.



Figure 3-8

3.7 PROCEDURE OF THE TRAINING PROGRAM:

The three training programs of this study were comprised with three modes of exercises. The training program was based upon simple to complex format. After Taking the Pre Test training program was started from the easy mode of exercises as beginner for 60 days. After the adaptation of the easy mode of exercises the intermediate mode of exercises was continued for 60 days and after the adaption of the intermediate mode of exercises the training program was included advanced mode of exercises for 60 days and post test was conducted after six months by the researcher. Each training program session was lasted for 40 minutes, in which 10 minutes for warming up and 25 minutes for specific training program and 5 minute for cooling down.

Frame of treatment schedule for six months in days

Duration of treatment in months	Duration of treatment in days	Intensity of exercise program perform by school students	Repetition of each exercises perform by school students
Pre-test			
Six Months	1 st to 60 th days (20 th July 2015)	Easy Mode of Exercises (30 to 40% load)	After warming-up of 10 min the specific training program was performed for 25 min and 5 minutes for cooling down.
	61 st to 120 th days (21 September 2015)	Intermediate Mode of Exercises (40 to 60% load)	After warming-up of 10 min the specific training program was performed for 25 min and 5 minutes for cooling down.
	121 st to 180 th days (23 November 2015 to 21 January 2015)	Advanced Mode of Exercises (60 to 80% load)	After warming-up of 10 min the specific training program was performed for 25 min and 5 minutes for cooling down.
Post Test			

3.8 PROCEDURE AND SCHEDULE OF PNF TRAINING PROGRAM IN WEEKS:

The exercises have been taken from the book “PNF in Practice: an Illustrated Guide” by Susan S. Adler, Dominiek Beckers and Math Buck, fourth edition, in the year 2014. Before giving the treatment of PNF techniques to the subjects the researcher has discussed these patterns with the Jaswant Sethi, the head of the department of physiotherapy, Lovely Professional University and Dr. Vishal the physiotherapist in Amritsar to understand the patterns and their implementations.

Category	Duration of Time	Exercises Name
Pre Test		
BEGINNER	8 weeks	Neck Pattern (neck flexion to the left and right in sitting position) (Figure-3.9), Neck Pattern (neck extension to the left and right in sitting position) (Figure-3.10), Resistance to scapular anterior elevation (Figure-3.11).
INTERMEDIATE	8 weeks	Pelvis Pattern (Resistance to pelvic anterior elevation) (Figure-3.12), Resistance to scapular posterior elevation (Figure-3.13), Hook lying lower trunk rotation (Figure-3.14).
ADVANCED	8 weeks	Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion) (Figure-3.15), Leg Pattern (Flexion-Adduction-internal rotation with straight leg) (Figure-3.16) Arms Pattern (Extension-adduction-internal rotation) (Figure-3.17).
Post Test		

3.8.1 PROCEDURE AND SCHEDULE OF PNF TRAINING PROGRAM IN DAYS:

Following is the description of training schedule of Proprioceptive Neuromuscular Facilitation Exercises for six months in weeks and days.

Days→ Week ↓	Mon	Tue	Wed	Thru	Fri	Sat	Sun
Pre-test							
8 weeks training program	Beginner: Neck Pattern (neck flexion to the left and right in sitting position) (Figure-3.9), Neck Pattern (neck extension to the left and right in sitting position) (Figure-3.10), Resistance to scapular anterior elevation (Figure-3.11).	Beginner: Neck Pattern (neck flexion to the left and right in sitting position) (Figure-3.9), Neck Pattern (neck extension to the left and right in sitting position) (Figure-3.10), Resistance to scapular anterior elevation (Figure-3.11).	Rest	Beginner: Neck Pattern (neck flexion to the left and right in sitting position) (Figure-3.9), Neck Pattern (neck extension to the left and right in sitting position) (Figure-3.10), Resistance to scapular anterior elevation (Figure-3.11).	Beginner: Neck Pattern (neck flexion to the left and right in sitting position) (Figure-3.9), Neck Pattern (neck extension to the left and right in sitting position) (Figure-3.10), Resistance to scapular anterior elevation (Figure-3.11).	Rest	Rest
8 weeks training program	Intermediate: Pelvis Pattern (Resistance to pelvic anterior elevation) (Figure-3.12), Resistance to scapular posterior elevation (Figure-3.13), Hook lying lower trunk rotation (Figure-3.14).	Intermediate: Pelvis Pattern (Resistance to pelvic anterior elevation) (Figure-3.12), Resistance to scapular posterior elevation (Figure-3.13), Hook lying lower trunk rotation (Figure-3.14).	Rest	Intermediate: Pelvis Pattern (Resistance to pelvic anterior elevation) (Figure-3.12), Resistance to scapular posterior elevation (Figure-3.13), Hook lying lower trunk rotation (Figure-3.14).	Intermediate: Pelvis Pattern (Resistance to pelvic anterior elevation) (Figure-3.12), Resistance to scapular posterior elevation (Figure-3.13), Hook lying lower trunk rotation (Figure-3.14).	Rest	Rest
8 weeks training program	Advanced: Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion) (Figure-3.15), Leg Pattern (Flexion-Adduction-internal rotation	Advanced: Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion) (Figure-3.15), Leg Pattern (Flexion-Adduction-internal rotation	Rest	Advanced: Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion) (Figure-3.15), Leg Pattern (Flexion-Adduction-internal rotation	Advanced: Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion) (Figure-3.15), Leg Pattern (Flexion-Adduction-internal rotation	Rest	Rest

with straight leg) (Figure-3.16), Arms Pattern (Extension– adduction– internal rotation) (Figure-3.17).	with straight leg) (Figure-3.16), Arms Pattern (Extension– adduction– internal rotation) (Figure-3.17).		with straight leg) (Figure-3.16), Arms Pattern (Extension– adduction– internal rotation) (Figure-3.17).	with straight leg) (Figure-3.16), Arms Pattern (Extension– adduction– internal rotation) (Figure-3.17).		
Post Test						

**List of exercises of Proprioceptive Neuromuscular Facilitation training program
BEGGININERS**

Exercise no. 1: Neck Pattern (neck flexion to the left and right in sitting position)

- Position: The subject in sitting position with his vertebra column straight both hands near the pelvic girdle or side line of the body. The trainer stands behind the subject.
- Grip: The grip of the hands of the trainer in the neck patterns are on the head (Cranium) and chin (Mandible). When the subject diagonally moves his neck downward the trainer stands behind on the right side of the subject and his right hand on the chin and left hand on the cranium of the head. Same procedure follows for the other side.



Figure-3.9

- Action: After taking the position and grip the subject tucks the chin in as the mandible bone depresses with rotation toward the left side and head moves down towards the chest diagonally and same procedure follows for the right side.
- Commands: The Action takes place with the commands as “Tuck your chin in” “bend your head down” “look at your left hip” and when performing on the right side the command will be “look at your right hip” given by the trainer.

- Resistance: The trainer gives traction on the chin with his right hand and resists the left rotation and left hand gives the rotational force to the head back toward the initial position.
- Repeat: 2 to 4 sets with 6 to 8 repetitions with each side.
- Benefit: Increase range of motion and muscle strength.

Exercise no. 2: Neck Pattern (neck extension to the left and right in sitting position)

- Position: The subject in sitting position with his vertebra column straight both hands near the pelvic girdle or side line of the body. The trainer stands behind the subject.
- Grip: The grip of the hands of the trainer in the neck patterns are on the head (Cranium) and chin (Mandible). When the subject diagonally move his neck upward the trainer stand behind on the right side of the subject and his right thumb placed on the middle of the chin and left hand on the top of the head and left hand and fingers diagonally pointed. Same procedure follows for the other side.



Figure-3.10

- Action: After taking the position and grip the subject protrude his mandible bone and lift his chin up diagonally with rotation towards the right and extended the neck and upper thoracic spine by following the mandible line. As the neck extension takes place the neck and upper thoracic supine elongated and same procedure follows for the left side.
- Commands: The Action takes place with the commands as “Lift Your Chin” “Lift Your Head” “Look Up” given by the trainer.
- Resistance: The trainer gives compression with his right hand on the chin along the line of the mandible and resists the right rotation and left hand gives the rotational force to the head back toward the starting position. During the first part of the motion use traction

through the head. When neck extended properly apply gentle compression on the top of the head of the subject.

- Repeat: 2 to 4 sets with 6 to 8 repetitions with each side.
- Benefit: Increase range of motion and muscle strength.

Exercise no.3: Resistance to scapular anterior elevation

- Position: The subject lies on the mat on sideward position on his right, right arm bend and hand under the head and legs a little bend in hook position. The trainer stands in stride position behind the back of the subject diagonally by facing up toward the right shoulder. The body weight of the trainer should be on front foot as movement progresses the weight should be on back foot of the trainer. Same position followed for the other side.
- Grip: The grip of the hands is in cupped position of fingers and placed on the shoulder joint (glenohumeral joint) and the other hand covers the first hand for support. Only fingers will contact on shoulder joint without touching the palm.



Figure-3.11

- Action: After taking the position and grip, in the starting position the subject pull his scapula downward and back toward the lower thoracic spine in diagonal motion and create the stretch on the neck muscles. Do not pull the shoulder so far that the head and in the ending position the scapula lifted up towards the nose of the patient and creates stretch on the scapular muscles.
- Commands: The Action takes place with the commands as “Shrug your shoulder up toward your nose, “Pull” given by the trainer.
- Resistance: The trainer gives resistance on the starting and ending position of the shoulder joint.

- Repeat: 2 to 4 sets with 6 to 8 repetitions with each side.
- Benefit: Increase range of motion and muscle strength of shoulder joint.

INTERMEDIATE

Exercise no. 4: Pelvis Pattern (Resistance to pelvic anterior elevation)

- Position: The subject lies on the mat on sideward on his right, right arm bend and hand under the head and legs a little bend in hook position. The trainer stands in stride position behind the back of the subject diagonally by facing up toward the right shoulder. The body weight of the trainer should be on back foot as movement progresses the weight should be on front foot of the trainer.
- Grip: The trainer put his both hands on the crest of the iliac. The fingers of the right hand grip on the crest of the iliac and just anterior to the midline and the other hand overlap the first hand for support.



Figure-3.12

- Action: After taking the position by the subject and the trainer, the pelvis moves up and forward drawing a small posterior tilt to follow the arc movement. There is an anterior shortening of the trunk on that side (lateral flexion). At the same time, an elongation on the contra lateral side occurs.
- Commands: The Action takes place with the commands as “Shrug Your Pelvis Up” “Pull” given by the trainer.
- Resistance: Pull the pelvis back toward the trainer and downward the table and when the pelvis moves to the mid position the line of the resistance is almost straight back. At the end of the motion the resistance is up toward the ceiling.
- Repeat: 4 to 6 sets with 8 to 10 repetitions with each side.
- Benefit: Increases the flexibility as well muscle strength.

Exercise no.5: Resistance to scapular posterior elevation

- **Position:** The subject lies on the mat on sideward position on his right, right arm bend and hand under the head and legs a little bend in hook position. The trainer stands in stride position behind the back near the head of the subject diagonally by facing down toward the right shoulder. The body weight of the trainer should be on front foot as movement progresses the weight should be on back foot of the trainer. Same position followed for the other side.
- **Grip:** The grip of the hands is in cupped position of fingers and placed the palm of the hand on the upper trapezius muscle near the shoulder joint (glenohumeral joint) and the other hand covers and supports the first hand.



Figure-3.13

- **Action:** After taking the position and grip, in the starting position the subject pull his scapula and shoulder joint downward towards the opposite ilium in diagonal motion and create the stretch till the trapezius muscle is taut. Do not pull so far that patient's head lifted up and in the ending position the scapula lifted up and adducted. Creates stretch and resistance on the scapular muscles.
- **Commands:** The Action takes place with the commands as “Shrug your shoulder up, “Push” given by the trainer.
- **Resistance:** The trainer gives resistance on the starting and ending position of the shoulder joint and related muscles.
- **Repeat:** 4 to 6 sets with 8 to 10 repetitions with each side.
- **Benefit:** Increase range of motion and muscle strength of shoulder joint.

Exercise no. 6: Hook lying lower trunk rotation

- **Position:** The subject lies on the mat in hook lying position on his back in supine position and arms near the hip girdle palms facing downward and both knees closed. The trainer kneels down diagonally in front of the knees of the subject.
- **Grip:** When movement begun with right side of the subject the trainer place his left hand on the iliac crest to facilitate the trunk from the sideward and right hand on the subject's right knee near the femur bone.



Figure-3.14

- **Action:** After taking the position by the trainer and the subject the movement takes place with the both legs moving downward diagonally toward the mat or floor and facilitate at the knee and pelvis. The pelvis rotates after the hips have completed their rotation, followed by the vertebra column (spine). In this position any increase in lumbar lordosis prevented by the abdominal muscles. The return to the initial position or upright, first the lumbar spine must de-rotate, followed by pelvis and then legs and correct timing is very important for this activity.
- **Command:** The Action takes place with the commands as “Rotate Your Knees” Lift Your Pelvis Up” given by the trainer.
- **Resistance:** Give the resistance with the left hand on subject's right knee returning to the upright leg position with lower trunk rotation to the right.
- **Repeat:** 4 to 6 sets with 8 to 10 repetitions with each side.
- **Benefit:** Increase muscle strength and flexibility.

ADVANCED

Exercise no. 7: Leg Pattern (Hip Flexion-Adduction-external rotation with knee flexion)

- Position: The subject lies on the mats on his back in supine position with both arms near the pelvis or hip.
- Grip: The trainer holds the plantar surface of the foot with his left hand's palm, thumb is at the base of the toes to facilitate the toe flexion and fingers hold at the middle of the foot. Same procedure for the other leg.



Figure-3.15

- Action: After taking the position by the subject and trainer first the both legs apart a little from each other then foot movement is toes extend and the foot and ankle dorsiflex and invert then the hip and knee flexion begin and both joints reach their ceiling (end ranges) at the same time making diagonal pattern. The hip and knee joints elongates diagonally from right to left on other side left to right.
- Command: The Action takes place with the commands as “Toes and Foot Up” “Bend Your Leg Up and across” “Bend Up” given by the trainer.
- Resistance: With your proximal hand through the line of the femur give traction by adding a rotary force to resist the hip motion. The resistance given by your distal hand to the dorsiflexion and inversion will also resist the hip adduction and external rotation. Your distal hand now resists the knee flexion by applying traction through the tibia toward the starting position.
- Repeat: 5 to 7 sets with 10 to 12 repetitions with each leg.
- Benefit: Increase muscle strength and flexibility.

Exercise no. 8: Leg Pattern (Flexion-Adduction-internal rotation with straight leg)

- Position: The subject lies on the mats on his back in supine position with both arms near the pelvis or hip.
- Grip: The distal hand of the trainer the left hand grip on the subject's foot with the fingers on the middle of the left foot and the counter pressure generate by the thumb on lateral border to hold the sides of the foot. Do not contacts on the planter surface because it blocks the motion of toe. Do not squeeze or pinch the foot. In proximal hand place the right hand on the anterior medial surface of the thigh near the knee joint.



Figure-3.16

- Action: After taking the position by the subject and trainer first the both legs apart a little from each other then foot movement is toes extend and the foot and ankle dorsiflex and invert then the hip and leg flexion begin and reach the ceiling at the same time making diagonal pattern. The leg elongates diagonally from right to left on other side left to right.
- Command: The Action takes place with the commands as “Toes and Foot Up” “Lift Your Leg Up and in” “Lift Up” given by the trainer.
- Resistance: Your distal hand combines resistance to inversion with traction through the dorsiflexed foot. The resistance to the hip adduction and external rotation comes from resisting the inversion. The traction resists both the dorsiflexion and hip flexion. Your proximal hand combines traction through the line of the femur with a rotary force to resist the external rotation and adduction.
- Repeat: 5 to 7 sets with 10 to 12 repetitions with each leg.
- Benefit: Increase muscle strength and flexibility.

Exercise no. 9: Arms Pattern (Flexion–adduction–external rotation)

- **Position:** The subject lies on the mats on his back in supine position with both arms near the pelvis or hip. The trainer stand near the shoulder joint aside of the subject.
- **Grip:** The distal hand of the trainer the left hand grip on the subject’s wrist with the fingers and thumb gives counter pressure on the ulnar and radius. Do not squeeze or pinch the wrist.



Figure-3.17

- **Action:** After taking the position and the grip by the subject and trainer first move the arm in flexion then adduction and external rotation motion by using diagonal pattern and during the adduction motion elbow joint moves towards the nose (may touch the nose).
- **Command:** The Action takes place with the commands as “Squeeze my hand, pull up and across your nose, Squeeze and pull” given by the trainer.
- **Resistance:** The trainer gives resistance to the forearm supination and shoulder adduction and external rotation and gives traction with his distal hand during wrist flexion and shoulder flexion.
- **Repeat:** 5 to 7 sets with 10 to 12 repetitions with each side.
- **Benefit:** Increase muscle strength of the arms.

3.9 PROCEDURE AND SCHEDULE OF PILATE TRAINING PROGRAM IN WEEKS:

The Pilates exercises have been taken from the book “Pilates Illustrated” by Portia Page in the year 2011. Some modifications have been made to keep in mind regarding the level of school girl and boys and the level of difficulty has been reduced.

Category	Duration of Time	Exercises Name
Pre Test		
BEGINER	8 weeks	Hundred (Figure-3.18), Rolling like a ball (Figure-3.19), Single leg stretch (Figure-3.20).
INTERMEDIATE	8 weeks	Single straight leg stretch (Figure-3.21), Saw (Figure-3.22), the roll up (Figure-3.23).
ADVANCED	8 weeks	Swan (Figure-3.24), Rollover (Figure-3.25), Criss cross (Figure-3.26).
Post test		

3.9.1 PROCEDURE AND SCHEDULE OF PILATE TRAINING PROGRAM IN DAYS:

Following is the description of training schedule of Pilates Exercises for six months.

Days → Weeks ↓	Mon	Tue	Wed	Thru	Fri	Sat	Sun
Pre-Test							
8 weeks training program	Beginner: Hundred (Figure-3.18), Rolling like a ball (Figure-3.19), Single leg stretch (Figure-	Beginner: Hundred (Figure-3.18), Rolling like a ball (Figure-3.19), Single leg stretch (Figure-	Rest	Beginner: Hundred (Figure-3.18), Rolling like a ball (Figure-3.19), Single leg stretch (Figure-	Beginner: Hundred (Figure-3.18), Rolling like a ball (Figure-3.19), Single leg stretch (Figure-	Rest	Rest

	3.20).	3.20).		3.20).	3.20).		
8 weeks training program	Intermediate : Single straight leg stretch (Figure-3.21) , Saw (Figure-3.22) , the roll up (Figure-3.23).	Intermediate : Single straight leg stretch (Figure-3.21) , Saw (Figure-3.22) , the roll up (Figure-3.23).	Rest	Intermediate : Single straight leg stretch (Figure-3.21) , Saw (Figure-3.22) , the roll up (Figure-3.23).	Intermediate : Single straight leg stretch (Figure-3.21) , Saw (Figure-3.22) , the roll up (Figure-3.23).	Rest	Rest
8 weeks training program	Advanced: Swan (Figure-3.24) , Rollover (Figure-3.25) , Criss cross (Figure-3.26).	Advanced: Swan (Figure-3.24) , Rollover (Figure-3.25) , Criss cross (Figure-3.26).	Rest	Advanced: Swan (Figure-3.24) , Rollover (Figure-3.25) , Criss cross (Figure-3.26).	Advanced: Swan (Figure-3.24) , Rollover (Figure-3.25) , Criss cross (Figure-3.26).	Rest	Rest
Post test							

List of exercises of Pilates exercises training program

BEGINNER

Exercise no.10: Hunderd

- Position: Lie on the floor in supine position with knees bend and arms alongside with the body, palms down on the floor and relax the upper body.



Figure-3.18

- Action: Slowly inhale and elevate one knee above the hip level, elevate the other knee above the hip level and exhale. Again inhale and lower the chin toward the chest near the sternum bone and lengthen the cervical vertebra column (neck), exhale and elevate the upper body by flexing the upper spine forward and both hands should be elevated parallel

to ground near the hip. Eyes should be staring between the both thighs and count for 5 seconds to hold in this position. This is one set.

- Repeat: 2 to 4 sets with 4 to 6 repetitions.
- Benefit: It focused on the muscles of abdominal, arms and legs, it helps to warming up the body and strengthens the powerhouse, increases the flexibility of upper back muscles.

Exercise no. 11: Rolling Like a Ball

- Position: Sit on the floor over the mat, bend both knees and hold with the both hands near the shins with elbows bend slightly, chin should be in thighs should be tight, heels and knees should be closed.



Figure-3.19

- Action: Slowly inhale and roll back on the upper back, exhale and roll up to the start position. Try to maintain the balance between sit bone and tailbone (lumber, sacrum and coccyx vertebra column) and repeat for 6 to 8 times. This is one set.
- Repeat: Perform 2 to 4 sets with 4 to 6 repetitions.
- Benefits: It focused on the muscles of scapula as well as abdominal muscles, strengthens the abdominal muscles, and Increases the flexibility of lower back muscles, improves shoulder and pelvis stability.

Exercise no. 12: Single Leg Stretch

- Position: Lie on your back in supine position with your knees above the hips level (tabletop position) making 90 degree angle and the upper body should be elevated and both arms should be reaching to the knees.



Figure-3.20

- Action: Slowly inhale while reaching in the starting position to prepare and exhale along with extends one leg away from 90 degrees to a 45 degree angle from the floor and other knee in towards the chest. As the same side of the bend knee the fingertips of the hands should be moving to the same side ankle and the other hand guiding the knee toward the chest. The tailbone should be on the mat, if the tailbone elevate from the mat stop bending in the knee. Inhale and get back to the starting position (tabletop position), keeping the upper back lifted up. Perform same action for the other leg.
- Repeat: Perform 2 to 4 sets with 4 to 6 repetitions for each leg.
- Benefits: It focused on the abdominals and back muscles, strengthens the abdominal muscles, increases the flexibility of upper back, teaches between the breath and movement coordination.

INTERMEDIATE

Exercise no. 13: Single Straight Leg Stretch

- Position: Lies on the floor in supine position.



Figure-3.21

- Action: Inhale and one leg lifted up (toward the ceiling) and the other leg should be straight and from the hip level it should be above the mat. The head should be lifting up and both hands holding on the calf from behind. Arms and head should be reaching towards the lifted leg. In case of lack of flexibility you may hold the leg on the knee and

pull the raised leg towards the head and inhale two times. Perform same action for the other leg.

- Repeat: Perform 3 to 5 sets with 6 to 8 repetitions for each leg.
- Benefit: It focused on abdominal, legs, arms and back muscles, strengthens the powerhouse, increases the flexibility of the upper back and hamstring muscles group, teaches the breath and movement coordination.

Exercise no. 14: Saw

- Position: Sit on the floor over the mat with open your both legs a bit wider than shoulder width, both feet flexed (toward the ceiling), arms should be up parallel to ground and palms facing down.



Figure-3.22

- Action: Inhale and rotate upper body to the left side by keeping the arms at shoulder height and exhale when right hand reaches the left feet and left arm should be behind the body and twisting the torso to the left side of the body. Inhale while moving up and exhale moving to the starting position. Perform same action for the right side.
- Repeat: Perform 3 to 5 sets with 6 to 8 repetitions for each leg.
- Benefit: It focused on the abdominal and back muscles group. Increase the mobility and rotation of the vertebra, upper back and mid back muscles. Teaches the right sitting posture, strengthen the core and pelvic girdle and lengthens the legs and spine.

Exercise no. 15: The Roll Up

- Position: Lies down on the floor on your back in supine position and both arms extended over the head or may be touch the ground. The legs should be closed and feet can be flexed up to the comfort level of the practitioner.



Figure-3.23

- Action: Inhale and lift the arms up towards the feet along with chin towards the chest and head should be in the both arms, rising one vertebra at a time from the mat. Exhales while both hands reaching on the both feet parallel to ground and inhale as you roll back lower your upper body with keeping the arms in front side of the chest and exhale while arms moving to its starting position over the head.
- Repeat: 2 sets with 5 to 8 repetitions.
- Benefit: It focused on muscles of abdominal, back and scapula. Strengthen the powerhouse and increase the flexibility of the lower back.

ADVANCED

Exercise no. 16: Swan

- Position: Lies on the floor on your stomach in prone position and both hands near the chest on sideward, forehead touches the ground and legs should be closed.



Figure-3.24

- Action: Inhale and press the hands in and elevate your upper torso and exhale with lower your upper body to the mat at the same time lifting the both legs toward the ceiling. Inhale and raise your both hands from the mat with elbow bend. Hold in this position for 4 to 6 seconds.
- Repeat: Perform 4 to 5 sets with 8 to 10 repetitions.

- **Benefit:** It focused on the muscle group of hamstring, upper back and shoulders. Strengthens the hamstring, back extensors and buttocks, stretches the abdominal muscle group, improves the stability of shoulder, increases range of motion in back extension.

Exercise no. 17: Rollover

- **Position:** Lies on the floor over the mat on your back in supine position and both legs joins together lifted up above your hip level. Both arms should be beside your body and palms facing downward.



Figure-3.25

- **Action:** Inhale and pull the powerhouse in. Exhale and press the both hands in and lift your hips up and roll over the spine until the legs reach above the head and parallel to ground. In this position inhale and open your legs and flex your both feet. Exhale and roll back to the initial position legs above the hip level and point the toes. This is one set.
- **Repeat:** Perform 4 to 5 sets with 8 to 10 repetitions..
- **Benefits:** Strengthens the Legs, Hips, Buttocks, and Back While Opening the Chest and Hip Flexors

Exercise no. 18: Criss cross

- **Position:** Lies on the floor over the mat on your back in supine position. One knee bend and other should be straight on 45 degree of angle (tabletop position) from the mat. Both hands should behind the head for support and lift your upper back up. Shoulders should be relaxed and elbows away from the ears.



Figure-3.26

- Action: Exhale and twist your upper torso from the rib cage and left elbow moves toward the right knee and left knee should be straight in 45 degree of angle from the mat. Inhale as you move to the starting position on your back, exhale and twist on the other side right elbow towards the left knee and right knee should be straight and drawing the angle of 45 degree from the mat.
- Repeat: 4 to 5 sets with 8 to 10 repetitions with each leg.
- Benefit: It focused on the muscles of abdominal, legs, arms and back. Strengthens the Powerhouse, increases the flexibility of upper back muscles, and teaches the core control, breath and movement coordination.

3.10 PROCEDURE AND SCHEDULE OF BALLET TRAINING PROGRAM IN WEEKS:

The ballet exercises have been taken from the book “How to Ballet: A step by step guide to the secrets of Ballet” by Jane Hackett, in the year 2011. Some modifications have been made in exercises to keep in mind the level of school girl and boys and the level of difficulty has been reduced.

Category	Duration of Time	Exercises Name
Pre Test		
BEGINNERS	8 weeks	Demi-plie: 1 st standing position (Figure-3.27), Demi-plie: 2 nd standing position (Figure-3.28), Grand-plie: 2 nd standing position (Figure-3.29).
INTERMEDIATE	8 weeks	Battements Tendus Forward: 1 st and 2 nd standing Position (Figure-3.30), Battements Tendus Sideward: 1 st and 2 nd stand position (Figure-3.31), Battements Tendus Backward: 1 st and 2 nd standing position (Figure-3.32).
ADVANCED	8 weeks	Demi Pointe (Releve) in 1 st Standing Position (Figure-3.33), Demi Plie 1 st Standing Position with Demi Pointe (Releve) (Figure-3.34), Passe releve (Figure-3.54).
Post Test		

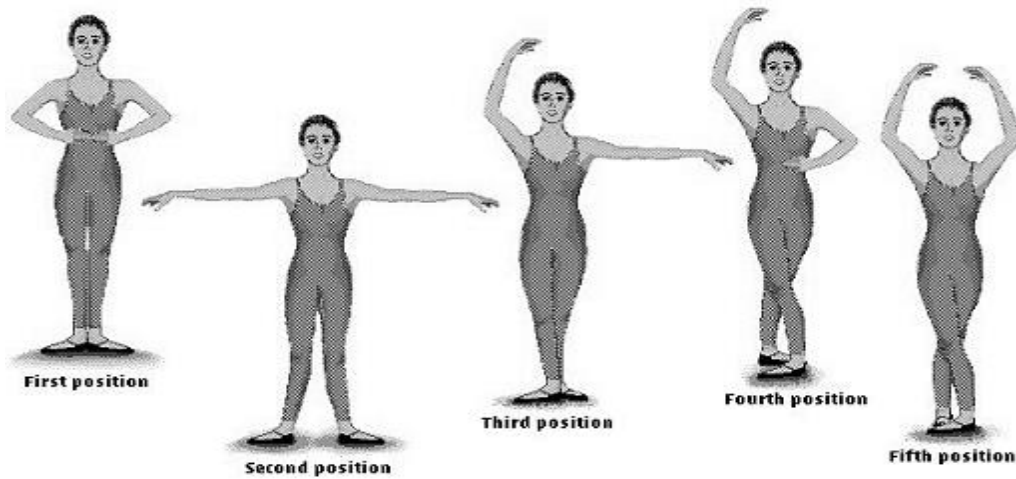
3.10.1 PROCEDURE AND SCHEDULE OF BALLET TRAINING PROGRAM IN DAYS:

Following is the description of training schedule of ballet exercises for six months.

Days → Weeks ↓	Mon	Tue	Wed	Thru	Fri	Sat	Sun
Pre-Test							
8 weeks training program	Beginner: Demi-plie: 1 st standing position (Figure-3.27), Demi-plie: 2 nd standing position (Figure-3.28), Grand-plie: 2 nd standing position (Figure-3.29).	Beginner: Demi-plie: 1 st standing position (Figure-3.27), Demi-plie: 2 nd standing position (Figure-3.28), Grand-plie: 2 nd standing position (Figure-3.29).	Rest	Beginner: Demi-plie: 1 st standing position (Figure-3.27), Demi-plie: 2 nd standing position (Figure-3.28), Grand-plie: 2 nd standing position (Figure-3.29).	Beginner: Demi-plie: 1 st standing position (Figure-3.27), Demi-plie: 2 nd standing position (Figure-3.28), Grand-plie: 2 nd standing position (Figure-3.29).	Rest	Rest
8 weeks training program	Intermediate: Battements Tendus Forward: 1 st and 2 nd standing Position (Figure-3.30), Battements Tendus Sideward: 1 st and 2 nd stand position (Figure-3.31), Battements Tendus Backward: 1 st and 2 nd standing position (Figure-3.32).	Intermediate: Battements Tendus Forward: 1 st and 2 nd standing Position (Figure-3.30), Battements Tendus Sideward: 1 st and 2 nd stand position (Figure-3.31), Battements Tendus Backward: 1 st and 2 nd standing position (Figure-3.32).	Rest	Intermediate: Battements Tendus Forward: 1 st and 2 nd standing Position (Figure-3.30), Battements Tendus Sideward: 1 st and 2 nd stand position (Figure-3.31), Battements Tendus Backward: 1 st and 2 nd standing position (Figure-3.32).	Intermediate: Battements Tendus Forward: 1 st and 2 nd standing Position (Figure-3.30), Battements Tendus Sideward: 1 st and 2 nd stand position (Figure-3.31), Battements Tendus Backward: 1 st and 2 nd standing position (Figure-3.32).	Rest	Rest
8 weeks training program	Advanced: Demi Pointe (Releve) in 1 st Standing Position (Figure-3.33), Demi Plie 1 st Standing Position with Demi Pointe (Releve) (Figure-3.34), Passe releve (Figure-3.35).	Advanced: Demi Pointe (Releve) in 1 st Standing Position (Figure-3.33), Demi Plie 1 st Standing Position with Demi Pointe (Releve) (Figure-3.34), Passe releve (Figure-3.35).	Rest	Advanced: Demi Pointe (Releve) in 1 st Standing Position (Figure-3.33), Demi Plie 1 st Standing Position with Demi Pointe (Releve) (Figure-3.34), Passe releve (Figure-3.35).	Advanced: Demi Pointe (Releve) in 1 st Standing Position (Figure-3.33), Demi Plie 1 st Standing Position with Demi Pointe (Releve) (Figure-3.34), Passe releve (Figure-3.35).	Rest	Rest
Post test							

List of exercises of ballet training program

Five standing positions in ballet



1st Standing Position: In first position the subject stand with back straight, look forward, legs straight and closed, heels join together, feet facing outside drawing 180 degrees angle, powerhouse in, shoulder relaxed and hands on the bar or wall for support according to the shoulder width.



2nd Standing Position: In second position the subject stand with back straight, look forward, legs open according to the shoulder width, feet facing outside drawing 180 degrees angle, powerhouse in, shoulders relaxed and hands on the bar or wall for support according to the shoulder width.



BEGINNER

Exercise no. 19: Demi Plie (1st Standing Position)

- Position: In first position the subject stand with back straight, look forward, legs straight and closed, heels join together, feet facing outside drawing 180 degrees angle, powerhouse in, shoulder relaxed and hands on the bar or wall for support according to the shoulder width.



Figure-3.27

- Action: On the command by the trainee the subject bend his half knees slowly open up the thigh muscles from the hip joint and breathe in without raising their heels from the ground and hold for 3 to 5 seconds in this position and breathe out when become to the

initial position. Make a diamond shape in this exercise. Additionally subjects can move their one arm upward and downward rhythmically (when knees bend one arm moves upward and when knees straightened arm moves downward), while another hand on the wall for support.

- Repeat: 6 to 8 repetitions in each position along with 2 to 3 sets.
- Benefits: Improve legs muscle strength and balance.

Exercise no. 20: Demi Plie (2nd Standing Position)

- Position: In second position the subject stand with back straight, look forward, legs open according to the shoulder width, feet facing outside drawing 180 degrees angle, powerhouse in, shoulders relaxed and hands on the bar or wall for support according to the shoulder width.



Figure-3.28

- Action: On the command by the trainee the subject bend his half knees slowly open up the thigh muscles outward from the hip joint and breathe in without raising their heels from the ground and hold for 3 to 5 seconds in this position and breathe out when become to the initial position. Additionally subjects can move their one arm upward and downward rhythmically (when knees bend one arm moves upward and when knees straightened arm moves downward), while another hand on the wall for support.
- Repeat: 6 to 8 repetitions in each position along with 2 to 3 sets.
- Benefits: Improves legs muscle strength and balance.

Exercise no. 21: Grand Plie (2nd Standing Position)

- Position: In second position the subject stand with back straight, look forward, legs open according to the shoulder width, feet facing outside drawing 180 degrees angle,

powerhouse in, shoulders relaxed and hands on the bar or wall for support according to the shoulder width.



Figure-3.29

- Action: On the command by the trainee the subject bend his full knees slowly open up the thigh muscles outward from the hip joint both thighs drawing a straight line and breathe in without raising their heels and hold for 3 to 5 seconds and breathe out when become to the initial position. Additionally subjects can move their one arm upward and downward rhythmically (when knees bend one arm moves upward and when knees straightened arm moves downward), while another hand on the wall for support.
- Repeat: 6 to 8 repetitions in each position along with 2 to 3 sets.
- Benefits: Improve muscle strength and balance.

INTERMEDIATE

Exercise no.22: Battements Tendus Forward:

- Position: The subject stand in first ballet standing position.



Figure-3.30

- Action: On the command by the trainee the subject slide or drag his foot from the toe ball forward by connect with the ground point the toe forward along with straight leg from the knee (lengthen the leg muscles) and move back to the initial position, breathes in and out rhythmically. One hand should be on the bar or wall and other hand should move with leg movement or on the side line of the body near hip, powerhouse in. Same process follows for the other leg and arm.
- Repeat: 8 to 10 repetitions with each leg along with 3 to 4 sets.
- Benefits: Increase muscle strength and stability.

Exercise no. 23: Battements Tendus Sideward:

- Position: The subject stand in first ballet standing position.



Figure-3.31

- Action: On the command by the trainee the subject slide or drag his foot from the toe ball sideward by connect with the ground point the toe sideward along with straight leg from the knee (lengthen the leg muscles) and move back to the initial position, breathes in and out rhythmically. One hand should be on the bar or wall and other hand should move with leg movement or on the side line of the body near hip, powerhouse in. Same process follows for the other leg and arm.
- Repeat: 8 to 10 repetitions with each leg along with 3 to 4 sets.
- Benefits: Increase muscle strength of the leg and stability.

Exercise no. 24: Battements Tendus Backward

- Position: The subject stand in first ballet standing position.



Figure-3.32

- Action: On the command by the trainee the subject slide or drag his foot from the toe ball backward by connect with the ground point the toe backward along with straight leg from the knee (lengthen the leg muscles) and move back to the initial position, breathes in and out rhythmically. One hand should be on the bar or wall and other hand should move from forward to sideward with leg movement, powerhouse in. Same process follows for the other leg and arm.
- Repeat: 8 to 10 repetitions with each leg along with 3 to 4 sets.
- Benefits: Increase muscle strength of the leg and stability.

ADVANCED

Exercise no 25: Demi Pointe (Releve) in 1st Standing Position

- Position: The subject stands in first ballet standing position and do not lean on the wall. Releve means to raise your heels upward and put your body weight on the balls of the feet.



Figure-3.33

- Action: Lift your heels upward without moving toes and balance on the balls of your feet, powerhouse in and stretched upward. Hold for 4 to 6 seconds in this position and lower down your heels. Breath in and out rhythmically.
- Repeat: 8 to 10 repetitions and 4 to 6 sets.
- Benefit: Improve muscle strength of calf as well balance.

Exercise no. 26: Demi Plie 1st Standing Position with Demi Pointe (Releve)

- Position: The subject stand in first ballet standing position.



Figure-3.34

- Action: After taking the standing position slowly bend your knees as demi plie then hold for 3 to 4 seconds slowly become into initial standing position by raising your heels upward without moving the toes and put your whole body weight on your balls of toes with straight legs, powerhouse in and stretched upward, hold for 4 to 6 seconds and get back to the first standing position. This is one repetition.
- Repeat: 8 to 10 repetitions and 4 to 6 sets.
- Benefits: Strengthen leg muscles, increase balance and lighten body and improves flexibility.

Exercise no. 27: Passe with Releve

- **Position:** Stand straight near the bar or wall by placing one hand on the wall parallel to ground. Bend your one knee and toe connects with your standing knee. The bend knee moving outward. This is a Passe position basically used for taking spin.



Figure-3.35

- **Action:** Place one hand on the bar or wall for support and stand in your passe position and raise the heel upward along with one arm and hold for 4 to 6 seconds. While raising the heel powerhouse should be in and stretched upward.
- **Repeat:** 8 to 10 repetitions and 4 to 6 sets.
- **Benefit:** Increase muscle strength and stability.

3.11 PROCEDURE AND SCHEDULE OF COMPOSITE TRAINING PROGRAM IN WEEKS:

Category	Duration Of Time	Exercises Name
Pre Test		
BEGINNER	8 weeks	PNF: Neck Pattern (neck flexion to the left and right in sitting position), Pilate exercise: Hundred, Ballet exercise: Demi-plie: 1 st standing position.
INTERMEDIATE	8 weeks	PNF: Pelvis Pattern (Resistance to pelvic anterior elevation) Pilate exercise: The roll-up, Ballet exercise: Battement tendus Sideward.
ADVANCED	8 weeks	PNF: Hip Flexion-Adduction-external rotation with knee flexion, Pilate exercise: Criss cross, Ballet exercise: Passe Position with Releve.
Post Test		

Following is the description of training schedule of composite training program for six months.

Days→ Weeks ↓	Mon	Tue	Wed	Thru	Fri	Sat	Sun
Pre-Test							
8 weeks training program	Beginner: PNF: Neck Pattern (neck flexion to the left and right in sitting position), Pilate exercise: Hundred, Ballet exercise: Demi-plie: 1 st standing position.	Beginner: PNF: Neck Pattern (neck flexion to the left and right in sitting position), Pilate exercise: Hundred, Ballet exercise: Demi-plie: 1 st standing position.	Rest	Beginner: PNF: Neck Pattern (neck flexion to the left and right in sitting position), Pilate exercise: Hundred, Ballet exercise: Demi-plie: 1 st standing position.	Beginner: PNF: Neck Pattern (neck flexion to the left and right in sitting position), Pilate exercise: Hundred, Ballet exercise: Demi-plie: 1 st standing position.	Rest	Rest
8 weeks training	Intermediate: PNF: Pelvis Pattern (Resistance to	Intermediate: PNF: Pelvis Pattern (Resistance to	Rest	Intermediate : PNF: Pelvis Pattern (Resistance to	Intermediate: PNF: Pelvis Pattern (Resistance to	Rest	Rest

program	pelvic anterior elevation), Pilate exercise: The roll-up, Ballet exercise: Battement tendus sideward.	pelvic anterior elevation), Pilate exercise: The roll-up, Ballet exercise: Battement tendus sideward.		pelvic anterior elevation), Pilate exercise: The roll-up, Ballet exercise: Battement tendus sideward.	pelvic anterior elevation), Pilate exercise: The roll-up, Ballet exercise: Battement tendus sideward.		
8 weeks training program	Advanced: PNF: Hip Flexion-Adduction-external rotation with knee flexion, Pilate exercise: Criss Cross, Ballet exercise: Passe Position with Revele.	Advanced: PNF: Hip Flexion-Adduction-external rotation with knee flexion, Pilate exercise: Criss Cross, Ballet exercise: Passe Position with Revele.	Rest	Advanced: PNF: Hip Flexion-Adduction-external rotation with knee flexion, Pilate exercise: Criss Cross, Ballet exercise: Passe Position with Revele.	Advanced: PNF: Hip Flexion-Adduction-external rotation with knee flexion, Pilate exercise: Criss Cross, Ballet exercise: Passe Position with Revele.	Rest	Rest
Post test							

The description of the exercises in the Composite Training Program has been already mentioned in their specific training groups (PNF, Pilate and Ballet exercises groups).

3.12 STATISTICAL TECHNIQUE

Statistical techniques and tools used for the current study was ANCOVA along with Post Hoc Test and Descriptive Analysis. The whole analysis was done by using SPSS version 21.0. After enter the data above given techniques were applied.

3.13 CHAPTER SUMMARY

The chapter deals with the research methodology, which includes a brief description of the research design, methodology, sampling technique, selection of school and sample, tool for data collection, test items, procedure and administration of the test items, procedure of the PNF, pilate, ballet and composite training program and finally the statistical analysis has been explained and adopted for the current research problem to achieve the objectives.

An experimental research design was chosen to achieve the objectives of the current study. The study was comprised with three exercises training programs to access the effect of PNF, Pilate and Ballet Exercises on Physical Fitness and Optimum Health of one hundred and fifty school students with the age of 11 to 14 years old. The sample and schools were selected after fulfilling the criteria. The sample was selected through the random

sampling technique from the three schools of Amritsar 1: DAV Public School, 2: Bhavan's SL Public School, 3: Prabhakar Sen Sec School along with composite training program and control group. Before the experiment Pre-test was taken by the researcher and each group was performed their specified exercises program for six months and post-test was conducted by the researcher at the end of the six months training program. The training session was lasted for 40 minutes in a week for four days. On the basis of three different training programs along with composite and control group, researcher has observed the effect of different type of trainings (PNF, Pilate, Ballet, Composite training) on Physical Fitness (Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance) and Optimum Health status.

To evaluate the physical fitness Johnson and Nelson Physical Fitness Tests were used as the tool for this study and self-made standardized questionnaire was used to assess the optimum health status of the school students. Each test item has the different procedure of administration which has been explained in this chapter.

The three training programs of this study were comprised with three modes of exercises as beginner, intermediate and advanced by following simple to complex format. After finalizing the tool and test item pre-test was conducted. The experiment was started from the easy mode of exercises as beginner for 60 days on 20th July 2015. After the adaptation of the easy mode of exercises the intermediate mode of exercises was continued for 60 days on 21 September 2015 and after the adaption of the intermediate mode of exercises the training program was included advanced mode of exercises for 60 days on 23 November 2015 to 21 January 2015. Each training program session was lasted for 40 minutes, in which 10 minutes for warming up and 25 minutes for specific training program and 5 minute for cooling down. Post test was conducted after six months by the researcher.

Statistical techniques were used to analyze the data to find out the results. Statistical techniques and tools used for the current study was ANCOVA along with Post Hoc Test and Descriptive Analysis. The whole analysis was done by using SPSS version 21.0.

CHAPTER-4

RESULT AND INTERPRETATION

This chapter deals with results, interpretations and hypothesis testing to achieve the objectives of the study. The data was collected as explained in the previous chapter-3 and calculated on SPSS version 21.0 with ANCOVA along with Post Hoc Test and Descriptive Analysis as the statistical techniques and tools for calculations. The results have been presented in tables and figures along with interpretation supported by reviews.

Results have been categorized into two sections as follows:

SECTION ONE: RESULTS AND INTERPRETATIONS ON PHYSICAL FITNESS:

- 4.1 Results and interpretations pertaining to Arm Strength.
- 4.2 Results and interpretations pertaining to Flexibility.
- 4.3 Results and interpretations pertaining to Abdominal Strength.
- 4.4 Results and interpretations pertaining to Speed.
- 4.5 Results and interpretations pertaining to Agility.
- 4.6 Results and interpretations pertaining to Static Balance.

SECTION TWO: RESULTS AND INTERPRETATIONS ON OPTIMUM HEALTH:

- 4.7 Results and interpretations pertaining to optimum health.

SECTION ONE: RESULTS AND INTERPRETATIONS ON PHYSICAL FITNESS

4.1 Results and Interpretations Pertaining to Arm Strength:

Table 4.1.1

Descriptive Analysis on Arms Strength Variable of Physical Fitness of School Students

Measure : Arms Strength				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	2.33	1.29
	Pilate	30	3.36	1.32
	Ballet	30	2.70	1.82
	Composite	30	3.00	1.76
	Control	30	2.86	1.90
Post-Test	PNF	30	4.46	2.14
	Pilate	30	5.86	2.33
	Ballet	30	4.06	2.51
	Composite	30	4.76	2.41
	Control	30	2.43	1.54

Table 4.1.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Arms Strength variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF 2.33, Pilate 3.36, Ballet 2.70, Composite 3.00, and Control 2.86. **Pre-Test SD:** PNF 1.29, Pilate 1.32, Ballet 1.82, Composite 1.76 and Control 1.90. **Post-Test Mean:** PNF 4.46, Pilate 5.86, Ballet 4.06, Composite 4.76 and Control 2.43. **Post-Test SD:** PNF 2.14, Pilate 2.33, Ballet 2.51, Composite 2.41 and Control 1.54, were respectively.

Figure 4.1

Graphical Presentation of Mean and SD in Pre-Test and Post-Test among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Arms Strength Variable of Physical Fitness of School Students

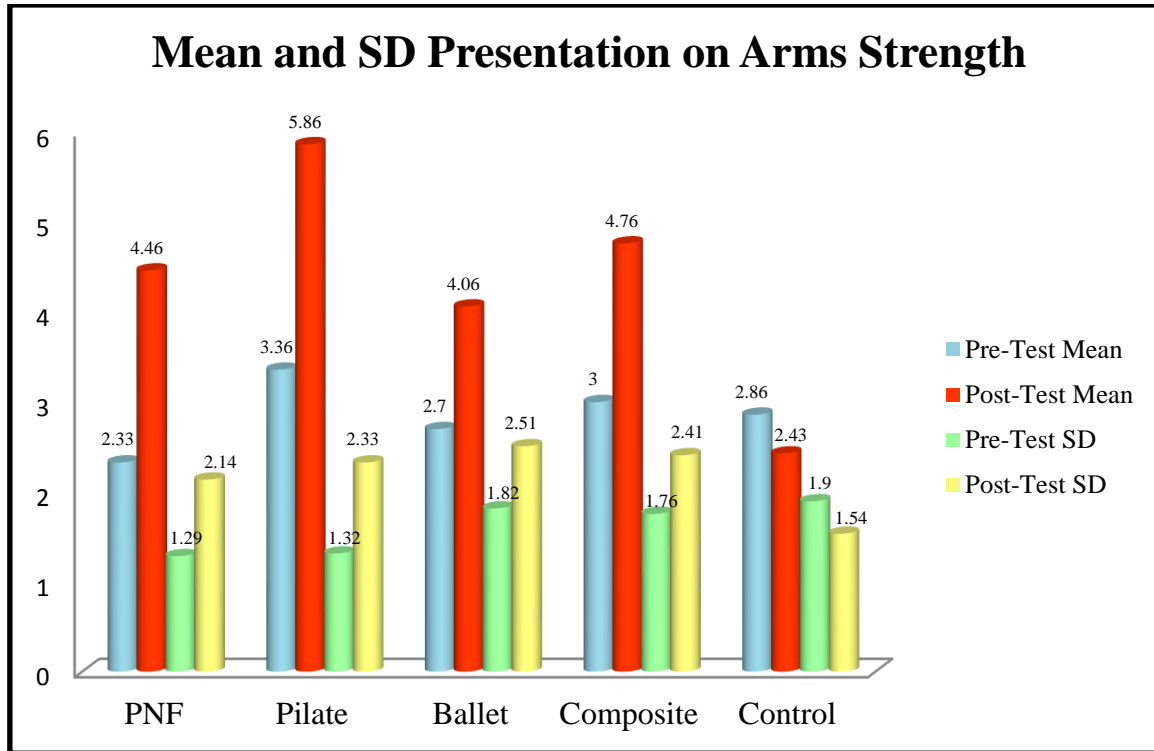


Figure 4.1

Table 4.1.2

Analysis of Co-Variance for the Post-test Data on Arms Strength Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	154.70	4	38.67	38.03	.001
Between Subjects	146.42	144	1.01		

Table 4.1.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Arms Strength variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no.1 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Arms Strength variable of Physical Fitness on post-test scores of school students” has been accepted. Asuman et al. (2015), Cesario et al. (2014), Rashad & El-Agamy (2010), Moreira et al. (2009), Cesario et al.

(2014), Oliveira et al. (2016), Parekh et al. (2014), Yooa et al. (2013), Arslanoglu et al. (2013), Amorim et al. (2011), Hassan & Amin (2011), Irez et al. (2011), El-Sayed et al. (2010), Ali et al. (2010), Keogh et al. (2009), Long et al. (2004) and Livanelioglu et al. (1998) considered that PNF, Pilate and ballet training improve the muscular (Arms) Strength.

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five treatments (PNF, Pilates, Ballet, Composite and Control) during post testing on Arms Strength of school students, which is shown in Table 4.1.3.

Table 4.1.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Arms Strength Variable of Physical Fitness of School Students

Pair wise Comparisons: Arms Strength			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	(p-value) Sig.
PNF	Pilate	.15	.558
	Ballet	.84*	.002
	Composite	.50	.058
	Control	2.67*	.000
Pilate	Ballet	.99*	.000
	Composite	.65*	.013
	Control	2.83*	.000
Ballet	Composite	.33	.196
	Control	1.83*	.000
Composite	Control	2.17*	.000

* Indicates the significant difference

Table 4.1.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Arms Strength Variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Ballet is .002, PNF and Control is .000, Pilate and Ballet is .000, Pilate and Composite is .013, Pilate and Control is .000, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Ballet Training, PNF and Control Training, Pilate and Ballet Training, Pilate and Composite

Training, Pilate and Control Training, Ballet and Control Training, Composite and Control Training.

Comparison of Groups with Insignificant Difference: PNF and Pilate is .558, PNF and Composite is .058, Ballet and Composite is .196. Since p-value is greater than .05, all these mean differences are insignificant at 5% level. Thus the following conclusion can be drawn:

There is insignificant difference found between the adjusted means of PNF and Pilate Training, PNF and Composite Training, Ballet and Composite Training.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Arms Strength variable of Physical Fitness Adjusted Mean is presented in Table 4.1.4.

Table 4.1.4

Adjusted Mean on Arms Strength Variable of Physical Fitness among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of School Students

Measure : Arms Strength	
Treatments	Adjusted Mean
PNF	5.09
Pilate	5.24
Ballet	4.25
Composite	4.59
Control	2.41

Table 4.1.4 presents the values of Adjusted Mean scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Arms Strength variable of Physical Fitness on school students. The observed **Adjusted Mean** values are: PNF 5.09, Pilate 5.24, Ballet 4.25, Composite 4.59 and Control 2.41, were respectively.

Thus it may be concluded that Arm strength of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Arms Strength among the subjects in comparison to that of the control group and Pilate training was found the most effective training on Arms Strength.

4.2 Results and Interpretations Pertaining to Flexibility:

Table 4.2.1

Descriptive Analysis on Flexibility Variable of Physical Fitness of School Students

Measure : Flexibility				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	.72	5.49
	Pilate	30	1.05	4.14
	Ballet	30	2.54	5.24
	Composite	30	1.47	5.48
	Control	30	1.12	5.92
Post-Test	PNF	30	5.53	5.14
	Pilate	30	2.67	4.14
	Ballet	30	5.43	4.77
	Composite	30	3.38	5.54
	Control	30	1.00	5.91

Table 4.2.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Flexibility variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF .72, Pilate 1.05, Ballet 2.54, Composite 1.47 and Control 1.12. **Pre-Test SD:** PNF 5.49, Pilate 4.14, Ballet 5.24, Composite 5.48 and Control 5.92. **Post-Test Mean:** PNF 5.53, Pilate 2.67, Ballet 5.43, Composite 3.38 and Control 1.00. **Post-Test Mean:** PNF 4.06, Pilate 5.86, Ballet 4.46, Composite 4.76 and Control 2.43. **Post-Test SD:** PNF 5.14, Pilate 4.14, Ballet 4.77, Composite 5.54 and Control 5.91, were respectively.

Figure 4.2

Graphical Presentation of Mean and SD in Pre-Test and Post-Test Scores among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Flexibility Variable of Physical Fitness of School Students

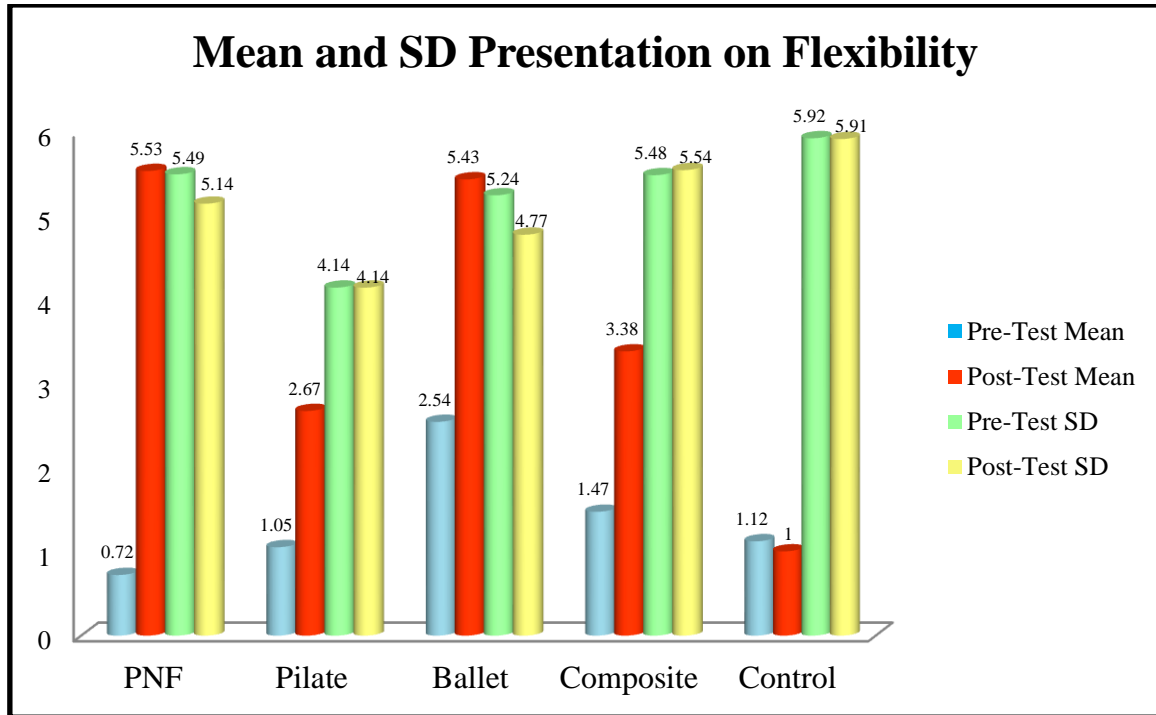


Figure 4.2

Table 4.2.2

Analysis of Co-Variance for the Post-test Data on Flexibility Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	df	Mean Square	F	(P-Value) Sig.
Within Subjects	641.86	4	160.46	177.25	.001
Between Subjects	130.36	144	.90		

Table 4.2.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Flexibility variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 2 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Flexibility variable of Physical Fitness on post-test scores of school students” has been accepted. Yıldırım et al. (2016), Asuman et al. (2015), Balamurugan & Kannadasan (2013), Zarghami et al. (2012), Rubini et al. (2011), Daneshmandi et al. (2011), Nagarwal et al. (2010), Kofotolis & Kellis (2006), Mayer et al.

(2005), Ferber et al. (2002), Feland et al. (2001), Lucas & Koslow (1984), Tolnai, et. al. (2016), Kiber et al. (2016), Arslanoglu et al. (2013), Mikalacki et al. (2013), Hassan & Amin (2011), Irez et al. (2011), Ali et al. (2010), Keogh et al. (2009) and Long et al. (2004) recommended that PNF, Pilate and Ballet training significantly improve Flexibility.

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five treatments (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Flexibility of school students, which is shown in Table 4.2.3.

Table 4.2.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Flexibility Variable of Physical Fitness of School Students

Pair wise Comparisons: Flexibility			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
PNF	Pilate	4.56 [*]	.000
	Ballet	3.22 [*]	.000
	Composite	4.24 [*]	.000
	Control	6.29 [*]	.000
Pilate	Ballet	1.33 [*]	.000
	Composite	.31	1.000
	Control	1.72 [*]	.000
Ballet	Composite	1.02 [*]	.001
	Control	3.06 [*]	.000
Composite	Control	2.04 [*]	.000

* Indicates the significant difference

Table 4.2.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Flexibility variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Pilate is .000, PNF and Ballet is .000, PNF and Composite is .000, PNF and Control is .000, Pilate and Ballet is .000, Pilate and Control is .000, Ballet and Composite is .001, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Pilate

Training, PNF and Ballet Training, PNF and Composite Training, PNF and Control Training, Pilate and Ballet Training, Pilate and Control Training, Ballet and Composite Training, Ballet and Control Training, Composite and Control Training.

Comparison of Groups with Insignificant Difference: The p-value for the mean difference between training groups Pilate and Composite is 1.00. Since p-value is greater than .05, the mean difference is insignificant at 5% level. Thus the following conclusion can be drawn:

There is insignificant difference found between the adjusted means of Pilate and Composite.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Flexibility variable of Physical Fitness Adjusted Mean is presented in Table 4.2.4.

Table 4.2.4

Adjusted Mean on Flexibility Variable of Physical Fitness among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of School Students

Measure : Flexibility	
Treatments	Adjusted Mean
PNF	7.27
Pilate	2.70
Ballet	4.04
Composite	3.02
Control	.97

Table 4.2.4 evidently point out the values of Pre-Test, Post-Test and Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Flexibility variable of Physical Fitness on school students. The observed **Adjusted Mean** values are: PNF 7.27, Pilate 2.70, Ballet 4.04, Composite 3.02 and Control .97, were respectively.

Thus it may be concluded that Flexibility of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Flexibility among the subjects in comparison to that of the control group and PNF training was found the most effective training on Flexibility.

4.3 Results and Interpretations Pertaining to Abdominal Strength:

Table 4.3.1

Descriptive Analysis on Abdominal Strength Variable of Physical Fitness of School Students

Measure : Abdominal Strength				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	5.46	3.12
	Pilate	30	5.56	2.82
	Ballet	30	5.66	3.50
	Composite	30	5.50	2.62
	Control	30	6.16	3.56
Post-Test	PNF	30	8.83	2.76
	Pilate	30	11.00	2.86
	Ballet	30	7.93	3.87
	Composite	30	8.86	2.78
	Control	30	5.66	3.55

Table 4.3.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Abdominal Strength variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF 5.46, Pilate 5.56, Ballet 5.66, Composite 5.50 and Control 6.16. **Pre-Test SD:** PNF 3.12, Pilate 2.82, Ballet 3.50, Composite 2.62 and Control 3.56. **Post-Test Mean:** PNF 8.83, Pilate 11.00, Ballet 7.93, Composite 8.86 and Control 5.66. **Post-Test SD:** PNF 2.76, Pilate 2.86, Ballet 3.87, Composite 2.78 and Control 3.55, were respectively.

Figure 4.3

Graphical Presentation of Mean in Pre-Test, Post-Test and Adjusted Mean among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Abdominal Strength Variable of Physical Fitness of School Students

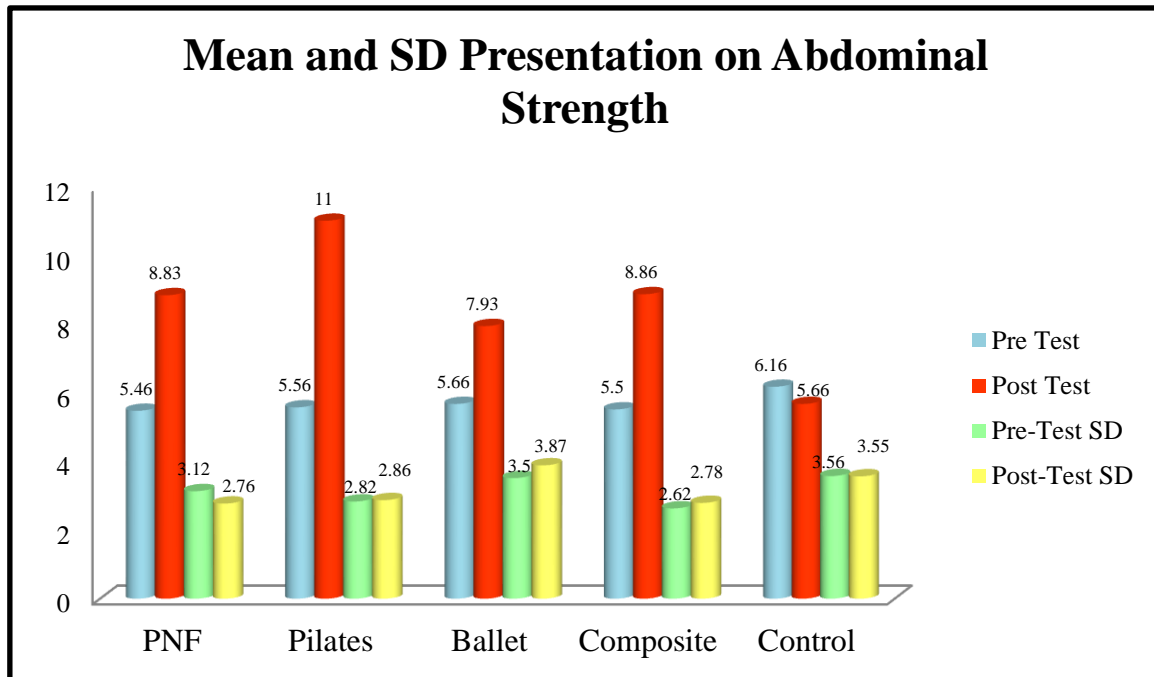


Figure 4.3

Table 4.3.2

Analysis of Co-Variance for the Post-test Data on Abdominal Strength Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	555.87	4	138.96	147.87	.001
Between Subjects	135.33	144	.94		

Table 4.3.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Abdominal Strength variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 3 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Abdominal Strength variable of Physical Fitness on post-test scores of school students” has been accepted. Asuman et al. (2015), Cesario et al. (2014), Rashad & El-Agamy (2010), Moreira et al. (2009), Tolnai, et.

al. (2016), Kiber et al. (2016), Oliveira et al. (2016), Parekh et al. (2014), Yooa et al. (2013), Arslanoglu et al. (2013), Amorim et al. (2011), Hassan & Amin (2011), Irez et al. (2011), El-Sayed et al. (2010), Ali et al. (2010), Keogh et al. (2009), Redding et al. (2009), Long et al. (2004) and Livanelioglu et al. (1998) recommended that PNF, Pilate and Ballet training have beneficial effect on Abdominal Strength.

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five treatments (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Abdominal Strength of school students which is shown in Table 4.3.3.

Table 4.3.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Abdominal Strength Variable of Physical Fitness of School Students

Pair wise Comparisons: Abdominal Strength			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
PNF	Pilate	2.07 [*]	.000
	Ballet	1.09 [*]	.000
	Composite	.00	1.000
	Control	3.84 [*]	.000
Pilate	Ballet	3.16 [*]	.000
	Composite	2.06 [*]	.000
	Control	5.91 [*]	.000
Ballet	Composite	1.09 [*]	.000
	Control	2.75 [*]	.000
Composite	Control	3.84 [*]	.000

* Indicates the significant difference

Table 4.3.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Abdominal Strength Variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Pilate is .000, PNF and Ballet is .000, PNF and Control is .000, Pilate and Ballet is .000, Pilate and Composite is .000, Pilate and Control is .000, Ballet and Composite is .000, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the

following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Pilate, PNF and Ballet, PNF and Control, Pilate and Ballet, Pilate and Composite, Pilate and Control, Ballet and Composite, Ballet and Control, Composite and Control.

Comparison of Groups with Insignificant Difference: The p-value for the mean difference between training groups PNF and Composite is 1.00. Since p-value is greater than .05, the mean difference is insignificant at 5% level. Thus the following conclusion can be drawn:

There is insignificant difference found between the adjusted means of PNF and Composite.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Abdominal Strength variable of Physical Fitness Adjusted Mean is presented in Table 4.3.4.

Table 4.3.4

Adjusted Mean on Abdominal Strength Variable of Physical Fitness among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of School Students

Measure : Abdominal Strength	
Treatments	Adjusted Mean
PNF	9.03
Pilate	11.10
Ballet	7.94
Composite	9.03
Control	5.18

Table 4.3.4 evidently point out the values of Pre-Test, Post-Test and Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Abdominal Strength variable of Physical Fitness on school students. The observed **Adjusted Mean** values are: PNF 9.03, Pilate 11.10, Ballet 7.94, Composite 9.03 and Control 5.18, were respectively.

Thus it may be concluded that Abdominal Strength of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Abdominal Strength among the subjects in comparison to that of the control group and Pilate training was found the most effective training on Abdominal Strength.

4.4 Results and Interpretations Pertaining to Speed:

Table 4.4.1

Descriptive Analysis on Speed Variable of Physical Fitness of School Students

Measure : Speed				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	13.96	1.70
	Pilate	30	14.30	1.65
	Ballet	30	13.93	1.80
	Composite	30	14.46	1.47
	Control	30	13.90	1.51
Post-Test	PNF	30	13.95	1.62
	Pilate	30	12.55	1.54
	Ballet	30	12.76	1.58
	Composite	30	13.56	1.53
	Control	30	14.69	1.45

Table 4.4.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Speed variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF 13.96, Pilate 14.30, Ballet 13.93, Composite 14.46 and Control 13.90. **Pre-Test SD:** PNF 1.70, Pilate 1.65, Ballet 1.80, Composite 1.47 and Control 1.51. **Post-Test Mean:** PNF 13.95, Pilate 12.55, Ballet 12.76, Composite 13.56 and Control 14.69. **Post-Test SD:** PNF 1.62, Pilate 1.54, Ballet 1.58, Composite 1.53 and Control 1.45, were respectively.

Figure 4.4

Graphical Presentation of Mean in Pre-Test and Post-Test among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Speed Variable of Physical Fitness of School Students

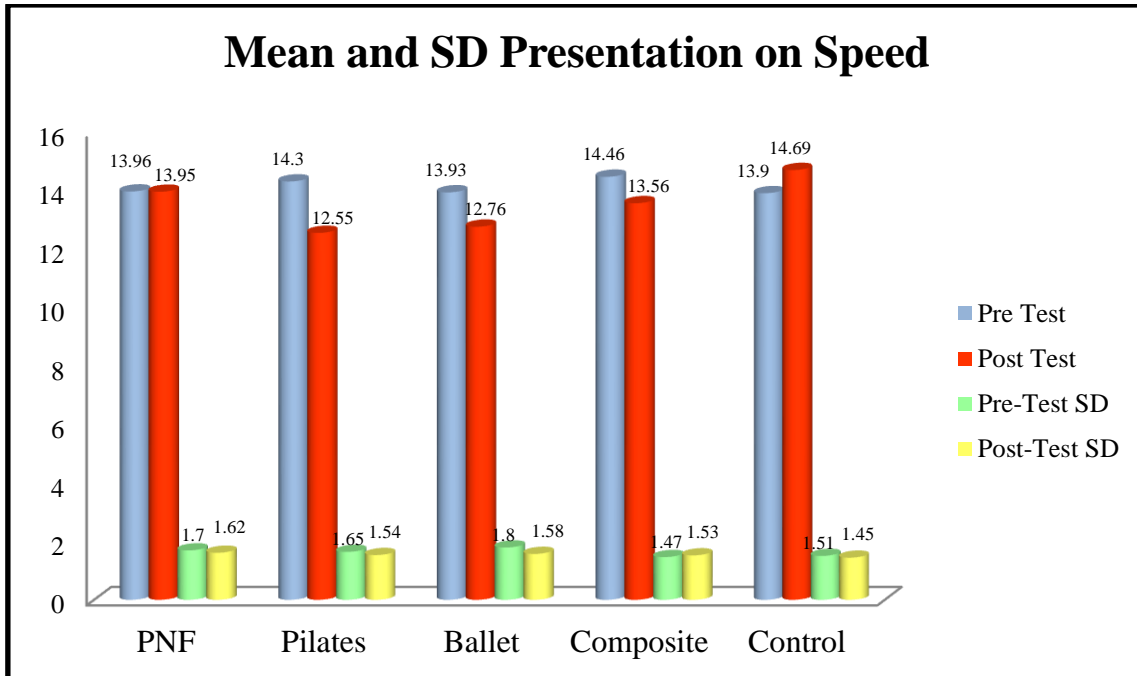


Figure 4.4

Table 4.4.2

Analysis of Co-Variance for the Post-test Data on Speed Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	116.39	4	29.09	206.15	.001
Between Subjects	20.32	144	.14		

Table 4.4.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Speed variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 4 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Speed variable of Physical Fitness on post-test scores of school students” has been accepted. Hojatallah et al. (2012) studied that PNF training improve the explosive power (Speed).

As the F-statistic is significant, post hoc comparison has been made for the adjusted

means of the five treatments (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Speed of school students, which is shown in Table 4.4.3.

Table 4.4.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Speed Variable of Physical Fitness of School Students

Pair wise Comparisons: Speed			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
PNF	Pilate	1.71 [*]	.000
	Ballet	1.15 [*]	.000
	Composite	.84 [*]	.000
	Control	.79 [*]	.000
Pilate	Ballet	.55 [*]	.000
	Composite	.87 [*]	.000
	Control	2.50 [*]	.000
Ballet	Composite	.31 [*]	.001
	Control	1.95 [*]	.000
Composite	Control	1.63 [*]	.000

* Indicates the significant difference

Table 4.4.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Speed Variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Pilate is .000, PNF and Ballet is .000, PNF and Composite is .001, PNF and Control is .000, Pilate and Ballet is .000, Pilate and Composite is .000, Pilate and Control is .000, Ballet and Composite is .001, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Pilate, PNF and Ballet, PNF and Composite, PNF and Control, Pilate and Ballet, Pilate and Composite, Pilate and Control, Ballet and Composite, Ballet and Control, Composite and Control.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Speed variable of

Physical Fitness Adjusted Mean is presented in Table 4.4.4.

Table 4.4.4

**Adjusted Mean on Speed Variable of Physical Fitness among Five Treatments
(Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of
School Students**

Measure : Speed	
Treatments	Adjusted Mean
PNF	14.08
Pilate	12.37
Ballet	12.93
Composite	13.24
Control	14.88

Table 4.4.4 evidently point out the values of Pre-Test, Post-Test and Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Speed variable of Physical Fitness on school students. The observed **Adjusted Mean** values are: PNF 14.08, Pilate 12.37, Ballet 12.93, Composite 13.24 and Control 14.88, were respectively.

Thus it may be concluded that Speed of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Speed among the subjects in comparison to that of the control group Pilate training was found the most effective training on Speed.

4.5 Results and Interpretations Pertaining to Agility:

Table 4.5.1

Descriptive Analysis on Agility Variable of Physical Fitness of School Students

Measure : Agility				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	12.78	1.45
	Pilate	30	12.99	1.37
	Ballet	30	12.66	1.62
	Composite	30	12.74	1.40
	Control	30	12.41	1.59
Post-Test	PNF	30	11.86	1.43
	Pilate	30	11.83	1.27
	Ballet	30	11.52	1.45
	Composite	30	11.83	1.27
	Control	30	13.27	1.63

Table 4.5.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Agility variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF 12.78, Pilate 12.99, Ballet 12.66, Composite 12.74, and Control 12.41. **Pre-Test SD:** PNF 1.45, Pilate 1.37, Ballet 1.62, Composite 1.40 and Control 1.59. **Post-Test Mean:** PNF 11.86, Pilate 11.83, Ballet 11.52, Composite 11.83, Control 13.27. **Post-Test SD:** PNF 1.43, Pilate 1.27, Ballet 1.45, Composite 1.27 and Control 1.63, were respectively.

Figure 4.5

Graphical Presentation of Mean in Pre-Test and Post-Test among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Agility Variable of Physical Fitness of School Students

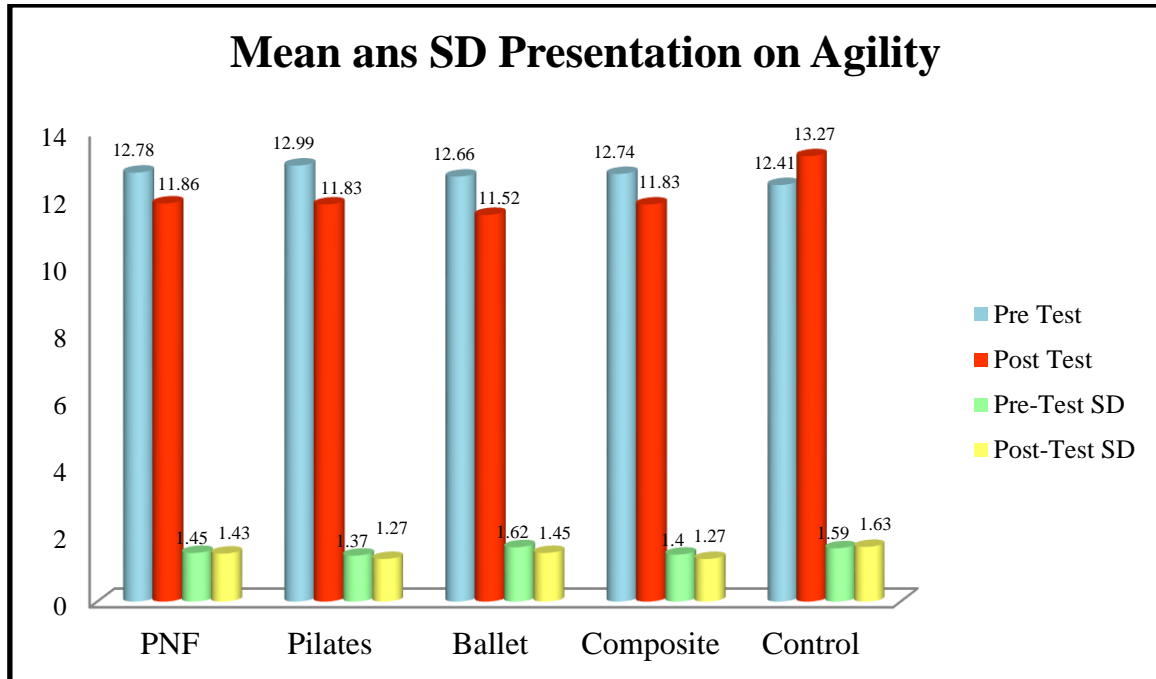


Figure 4.5

Table 4.5.2

Analysis of Co-Variance for the Post-test Data on Agility Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	82.44	4	20.61	93.71	.001
Between Subjects	31.67	144	.22		

Table 4.5.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Agility variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 5 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Agility variable of Physical Fitness on post-test scores of school students” has been accepted. Balamurugan & Kannadasan (2013), Parekh et al. (2014), Irez et al. (2011), Keogh et al. (2009) considered that PNF, Pilate and ballet training improve the Agility (Reaction Time).

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five treatments (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Agility of school students, which is shown in Table 4.5.3.

Table 4.5.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Agility Variable of Physical Fitness of School Students

Measure: Agility			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	(p-value) Sig.
PNF	Pilate	.21	.083
	Ballet	.22	.061
	Composite	.01	.918
	Control	1.73*	.000
Pilate	Ballet	.01	.888
	Composite	.22	.066
	Control	1.95*	.000
Ballet	Composite	.24*	.048
	Control	1.96*	.000
Composite	Control	1.72*	.000

* Indicates the significant difference

Table 4.5.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Agility Variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Control is .000, Pilate and Control is .000, Ballet and Composite is .048, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Control, Pilate and Control, Ballet and Composite, Ballet and Control, Composite and Control.

Comparison of Groups with Insignificant Difference: The p-value for the mean difference between training groups PNF and Pilate is .083, PNF and Ballet is .061, PNF and Composite is .918, Pilate and Ballet is .888, Pilate and Composite is .066. Since p-value is greater than .05, all these mean differences are insignificant at 5% level. Thus the following conclusion

can be drawn:

There is insignificant difference found between the adjusted means of PNF and Pilate, PNF and Ballet, PNF and Composite, Pilate and Ballet, Pilate and Composite.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Agility variable of Physical Fitness Adjusted Mean is presented in Table 4.5.4.

Table 4.5.4
Adjusted Mean on Agility Variable of Physical Fitness among Five Treatments
(Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of
School Students

Measure : Agility	
Treatments	Adjusted Mean
PNF	11.80
Pilate	11.59
Ballet	11.57
Composite	11.81
Control	13.54

Table 4.5.4 evidently point out the values of Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Agility variable of Physical Fitness on school students. The observed **Adjusted Mean** values are: PNF 11.80, Pilate 11.59, Ballet 11.57, Composite 11.81 and Control 13.54 were respectively.

Thus it may be concluded that Agility of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Agility among the subjects in comparison to that of the control group Ballet training was found the most effective training on Agility.

4.6 Results and Interpretations Pertaining to Static Balance:

Table 4.6.1

Descriptive Analysis on Static Balance Variable of Physical Fitness of School Students

Measure : Static Balance				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	3.40	1.96
	Pilate	30	3.54	1.91
	Ballet	30	3.97	2.15
	Composite	30	3.53	2.11
	Control	30	4.32	2.40
Post-Test	PNF	30	6.78	2.68
	Pilate	30	7.98	2.44
	Ballet	30	9.57	2.26
	Composite	30	7.56	2.29
	Control	30	4.76	2.62

Table 4.6.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Static Balance variable of Physical Fitness on school students. The observed mean and SD values are **Pre-Test Mean:** PNF 3.40, Pilate 3.54, Ballet 3.97, Composite 3.53 and Control 4.32. **Pre-Test SD:** PNF 1.96, Pilate 1.91, Ballet 2.15, Composite 2.11 and Control 2.40. **Post-Test Mean:** PNF 6.78, Pilate 7.98, Ballet 9.57, Composite 7.56 and Control 4.76. **Post-Test SD:** PNF 2.68, Pilate 2.44, Ballet 2.26, Composite 2.29 and Control 2.62, were respectively.

Figure 4.6

Graphical Presentation of Mean in Pre-Test and Post-Test among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Static Balance Variable of Physical Fitness of School Students

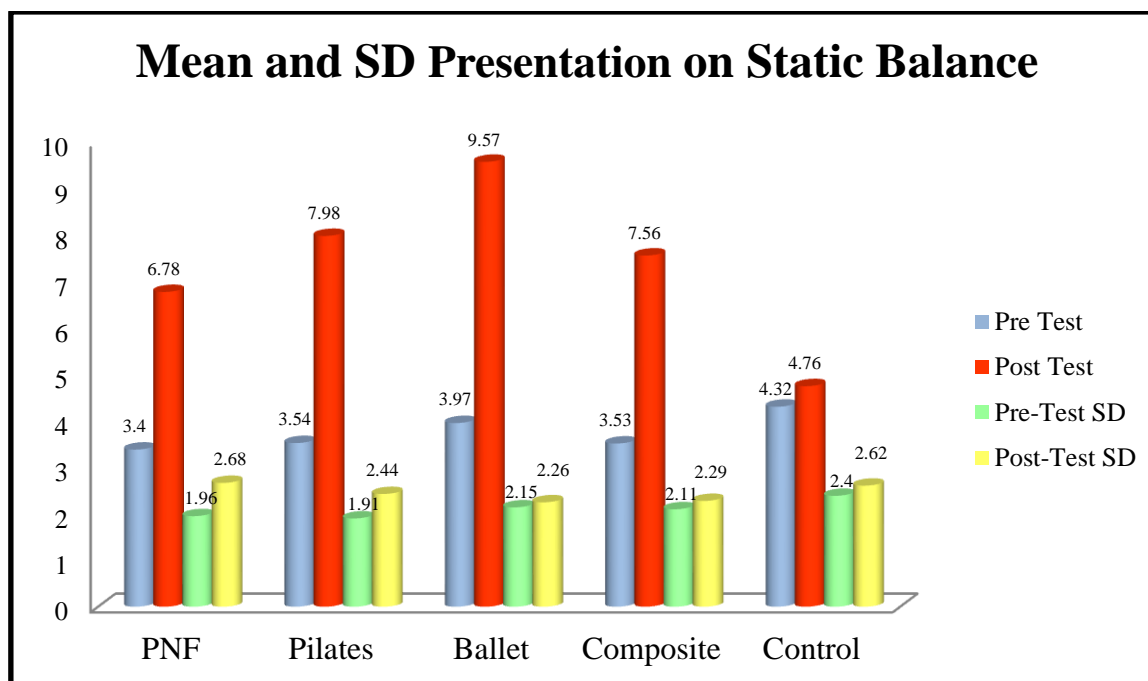


Figure 4.6

Table No 4.6.2

Analysis of Co-Variance for the Post-test Data on Static Balance Variable of Physical Fitness of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	441.35	4	110.33	56.84	.001
Between Subjects	279.52	144	1.94		

Table 4.6.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Static Balance variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 6 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Static Balance variable of Physical Fitness on post-test scores of school students” has been accepted. Pereira & Goncalves (2012), Hwangbo, N.P., & Kim, D.K. (2016), Young et al. (2015), Tolnai, et. al. (2016), Kiber et al. (2016), Barker et al. (2015), Hyun et al. (2014), Irez et al. (2011), Notarnicola et.

al. (2014), Houston & McGill (2013) and Keogh et al. (2009) considered that PNF, Pilate and ballet training improves the balance (Static and Dynamic).

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five treatments (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Static Balance of school students, which is shown in Table 4.6.3.

Table 4.6.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Static Balance Variable of Physical Fitness of School Students

Pair wise Comparisons: Static Balance			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	(p-value) Sig.
PNF	Pilate	1.06*	.004
	Ballet	2.24*	.000
	Composite	.65	.071
	Control	2.90*	.000
Pilate	Ballet	1.17*	.001
	Composite	.40	.260
	Control	3.97*	.000
Ballet	Composite	1.58*	.000
	Control	5.14*	.000
Composite	Control	3.56*	.000

* Indicates the significant difference

Table 4.6.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Static Balance Variable of Physical Fitness on school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Pilate is .004, PNF and Ballet is .000, PNF and Control is .000, Pilate and Ballet is .001, Pilate and Control is .000, Ballet and Composite is .000, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means of PNF and Pilate, PNF and Ballet, PNF and Control, Pilate and Ballet, Pilate and Control, Ballet and Composite, Ballet and Control, Composite and Control.

Comparison of Groups with Insignificant Difference: The p-value for the mean difference

between training groups PNF and Composite is .071, Pilate and Composite is .260. Since p-value is greater than .05, all these mean differences are insignificant at 5% level. Thus the following conclusion can be drawn:

There is insignificant difference found between the adjusted means of PNF and Composite, Pilate and Ballet, Pilate and Composite, Ballet and Composite.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Static Balance variable of Physical Fitness Adjusted Mean is presented in Table 4.6.4.

Table 4.6.4
Adjusted Mean on Static Balance Variable of Physical Fitness among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of School Students

Measure : Static Balance	
Treatments	Adjusted Mean
PNF	7.12
Pilate	8.18
Ballet	9.36
Composite	7.77
Control	4.21

Table 4.6.4 evidently point out the values of Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Static Balance variable of Physical Fitness on school students. The observed mean values are **Adjusted Mean** values are: PNF 7.12, Pilate 8.18, Ballet 9.36, Composite 7.77 and Control 4.21 were respectively.

Thus it may be concluded that Static Balance of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Static Balance among the subjects in comparison to that of the control group Ballet training was found the most effective training on Static Balance.

SECTION TWO: RESULTS AND INTERPRETATIONS PERTAINING TO OPTIMUM HEALTH

4.7 Results and interpretations pertaining to optimum health.

Table 4.7.1

Descriptive Analysis on Optimum Health of School Students

Measure : Optimum Health				
Testing	Treatment	N	Mean	SD
Pre-Test	PNF	30	170.56	10.64
	Pilate	30	170.43	11.33
	Ballet	30	172.76	10.01
	Composite	30	172.90	11.96
	Control	30	171.90	10.76
Post-Test	PNF	30	187.33	8.64
	Pilate	30	188.90	8.06
	Ballet	30	187.66	7.36
	Composite	30	185.36	9.13
	Control	30	169.93	12.19

Table 4.7.1 evidently point out the values of Mean and SD on Pre-Test and Post-Test scores for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Optimum Health of school students. The observed mean and SD values are **Pre-Test Mean:** PNF 170.56, Pilate 170.43, Ballet 172.76, Composite 172.90, and Control 171.90. **Pre-Test SD:** PNF 10.64, Pilate 11.33, Ballet 10.01, Composite 11.96 and Control 10.76. **Post-Test Mean:** PNF 187.33, Pilate 188.90, Ballet 187.66, Composite 185.36 and Control 169.93. **Post-Test SD:** PNF 8.64, Pilate 8.06, Ballet 7.36, Composite 9.13 and Control 12.19, were respectively.

Figure 4.7

Graphical Presentation of Mean in Pre-Test and Post-Test among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Optimum Health of School Students

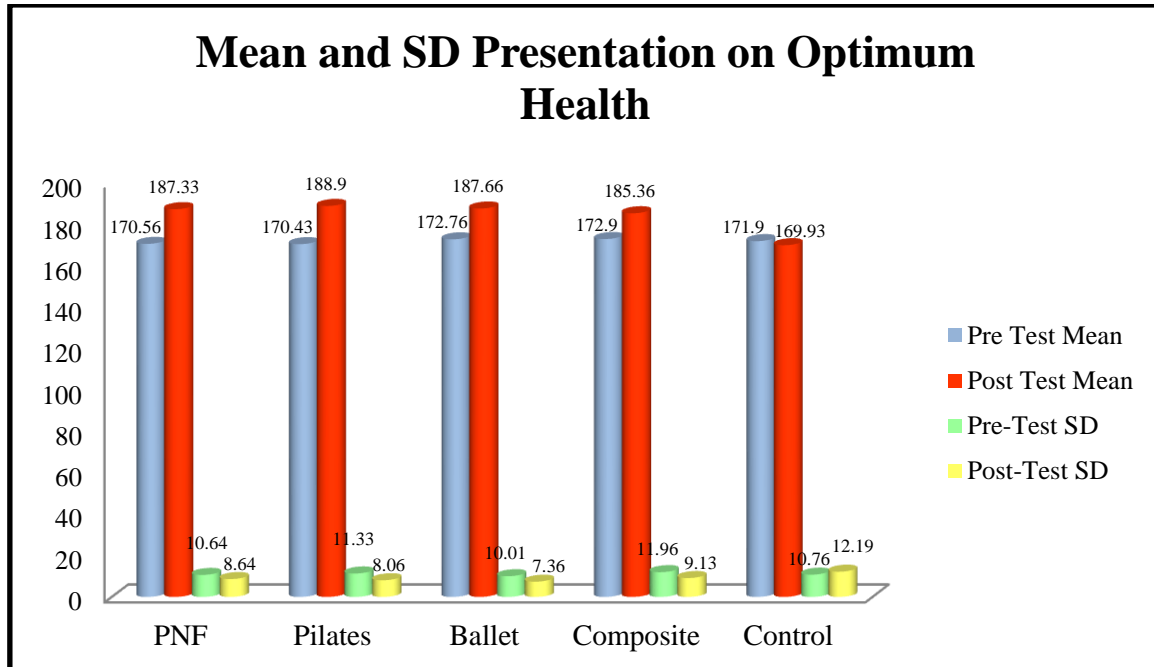


Figure 4.7

Table 4.7.2

Analysis of Co-Variance for the Post-test Data on Optimum Health Variable of School Students

Source of Variation	Sum of Squares	Df	Mean Square	F	(P-Value) Sig.
Within Subjects	7756.93	4	1939.233	45.22	.001
Between Subjects	6174.13	144	42.876		

Table 4.7.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Optimum Health of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 7 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Optimum Health on post-test scores of school students” has been accepted. Literature supported that exercises improves the optimum health of an individual, Ferreira et al. (2011) pilate training improve health status, and regular exercises

improves the physical and mental health, Roh (2016), Viera et al. (2013), Caldwell et al. (2009), Beebe et al. (2005) & Ray et al. (2001).

As the F-statistic is significant, post hoc comparison has been made for the adjusted means of the five training groups (PNF, Pilates, Ballet, Composite and Control) respectively during post testing on Optimum Health of school students, which is shown in Table 4.7.3.

Table 4.7.3

Post hoc Comparison for the Group Means in Post Measurement Adjusted with the Initial Difference on Optimum Health of School Students

Pair wise Comparisons: Optimum Health			
(I) Treatment	(J) Treatment	Mean Difference (I-J)	(P-value) Sig.
PNF	Pilate	1.64	.332
	Ballet	.97	.565
	Composite	3.35*	.050
	Control	18.19*	.000
Pilate	Ballet	2.62	.124
	Composite	5.00*	.004
	Control	19.84*	.000
Ballet	Composite	2.37	.161
	Control	17.21*	.000
Composite	Control	14.83*	.000

* Indicates the significant difference

Table 4.7.3 disclosed the Sig. value for the mean difference between all five treatments (PNF, Pilate, Ballet, Composite, Control) on Optimum Health of school students:

Comparison of Groups with Significant Difference: The p-value for the mean difference between training groups PNF and Composite is .050, PNF and Control is .000, Pilate and Composite is .004, Pilate and Control is .000, Ballet and Control is .000, Composite and Control is .000. Since p-value is less than .05, all these mean differences are significant at 5% level. Thus the following conclusion can be drawn:

There is significant difference found between the adjusted means PNF and Composite, PNF and Control, Pilate and Composite, Pilate and Control, Ballet and Control, Composite and Control Training.

Comparison of Groups with Insignificant Difference: The p-value for the mean difference between training groups PNF and Pilate is .332, PNF and Ballet is .565, Pilate and Ballet is

.124, Ballet and Composite is .161. Since p-value is greater than .05, all these mean differences are insignificant at 5% level. Thus the following conclusion can be drawn:

There is insignificant difference found between the adjusted means of PNF and Pilate, PNF and Ballet, Pilate and Ballet, Ballet and Composite.

To find out best treatment among all the five treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) on Optimum Health among boys and girls Adjusted Mean is presented in Table 4.7.4.

Table 4.7.4

Adjusted Mean on Optimum Health among Five Treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet Composite and Control) of School Students

Measure : Optimum Health	
Treatments	Adjusted Mean
PNF	188.01
Pilate	189.66
Ballet	187.03
Composite	184.66
Control	169.82

Table 4.7.4 evidently point out the values of Adjusted Mean for all the five treatments (PNF, Pilate, Ballet, Composite and Control) on Optimum Health of school students. The observed **Adjusted Mean** values are: PNF 188.01, Pilate 189.66, Ballet 187.03, Composite 184.66 and Control 169.82, were respectively.

Thus it may be concluded that Optimum Health of the PNF, Pilate, Ballet and Composite group is significantly greater than that of the control group. Hence it may be inferred that all the groups were equally effective in improving Optimum Health among the subjects in comparison to that of the control group Pilate training was found the most effective training on Optimum Health.

4.8 CHAPTER SUMMARY

To measure the effect of three different treatments (PNF, Pilate and Ballet) on physical fitness and optimum health along with composite and control group this chapter has revealed the analysis of raw data on physical fitness and optimum health and showed the result with interpretation to achieve the objectives of the study. It was found that 40 minutes PNF, Pilate and Ballet training, 4 days in a week could improve the Physical Fitness level and

Optimum Health status of school students with the age of 11 to 14 years old. The statistical technique ANCOVA along with descriptive analysis, showed the significant difference in post-test scores on Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance variables of Physical Fitness and Optimum Health of School Students taking different type of treatments when compared to control group as given below:

Table 4.1.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Arms Strength variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no.1 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Arms Strength variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.1.4 shows the observed **Adjusted Mean** values are: PNF 5.09, Pilate 5.24, Ballet 4.25, Composite 4.59 and Control 2.41, were respectively, which shows all the groups were equally effective in improving Arms Strength among the subjects in comparison to that of the control group and Pilate training had found to be most effective on improving Arms Strength of school students.

Table 4.2.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Flexibility variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 2 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Flexibility variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.2.4 shows the observed **Adjusted Mean** values are: PNF 7.27, Pilate 2.70, Ballet 4.04, Composite 3.02 and Control .97, were respectively, which shows all the groups were equally effective in improving Flexibility among the subjects in comparison to that of the control group and PNF training had found to be most effective on improving Flexibility of school students.

Table 4.3.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Abdominal Strength variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 5 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Abdominal Strength variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.3.4

shows the observed **Adjusted Mean** values are: PNF 9.03, Pilate 11.10, Ballet 7.94, Composite 9.03 and Control 5.18, were respectively, which shows all the groups were equally effective in improving Abdominal Strength among the subjects in comparison to that of the control group and Pilate training had found to be most effective on improving Abdominal Strength of school students.

Table 4.4.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Speed variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 4 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Speed variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.4.4 shows the observed **Adjusted Mean** values are: PNF 13.65, Pilate 12.38, Ballet 12.92, Composite 13.26 and Control 14.87, were respectively, which shows all the groups were equally effective in improving Arms Strength among the subjects in comparison to that of the control group and Pilate training had found to be most effective on improving Speed of school students.

Table 4.5.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Agility variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 5 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Agility variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.5.4 shows the observed **Adjusted Mean** values are: PNF 11.80, Pilate 11.59, Ballet 11.57, Composite 11.81 and Control 13.54.were respectively, which shows all the groups were equally effective in improving Agility among the subjects in comparison to that of the control group and Ballet training had found to be most effective on improving Agility of school students.

Table 4.6.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Static Balance variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 6 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Static Balance variable of Physical Fitness on post-test scores of school students” has been accepted and table 4.6.4 shows the

observed **Adjusted Mean** values are: PNF 7.12, Pilate 8.18, Ballet 9.36, Composite 7.77 and Control 4.21 were respectively, which shows all the groups were equally effective in improving Static Balance among the subjects in comparison to that of the control group and Ballet training had found to be most effective on improving Static Balance of school students.

Table 4.7.2 shows the F-value for comparing the adjusted means in five treatments (PNF, Pilate, Ballet, Composite and Control) during post testing on Optimum Health of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 7 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Optimum Health on post-test scores of school students” has been accepted and table 4.7.4 shows the observed **Adjusted Mean** values are: PNF 188.01, Pilate 189.66, Ballet 187.03, Composite 184.66 and Control 169.82, were respectively, which shows all the groups were equally effective in improving Optimum Health among the subjects in comparison to that of the control group and Pilate training had found to be most effective on improving Optimum Health of school students.

CHAPTER-5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Physical Fitness and Optimum Health is the key of healthy life. There are so many factors which influence the Physical Fitness level and Optimum Health status of an individual and daily exercise is the major factor which showed positive improvements. Regular physical activity improves the physical fitness level and health status beside prevention of several chronic diseases e.g. cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis and premature death (Warburton, et.al. 2006).

The study was comprised with three exercises training programs to access the effect of PNF, pilate and ballet exercises on physical fitness and optimum health of school students of Amritsar district with age group up to 11 to 14 years old girls and boys along with composite training program and control group. Total one hundred and fifty school students were selected through the purposive random sampling technique from Prabhakar Senior Secondary School, DAV Public School and Bhavan's SL Public School as the sample of this present study divided into five groups: Group 1: PNF (PNF training program), Group 2: Pilates (Pilates exercise training program), Group 3: Ballet (Ballet exercise training program), Group 4: Composite Group (Combination of three exercise training programs) and 5: Control Group. In each group there were 30 subjects (15 girls and 15 boys).

The PNF exercises have been taken from "PNF in Practice: an Illustrated Guide" by Susan S. Adler, Dominiek Beckers and Math Buck, fourth edition, in the year 2014. The Pilates exercises have been taken from "Pilates Illustrated" by Portia Page in the year 2011. The ballet exercises have been taken from "How to Ballet: A step by step guide to the secrets of Ballet" by Jane Hackett, in the year 2011. Some modifications have been made in exercises to keep in mind the level of school girl and boys and the level of difficulty has been reduced. Before begin the training of six months pre-test was taken by the researcher with Johnson and Nelson Physical Fitness Test battery (1988) standardized for 11 to 14 years old school students. Chin-ups for boys to measure Arm Strength (1966), Modified pushups for girl to measure Arms strength (1977), Sit and reach test to measure Flexibility (1977), Bent Knee Sit-ups to measure Abdominal Endurance and strength (1976), fifty meter Dash to measure Speed (1972), Shuttle Run to measure Agility (1966), Stork Stand Balance Test to

measure Static Balance (1976), Optimum Health Scale Self-made standardized questionnaire published in National psychological Cooperation of Agra on 4 May 2016.

Each group were performed their specified exercise program for six months. The training session was lasted for 40 minutes in a day and four days in a week as per the time table provided by the school. On the basis of three different training programs along with composite and control group, researcher has observed the effect of different type of trainings (PNF, Pilate, Ballet, Composite training) on Physical Fitness (Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance) and Optimum Health status. The three training programs of this study were comprised with three modes of exercises. The training program was based upon simple to complex format. After Taking the Pre Test training program was started from the easy mode of exercises as beginner for 60 days. After the adaptation of the easy mode of exercises the intermediate mode of exercises was continued for 60 days and after the adaption of the intermediate mode of exercises the training program was included severe mode of exercises as advanced for 60 days and post test was conducted after six months by the researcher. Each training program session was lasted for 40 minutes, in which 10 minutes for warming up and 25 minutes for specific training program and 5 minute for cooling down.

The pre-test and post-test of Physical Fitness and Optimum Health were recorded before and after six months training program and compared with each other by applying the Descriptive Analysis and ANCOVA with Post Hoc test to see the difference on post-test scores on all the five experimental groups on physical fitness and optimum health. The discussions of result are as follows on each variable of physical fitness along with optimum health:

In table 4.1.2 shows the F-value of school students is 38.03 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Arms Strength variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no.1 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Arms Strength variable of Physical Fitness on post-test scores of school students” has been accepted. Literature supported that all the three training programs PNF, Pilate and Ballet training have significant improvements on muscular Arms Strength. Asuman et al. (2015), Cesario et al. (2014), Rashad & El-Agamy (2010), Moreira et al. (2009), Cesario et al. (2014), Oliveira et al. (2016), Parekh et al. (2014), Yooa et al. (2013), Arslanoglu et al.

(2013), Amorim et al. (2011), Hassan & Amin (2011), Irez et al. (2011), El-Sayed et al. (2010), Ali et al. (2010), Keogh et al. (2009), Long et al. (2004) and Livanelioglu et al. (1998).

Table 4.2.2 shows the F-value of school students is 177.25 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Flexibility of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 2 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Flexibility variable of Physical Fitness on post-test scores of school students” has been accepted. Yıldırım et al. (2016), Asuman et al. (2015), Balamurugan & Kannadasan (2013), Zarghami et al. (2012), Rubini et al. (2011), Daneshmandi et al. (2011), Nagarwal et al. (2010), Kofotolis & Kellis (2006), Mayer et al. (2005), Ferber et al. (2002), Feland et al. (2001), Lucas & Koslow (1984), Tolnai, et. al. (2016), Kiber et al. (2016), Arslanoglu et al. (2013), Mikalacki et al. (2013), Hassan & Amin (2011), Irez et al. (2011), Ali et al. (2010), Keogh et al. (2009) and Long et al. (2004) recommended that PNF, Pilate and Ballet training significantly improve Flexibility.

Table 4.3.2 shows the F-value of school students is 147.87 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Abdominal Strength of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 3 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Abdominal Strength variable of Physical Fitness on post-test scores of school students” has been accepted. Asuman et al. (2015), Cesario et al. (2014), Rashad & El-Agamy (2010), Moreira et al. (2009), Tolnai, et. al. (2016), Kiber et al. (2016), Oliveira et al. (2016), Parekh et al. (2014), Yooa et al. (2013), Arslanoglu et al. (2013), Amorim et al. (2011), Hassan & Amin (2011), Irez et al. (2011), El-Sayed et al. (2010), Ali et al. (2010), Keogh et al. (2009), Redding et al. (2009), Long et al. (2004) and Livanelioglu et al. (1998) recommended that PNF, Pilate and Ballet training have beneficial effect on Abdominal Strength.

Table 4.4.2 shows the F-value of school students is 206.15 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Speed of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 4 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet

and Composite training program) on Speed variable of Physical Fitness on post-test scores of school students” has been accepted. Hojatallah et al. (2012) studied that PNF training improve the explosive power (Speed).

Table 4.5.2 shows the F-value of school students is 93.71 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Agility variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 5 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Agility variable of Physical Fitness on post-test scores of school students” has been accepted. Balamurugan & Kannadasan (2013), Parekh et al. (2014), Irez et al. (2011), Keogh et al. (2009) considered that PNF, Pilate and ballet training improve the Agility (Reaction Time).

Table 4.6.2 shows the F-value of school students is 56.84 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Static Balance variable of Physical Fitness on school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 6 “There exists significant effect of different type of treatments (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Static Balance variable of Physical Fitness on post-test scores of school students” has been accepted. Pereira & Goncalves (2012), Hwangbo, N.P., & Kim, D.K. (2016), Young et al. (2015), Tolnai, et. al. (2016), Kiber et al. (2016), Barker et al. (2015), Hyun et al. (2014), Irez et al. (2011), Notarnicola et. al. (2014), Houston & McGill (2013) and Keogh et al. (2009) considered that PNF, Pilate and ballet training improves the balance (Static and Dynamic).

Table 4.7.2 shows the F-value of school students is 45.22 for the adjusted means of the five training groups (PNF, Pilate, Ballet, Composite and Control) during post testing on Optimum Health of school students. The p-value for the F-Statistic is .001, which is less than 0.05, therefore **significant** difference is found; hence hypothesis no. 7 “There exists significant effect of different type of trainings (Proprioceptive Neuromuscular Facilitation, Pilates, Ballet and Composite training program) on Optimum Health on post-test scores of school students” has been accepted. Literature supported that exercises improves the optimum health of an individual, Ferreira et al. (2011) pilate training improve health status, and regular exercises improves the physical and mental health, Roh (2016), Vieria et al. (2013), Caldwell et al. (2009), Beebe et al. (2005) & Ray et al. (2001).

5.2 CONCLUSION

Within the restriction of the present study, the following conclusions were drawn:

In conclusion the present study discovered that 40 minutes Proprioceptive Neuromuscular Facilitation, Pilate and Ballet training, 4 days in a week can improve the Physical Fitness level and Optimum Health status of healthy school students with the age of 11 to 14 years old.

- It is concluded from the present findings that PNF, Pilate, Ballet and Composite trainings have significant improvements on Physical Fitness (Arms Strength, Flexibility, Abdominal Strength, Speed, Agility and Static Balance) level of school students.
- Significant differences were found on Optimum Health of school students were taking different types of trainings: PNF, Pilate, Ballet and Composite.

5.3 RECOMMENDATION

The topic of the current research is very vast and has wide scope for future research. Thus, in the light of the present findings and conclusion of the study, the following recommendations are made:

1. The findings of the present study may useful for the Physical Education teachers and coaches to prepare the training programs and modifying the existing training programs for the growth and development of the school students.
2. The optimum health questionnaire will help the Physical Education teachers and coaches to assess the health status of the school students (girls and boys) with the age of 11 to 14 years.
3. Physical Fitness variable's data will help the coaches to modify the training schedules as per the need of an individual and helpful for the Physical Education teachers to assess the Physical fitness level of school students.
4. The research may investigate the effect of PNF, Pilate and Ballet training on other physiological and psychological parameters that is not investigated in the present study.
5. It is recommended that only one training program can be used on large sample size for more reliable and valid results.
6. This study was conducted on the 11 to 14 years of age groups of school boys and girls. Same study is suggested to be conducted on the different age groups of both genders.
7. It is recommended that this study can be conducted on special children, obese children and who's suffering from diseases and accidents for their better health.

8. Comparative and survey study can be conducted to see the physical fitness level and optimum health status of the school students and may be with other physical, physiological anthropometrical and psychological variables.
9. The study can be expansion by involving players of different games and different performance levels i.e. State, National and International.

CHAPTER SUMMARY

This chapter presents the Summary, Recommendations and Conclusions of the current study. In summary the researcher has revealed the whole experimental design of the study along with methodology, experimental design of the training sessions and their results on Physical Fitness and Optimum Health of school students specifically. Conclusion gives complete picture of the results, which evidently disclosed that 40 minute training, four days in a week of PNF, Pilate and Ballet exercises along with composite training can improve the Arms Strength, Flexibility, Abdominal Strength, Speed, Agility, Static Balance variables of Physical Fitness and Optimum Health status of healthy school students with the age of 11 to 14 years old. The recommendations are very important segment for the future research, which based upon the present results. In this study it may recommended that the findings of the study may beneficial for the Physical Education Teachers and coaches to reconstruct their training programs and modifying the existing training programs to enhance the Physical Fitness for the better results as the optimum growth and development of the school students and the optimum health questionnaire will help to assess the health status of the school girls and boys with the age of 11 to 14 years. The study also recommended that other variables can also be assess in relation to physiological and psychological parameters with one training program on larger and different sample size.

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APPENDIX-A

Raw Scores of Physical Fitness and Optimum Health of Proprioceptive Neuromuscular Facilitation (PNF) Group (N=30)

S.N	Arms Strength		Flexibility		Abdominal Strength		Speed		Agility		Static Balance		Optimum Health	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	5.00	8.00	-3.50	4.10	2.00	7.00	13.40	13.30	10.90	9.60	1.00	5.20	155.00	168.00
2	1.00	2.00	14.40	16.70	10.00	13.00	12.70	13.00	10.40	10.10	2.40	7.80	158.00	172.00
3	3.00	4.00	.20	5.90	1.00	6.00	15.90	15.60	13.80	11.70	3.80	9.30	164.00	178.00
4	1.00	1.00	3.30	8.60	12.00	15.00	10.90	11.40	10.70	9.80	8.10	13.40	157.00	180.00
5	3.00	5.00	-4.20	3.30	6.00	9.00	12.60	12.80	10.70	9.60	3.20	5.40	167.00	183.00
6	3.00	6.00	6.80	12.10	9.00	12.00	12.90	13.10	12.50	11.70	6.30	8.70	180.00	185.00
7	1.00	3.00	-3.30	4.80	7.00	11.00	12.30	12.40	12.90	10.70	7.20	12.50	173.00	185.00
8	4.00	7.00	-11.50	-3.10	4.00	7.00	12.70	13.00	13.80	12.90	3.90	8.20	175.00	187.00
9	2.00	4.00	2.10	9.60	11.00	14.00	13.70	12.80	12.90	12.20	5.40	7.40	180.00	187.00
10	3.00	4.00	.90	5.70	5.00	8.00	12.90	13.40	10.70	10.10	2.90	5.80	177.00	189.00
11	1.00	2.00	-8.20	.70	.00	4.00	17.90	17.90	15.40	14.90	1.80	5.00	168.00	191.00
12	2.00	4.00	-1.90	8.30	9.00	13.00	12.70	12.40	11.30	10.60	6.70	11.20	181.00	191.00
13	2.00	4.00	1.70	9.90	8.00	10.00	11.90	12.20	11.80	11.10	5.70	8.00	175.00	192.00
14	.00	1.00	1.80	8.10	6.00	9.00	13.10	12.90	14.50	12.90	2.10	10.10	189.00	194.00
15	5.00	8.00	2.30	7.00	2.00	6.00	16.20	15.90	15.10	14.60	1.10	3.40	163.00	204.00
16	1.00	2.00	1.10	7.40	8.00	10.00	14.90	15.00	13.40	12.60	3.40	4.90	149.00	172.00
17	4.00	6.00	-1.40	5.30	2.00	6.00	16.20	16.00	14.80	13.80	1.50	6.80	151.00	174.00
18	4.00	7.00	-3.90	1.50	.00	3.00	17.05	17.10	15.10	13.60	1.20	2.70	166.00	184.00
19	1.00	2.00	4.40	10.20	5.00	8.00	12.80	12.90	11.90	11.20	2.80	6.00	166.00	185.00
20	2.00	5.00	.90	6.00	3.00	7.00	14.60	14.70	13.10	12.10	2.20	5.90	167.00	186.00
21	3.00	6.00	-2.10	2.60	2.00	7.00	16.60	16.50	14.70	14.00	5.10	8.40	152.00	189.00
22	3.00	8.00	2.30	9.80	5.00	9.00	13.80	13.70	11.70	11.10	2.60	4.40	178.00	189.00
23	2.00	5.00	-3.40	2.30	5.00	9.00	13.90	13.70	11.50	11.10	4.40	7.10	177.00	189.00
24	2.00	5.00	-1.90	3.60	4.00	8.00	13.70	13.80	12.10	11.80	2.30	4.10	181.00	189.00
25	.00	1.00	.80	7.00	7.00	10.00	14.60	14.50	12.50	11.90	4.10	7.60	184.00	191.00
26	2.00	5.00	-5.10	1.10	5.00	8.00	15.20	15.20	13.10	12.30	3.30	6.20	181.00	193.00
27	3.00	5.00	1.50	5.30	7.00	9.00	12.90	12.60	12.70	11.30	1.60	4.70	179.00	193.00
28	3.00	6.00	-14.90	-10.80	5.00	8.00	12.60	12.70	12.60	11.10	1.40	2.90	175.00	198.00
29	2.00	6.00	-5.40	1.10	7.00	8.00	12.70	12.60	13.80	12.80	.90	3.80	176.00	199.00
30	2.00	2.00	4.60	12.00	7.00	11.00	15.60	15.50	13.10	12.60	3.60	6.60	173.00	203.00

APPENDIX-B

Raw Scores of Physical Fitness and Optimum Health of Pilate Group (N=30)

S.N	Arms Strength		Flexibility		Abdominal Strength		Speed		Agility		Static Balance		Optimum Health	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	1.00	2.00	-4.70	-3.00	3.00	9.00	13.70	12.30	12.60	11.90	1.70	6.10	181.00	178.00
2	3.00	5.00	1.20	2.70	9.00	15.00	13.40	10.80	12.20	10.90	2.70	8.90	174.00	181.00
3	4.00	7.00	-6.90	-5.90	8.00	14.00	10.90	10.10	10.10	9.40	4.60	9.20	167.00	181.00
4	2.00	3.00	1.20	4.10	1.00	6.00	15.50	13.50	14.30	13.20	3.50	8.60	158.00	182.00
5	3.00	5.00	.70	1.60	7.00	14.00	14.10	12.70	12.40	11.30	3.20	7.90	156.00	184.00
6	4.00	5.00	3.70	6.20	10.00	15.00	13.20	10.40	10.80	10.20	4.10	9.90	167.00	185.00
7	2.00	5.00	.70	2.50	8.00	14.00	14.10	12.10	11.40	10.30	3.70	8.70	171.00	188.00
8	2.00	4.00	-3.20	-1.90	7.00	12.00	15.10	13.10	13.40	12.80	4.20	8.90	176.00	188.00
9	2.00	3.00	6.10	7.50	2.00	9.00	16.70	15.30	14.90	13.60	1.60	6.30	160.00	189.00
10	3.00	5.00	5.60	6.10	7.00	13.00	14.60	12.00	13.80	12.20	1.40	8.20	180.00	191.00
11	2.00	2.00	2.50	4.30	4.00	9.00	16.10	13.80	15.40	13.70	7.70	7.20	178.00	192.00
12	3.00	3.00	3.40	6.40	3.00	9.00	13.60	11.70	11.90	11.10	2.50	8.90	180.00	194.00
13	4.00	7.00	7.80	9.40	11.00	17.00	11.30	10.20	10.70	10.00	5.50	13.10	175.00	199.00
14	3.00	3.00	-4.50	-3.50	7.00	11.00	13.70	12.40	14.10	13.50	3.30	8.90	176.00	199.00
15	2.00	3.00	5.80	6.80	10.00	15.00	12.90	10.70	11.90	10.60	5.10	11.70	157.00	202.00
16	1.00	5.00	3.80	5.40	2.00	8.00	14.60	13.30	13.20	12.60	.10	3.70	158.00	173.00
17	5.00	8.00	-1.20	2.20	6.00	11.00	15.30	13.50	13.40	12.50	3.60	8.00	171.00	177.00
18	4.00	7.00	3.40	4.20	4.00	9.00	16.00	14.20	13.20	12.10	3.00	6.40	147.00	180.00
19	5.00	9.00	-2.00	-.10	7.00	11.00	12.40	11.00	11.50	10.10	1.50	4.60	160.00	184.00
20	3.00	6.00	1.10	2.40	.00	6.00	16.60	14.40	14.40	12.80	2.30	8.30	160.00	184.00
21	3.00	5.00	-10.40	-8.40	2.00	8.00	14.20	12.70	13.70	12.60	1.90	4.60	181.00	184.00
22	4.00	7.00	1.10	4.20	3.00	8.00	17.10	14.90	15.60	14.20	4.30	6.40	171.00	187.00
23	4.00	8.00	6.80	8.10	5.00	9.00	14.30	12.70	12.70	11.90	2.10	5.30	162.00	187.00
24	5.00	9.00	-1.10	-.10	7.00	12.00	14.70	13.00	12.50	11.10	4.40	8.40	160.00	189.00
25	4.00	8.00	2.00	3.40	5.00	9.00	16.20	14.20	14.10	12.20	1.10	4.30	158.00	193.00
26	6.00	10.00	-1.70	-.40	8.00	14.00	12.90	11.20	12.20	10.70	8.90	13.10	184.00	196.00
27	3.00	7.00	4.60	6.20	7.00	12.00	13.30	12.00	13.80	12.10	3.40	6.20	184.00	198.00
28	6.00	9.00	2.10	3.10	5.00	10.00	12.80	11.40	13.10	12.00	4.80	8.40	182.00	198.00
29	3.00	7.00	2.10	3.90	4.00	9.00	17.30	15.80	14.30	13.10	3.90	7.30	191.00	200.00
30	5.00	9.00	1.70	2.70	5.00	12.00	12.40	11.10	12.20	10.40	6.10	11.90	188.00	204.00

APPENDIX-C

Raw Scores of Physical Fitness and Optimum Health of Ballet Group (N=30)

S.N	Arms Strength		Flexibility		Abdominal Strength		Speed		Agility		Static Balance		Optimum Health	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	3.00	6.00	8.30	11.10	12.00	15.00	12.70	11.60	11.20	10.60	2.50	11.10	157.00	175.00
2	.00	1.00	1.80	3.10	2.00	4.00	14.70	13.70	15.10	13.80	2.20	8.40	155.00	178.00
3	5.00	6.00	10.40	12.00	8.00	9.00	13.50	12.20	13.40	12.70	7.70	12.60	151.00	179.00
4	3.00	4.00	9.80	11.30	11.00	14.00	11.30	10.30	10.20	9.70	10.10	16.40	167.00	179.00
5	3.00	4.00	3.70	5.90	10.00	14.00	11.80	10.80	11.20	10.40	3.90	9.20	165.00	182.00
6	2.00	3.00	4.50	6.00	7.00	10.00	13.10	12.20	10.40	10.00	4.20	9.20	173.00	184.00
7	6.00	9.00	.50	3.20	5.00	8.00	15.10	14.00	12.80	12.20	5.90	12.10	176.00	184.00
8	1.00	2.00	3.00	6.30	14.00	17.00	10.10	9.60	9.80	9.30	7.10	12.50	166.00	186.00
9	4.00	5.00	6.20	8.80	5.00	6.00	12.90	11.00	10.70	9.80	4.60	10.10	174.00	187.00
10	3.00	4.00	4.40	6.70	11.00	14.00	13.40	12.00	10.70	10.10	4.30	7.90	177.00	188.00
11	2.00	4.00	-2.10	1.00	1.00	4.00	17.20	15.20	15.10	13.50	2.40	7.50	187.00	191.00
12	.00	1.00	-4.40	-.90	2.00	5.00	14.20	13.30	14.60	13.90	4.90	11.40	180.00	192.00
13	1.00	1.00	1.20	4.10	3.00	5.00	13.00	11.90	11.30	10.70	2.40	9.10	181.00	193.00
14	1.00	2.00	-7.40	-5.10	3.00	4.00	15.20	14.10	13.10	12.60	4.40	11.00	186.00	196.00
15	3.00	4.00	-3.50	-.30	7.00	9.00	12.10	10.80	12.60	11.10	1.30	5.60	188.00	199.00
16	2.00	2.00	7.00	8.80	4.00	7.00	15.00	13.80	13.10	11.90	3.00	9.30	161.00	170.00
17	1.00	2.00	13.70	15.50	6.00	7.00	13.80	12.70	12.30	10.70	1.40	8.80	172.00	181.00
18	1.00	2.00	-3.70	-.70	2.00	4.00	17.80	16.00	15.10	13.10	3.40	8.10	171.00	183.00
19	2.00	2.00	6.90	9.70	8.00	11.00	12.30	11.50	11.10	10.10	1.70	7.40	170.00	185.00
20	5.00	8.00	7.30	9.70	6.00	8.00	16.10	15.00	15.70	15.00	5.90	11.70	167.00	188.00
21	2.00	3.00	10.10	13.70	.00	1.00	18.10	16.00	15.00	13.50	5.90	8.20	163.00	188.00
22	5.00	7.00	-.60	3.90	5.00	9.00	13.60	12.40	11.90	10.60	2.30	9.20	168.00	188.00
23	3.00	5.00	3.10	6.80	3.00	6.00	13.10	12.30	12.40	10.60	2.30	8.60	172.00	189.00
24	4.00	6.00	1.40	4.90	3.00	4.00	15.40	13.90	13.20	12.10	3.40	8.20	178.00	190.00
25	.00	1.00	3.40	5.10	4.00	7.00	13.70	12.80	12.60	11.10	.80	5.70	169.00	191.00
26	5.00	8.00	-5.40	-.40	9.00	11.00	12.80	12.10	13.70	11.20	6.30	12.10	181.00	194.00
27	4.00	7.00	-3.20	1.90	5.00	6.00	13.20	12.20	12.80	10.40	6.10	10.10	182.00	195.00
28	6.00	8.00	1.60	5.40	7.00	7.00	13.90	12.80	12.40	11.50	2.20	8.80	181.00	196.00
29	4.00	5.00	.20	3.10	5.00	7.00	14.50	13.60	13.80	11.80	2.70	7.10	172.00	198.00
30	.00	.00	-1.90	2.30	2.00	5.00	14.40	13.20	12.60	11.70	3.80	9.70	193.00	201.00

APPENDIX-D

Raw Scores of Physical Fitness and Optimum Health of Composite Group (N=30)

S.N	Arms Strength		Flexibility		Abdominal Strength		Speed		Agility		Static Balance		Optimum Health	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	3.00	3.00	11.20	12.70	4.00	7.00	15.20	15.10	13.20	12.20	2.80	8.20	157.00	171.00
2	3.00	4.00	-2.40	-.90	7.00	11.00	15.30	14.70	13.30	12.50	8.10	10.70	160.00	175.00
3	3.00	3.00	-3.80	-2.30	6.00	11.00	13.40	12.90	11.80	10.70	5.30	9.50	169.00	175.00
4	1.00	2.00	2.50	4.10	10.00	15.00	13.80	12.60	11.10	10.60	5.00	12.20	162.00	176.00
5	2.00	3.00	4.70	6.20	2.00	7.00	14.10	13.10	12.90	11.70	3.80	10.80	164.00	178.00
6	.00	3.00	1.70	2.90	2.00	6.00	16.30	15.20	13.70	12.90	1.10	5.70	172.00	179.00
7	1.00	2.00	-6.10	-4.10	3.00	6.00	15.30	14.40	14.30	13.70	.70	5.10	167.00	183.00
8	.00	1.00	-5.90	-4.40	9.00	13.00	16.20	15.40	14.70	13.80	.50	4.40	166.00	183.00
9	1.00	2.00	.70	3.50	4.00	6.00	14.70	13.70	12.50	11.80	1.90	4.50	173.00	185.00
10	2.00	2.00	3.20	5.60	8.00	11.00	12.20	11.80	11.50	10.70	6.10	7.60	169.00	187.00
11	.00	2.00	-7.80	-6.70	5.00	8.00	16.40	16.00	15.00	14.10	4.30	6.90	180.00	190.00
12	4.00	5.00	8.20	10.40	8.00	12.00	14.10	13.50	11.10	10.40	4.70	11.40	181.00	191.00
13	4.00	5.00	1.90	3.90	11.00	14.00	13.70	12.60	12.20	11.60	3.20	7.50	184.00	199.00
14	4.00	5.00	9.50	10.80	6.00	8.00	12.20	11.60	10.50	10.00	1.40	6.30	193.00	200.00
15	3.00	3.00	3.40	6.30	7.00	10.00	12.90	11.80	10.80	10.30	4.20	10.10	195.00	204.00
16	5.00	8.00	1.60	3.40	5.00	9.00	13.90	12.60	11.60	10.80	2.40	6.10	138.00	173.00
17	4.00	6.00	1.10	2.90	3.00	5.00	14.40	13.10	12.30	11.80	4.90	6.80	171.00	174.00
18	6.00	9.00	2.70	4.50	6.00	9.00	13.10	12.50	11.80	10.70	2.80	6.40	165.00	177.00
19	6.00	10.00	5.90	7.40	5.00	9.00	12.90	12.40	11.90	10.70	3.70	8.20	169.00	181.00
20	2.00	4.00	7.60	8.80	2.00	7.00	16.30	15.70	14.40	13.70	3.30	8.20	174.00	181.00
21	2.00	5.00	-10.10	-8.10	5.00	8.00	14.70	14.20	12.70	11.80	5.10	7.70	168.00	182.00
22	6.00	9.00	3.50	5.10	5.00	7.00	14.80	13.90	12.30	11.80	4.60	6.80	177.00	183.00
23	3.00	5.00	9.30	12.60	8.00	10.00	11.90	10.60	12.80	11.50	1.20	4.10	162.00	184.00
24	4.00	7.00	4.60	7.90	9.00	12.00	14.50	13.10	11.70	10.70	7.70	9.80	178.00	186.00
25	4.00	6.00	3.40	4.70	3.00	5.00	17.30	16.20	14.80	13.00	.40	4.80	177.00	187.00
26	1.00	3.00	-6.20	-4.10	.00	4.00	16.80	16.10	15.90	14.70	4.30	8.60	172.00	188.00
27	5.00	8.00	3.50	5.80	7.00	9.00	12.30	11.50	11.10	10.50	1.90	6.20	182.00	194.00
28	3.00	6.00	-7.10	-4.20	3.00	8.00	16.10	15.20	14.20	12.70	2.40	5.70	182.00	197.00
29	4.00	6.00	.90	2.80	6.00	12.00	14.20	12.80	12.50	11.50	7.10	11.20	186.00	199.00
30	4.00	6.00	2.40	3.90	6.00	7.00	14.80	12.70	13.70	12.20	1.10	5.50	194.00	199.00

APPENDIX-E

Raw Scores of Physical Fitness and Optimum Health of Control Group (N=30)

S.N	Arms Strength		Flexibility		Abdominal Strength		Speed		Agility		Static Balance		Optimum Health	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	1.00	1.00	1.60	1.70	11.00	9.00	13.40	13.70	12.20	13.70	3.10	3.70	163.00	150.00
2	3.00	3.00	-1.40	-1.50	6.00	6.00	14.20	14.90	13.60	14.10	2.90	4.80	172.00	152.00
3	.00	.00	14.60	14.40	4.00	3.00	17.40	17.80	15.70	16.40	1.70	1.50	163.00	157.00
4	.00	.00	4.10	3.90	8.00	7.00	13.10	14.50	11.20	12.20	2.70	2.50	157.00	158.00
5	4.00	3.00	1.70	1.50	13.00	14.00	12.00	12.20	10.50	11.40	10.10	10.70	161.00	160.00
6	1.00	1.00	-2.50	-2.40	.00	.00	13.90	14.90	12.30	12.10	4.20	3.40	165.00	165.00
7	1.00	1.00	4.10	4.30	.00	.00	13.10	14.10	10.90	11.40	5.20	5.20	168.00	165.00
8	1.00	1.00	5.50	5.20	12.00	12.00	11.10	11.40	10.70	11.30	5.60	4.40	169.00	171.00
9	4.00	3.00	-2.20	-2.30	12.00	11.00	11.10	12.40	9.30	9.90	7.10	9.60	178.00	178.00
10	3.00	3.00	-4.50	-4.70	9.00	8.00	12.70	13.10	10.70	11.70	2.10	1.10	181.00	182.00
11	2.00	2.00	10.50	10.10	5.00	5.00	13.80	14.30	13.10	13.80	3.80	5.60	176.00	184.00
12	2.00	1.00	-3.60	-3.70	4.00	3.00	15.80	16.00	14.60	14.20	3.90	5.00	180.00	185.00
13	2.00	2.00	-1.70	-2.20	1.00	.00	13.20	14.80	11.80	13.90	9.10	7.30	188.00	186.00
14	.00	.00	-9.40	-9.50	11.00	10.00	16.30	16.90	15.10	16.40	1.90	2.00	189.00	187.00
15	2.00	2.00	.70	.80	3.00	3.00	13.60	13.90	11.50	11.70	4.70	6.10	181.00	188.00
16	5.00	4.00	2.30	2.40	7.00	5.00	14.40	15.10	13.80	14.70	4.60	6.30	156.00	151.00
17	5.00	4.00	4.60	4.40	5.00	6.00	14.10	15.40	12.20	12.60	3.70	4.60	165.00	154.00
18	6.00	5.00	4.10	4.00	8.00	9.00	13.70	14.40	11.90	12.50	2.00	2.30	161.00	159.00
19	2.00	2.00	-10.20	-10.20	4.00	4.00	15.10	16.10	13.10	14.20	5.70	6.50	148.00	161.00
20	2.00	2.00	8.40	8.50	7.00	7.00	15.20	15.80	14.10	14.70	1.10	1.00	178.00	162.00
21	6.00	4.00	-4.40	-4.70	9.00	8.00	12.90	13.70	11.10	12.20	8.50	8.30	167.00	165.00
22	5.00	5.00	5.30	5.00	6.00	5.00	14.90	16.10	11.90	13.70	6.30	7.40	188.00	167.00
23	3.00	2.00	-9.10	-9.50	3.00	3.00	15.10	15.90	14.40	15.70	1.30	1.20	167.00	168.00
24	5.00	4.00	9.10	9.00	6.00	5.00	11.80	12.90	10.70	11.50	7.70	8.10	164.00	168.00
25	6.00	5.00	5.60	5.30	9.00	8.00	12.30	13.70	10.90	13.10	3.40	4.10	170.00	171.00
26	.00	.00	-3.70	-3.70	1.00	.00	15.30	16.10	14.90	15.50	2.40	2.90	176.00	176.00
27	4.00	3.00	4.20	4.00	7.00	6.00	14.70	15.30	12.70	12.90	3.20	3.60	173.00	176.00
28	4.00	4.00	2.10	1.90	5.00	4.00	16.10	16.20	13.50	15.20	6.10	7.20	182.00	180.00
29	4.00	3.00	-4.50	-4.60	5.00	5.00	13.20	14.10	11.70	12.50	4.10	5.10	180.00	183.00
30	3.00	3.00	2.30	2.70	4.00	4.00	13.70	15.10	12.40	12.90	1.50	1.30	191.00	189.00

APPENDIX-F
OPTIMUM HEALTH SCALE

Read each statement and choose your responses from the given five options which have been given above the boxes [] in the form of abbreviations namely as: **1. SA** = Strongly Agree **2. A** = Agree **3.U** = Undecided **4. D** = Disagree **5. SD** = Strongly Disagree by putting tick mark [] in to the given boxes in front of each statement according to your preference response.

	SA	A	U	D	SD
1. I feel happy when I take part in sports activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I take part in extracurricular activities in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I love to eat fruits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I take sound sleep.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I do physical work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I take care of my personal hygiene.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I never face health related problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I experience body pain when I perform physical activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I spend maximum time on TV.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I like to eat junk food.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I take decisions easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I feel mentally prepare when I do any work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. I have different types of hobbies.
14. I am ready to face challenges.
15. I easily adjust myself with new situations.
16. I enjoy my daily learning.
17. I enjoy doing school home work.
- 18.** I find difficulty in concentration.
- 19.** I have mental pressure about school home work.
- 20.** I get very nervous when my home work not completed on time.
21. I spend enough time with my family.
22. I feel happy to share my things with others.
23. I have people around me with whom I am comfortable.
24. I enjoy functions and parties.
25. I feel confident when I meet with new people.
26. I easily made new friends.
- 27.** I find difficulty to mix-up with new people.
- 28.** I break promises.

29. I feel enthusiastic or motivated when I perform any task.
30. I easily share my problems with my parents.
31. I want to be loved by one and all.
32. I become alert due to exams.
33. I get concerned when I lost my things.
34. I emotionally or internally feel strong.
35. I feel bad when people around me not appreciate my work.
36. I get angry very soon.
37. I enjoy following rules and regulations.
38. I understand the value of people.
39. I believe in God.
40. I enjoy helping poor people.
41. I give my support to others without any condition.
42. I love myself.
43. I believe in to contribute something for others.
44. Sometime I feel unhappy.
45. I am not trust worthy.

APPENDIX-G

Presentation on Test of Normality on Pre-Test Scores on Arms Strength, Flexibility, Abdominal Strength, Speed, Agility, Static Balance, Optimum Health of each treatment.

Test of Normality				
Testing	Training	Shapiro - Wilk		
		Statistic	df	Sig.
Pre - Test Arms Strength	PNF	.941	30	.097
	Pilate	.943	30	.107
	Ballet	.941	30	.096
	Composite	.942	30	.105
	Control	.936	30	.069
Pre - Test Flexibility	PNF	.950	30	.170
	Pilate	.954	30	.212
	Ballet	.985	30	.945
	Composite	.947	30	.138
	Control	.977	30	.754
Pre - Test Abdominal Strength	PNF	.974	30	.646
	Pilate	.971	30	.572
	Ballet	.955	30	.225
	Composite	.982	30	.868
	Control	.968	30	.492
Pre - Test Speed	PNF	.933	30	.058
	Pilate	.979	30	.791
	Ballet	.965	30	.416
	Composite	.970	30	.552
	Control	.987	30	.964
Pre - Test Agility	PNF	.960	30	.301
	Pilate	.986	30	.958
	Ballet	.962	30	.341
	Composite	.963	30	.369
	Control	.969	30	.514
Pre - Test Static Balance	PNF	.930	30	.049
	Pilate	.955	30	.224
	Ballet	.937	30	.077
	Composite	.960	30	.305
	Control	.938	30	.078
Pre - Test Optimum Health	PNF	.942	30	.101
	Pilate	.954	30	.213
	Ballet	.989	30	.988
	Composite	.962	30	.345
	Control	.977	30	.730



DAY PUBLIC SCHOOL
LAWRENCE ROAD, AMRITSAR

Ref. No. G/743/2016

Date 5-2-16

To Whom It May Concern

This is to certify that **Ms. Loveleen Bala** research scholar of Lovely Professional University, department of Physical Education has conducted her experiment from the month of July 2015 to January 2016, 4 days in a week on 11 to 14 year old school students.

Principal
D.A.V. Public School
Lawrence Road, Amritsar

(Dr. Neera Sharma)
Principal

MANAGED BY - DAV COLLEGE MANAGING COMMITTEE, CHITRA GUPTA ROAD, NEW DELHI

Affiliated to CBSE No. 1630049 School No. 4503

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Bhavan's SL PUBLIC SCHOOL

Amritsar Kendra of Bharatiya Vidya Bhavan Mumbai

(Founded by Kulpati K.M. Munshi)

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Ref... B.V.B./Misc./21,577

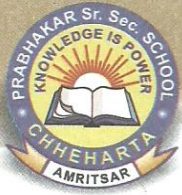
Dated 9th Feb., 2016

To Whom It May Concern

This is to certify that Miss Loveleen Bala research scholar of Lovely Professional University from Physical Education Deptt. Gave training to the students of our school lying between the age group of 11-14 yrs during the school zero period. She gave the training from July 2015 to January 2016 under the supervision of our sports teacher Mrs. Jaswinder Kaur.


Principal
Bharatiya Vidya Bhavan
S.L. Public School,

Dr. Anita Bhalla
Director Principal



PRABHAKAR SEN. SEC. SCHOOL

BHALLA COLONY, CHHEHARTA, AMRITSAR.

Recognised

Ref No. PSS. 444

Dated 05/02/2016

This is to be certify that Miss LOVLEEN BALA research scholar of Lovely Professional University, department of physical education has conducted her experiment from the month of July 2015 to January 2016, 4 days in a week on 11 to 14 year old school students.



Prabhakar

PRINCIPAL
PRABHAKAR SR. SEC. SCHOOL
Bhalla Colony, Chheharta, Amritsar
ID No. 354 Upto Sr. Sec. Exams

"One right Decision and Good Schooling will make your child's Future...."

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