INTRODUCTION
CHAPTER-I

INTRODUCTION

1.0.0 Introduction

Man is active being. Movement and physical activities are vital to his well being both from physical and physiological perspective. The time when sports were nothing more than an enjoyable recreation for individual is irrevocable past. The phenomenon of sports today intervenes in almost all the field of human endeavour and very often it even has a central position. A sport thus has experienced an enormous extension quantitatively as well as qualitatively with many positive but some negative aspects too.

Physical activity and physical exercise in the form of any sports activities, recreational or combative, were regarded as the most important factors in keeping an individual physically healthy and mentally sharp. Sports may be viewed as that expected human activity which essentially strengthens the integration of body and mind. Recently, it is felt that apart from the purposeful physical activity, games and a measure of maintenance of general health, happiness and fitness for effective and efficient living. Hence, sports participation and sports efficiency is influenced by physical fitness.

Now a days Sports have become a part and parcel of humans life. Millions of fans follow different sporting events all over the world with an enthusiasm bordering on devotion. Many people participate in games and sports for fun, happiness, pleasure as well as for health and fitness. Increased participation in sports has resulted in competition provides the means by which one can show one's worth successfully.¹

Physical as well as mental development of Human Beings depends upon their physical fitness through games and sports. Participation in Sports has great significance in the All-round development of an Individual. To cultivate athletes and sports contest was a civic duty in ancient Greece. Sports play an important role in building a healthy and strong nation. Addressing the youth, the great saint and

philosopher Swami Vivekananda said — First of all, our young men must be strong religion will come afterwards. Be strong, my young friends, that is my advice to you, you will be nearer to heaven through FOOTBALL than through study of GEETA.

The world’s greatest sporting spectacle was the idea of a French nobleman named Baron Pierre de Coubertin. During his travels round the world, Pierre de Coubertin was particularly impressed with high interest in sports that he found in America and England. It was after his travels that the Frenchman realized more than ever the truth of the ancient Greek ideal that the body as well as the mind, must be cared for and improved.

He convinced many sporting authorities that an Olympic Games was an excellent means of teaching international understanding to the youth of the world. In 1986, the first Olympic Games of the Modern era took place in Athens.

Sports are accepted as a cultural phenomenon. There are constant endeavour to achieve higher standards of sports performance. As a result today competitive sports demands optimum physical fitness for highest level of sports performance. Many people take part in sports activities for the fun of it or for health and fitness. A sport has become a profession to some having skills and ample financial benefits are linked with a high degree of popularity.²

Today, in the modern competitive era, every sportsman is in a race to excel others and competition has become a fundamental mode of human expression as it is one of the very important function by which National and International reorganization and prestige is gained. From its very simple form, sports have emerged into highly organized activity of human society and it has become a complex social and cultural phenomenon.³

At each Olympic games and international completions the standard of performance is raised and new records are set for human skills and endurance. Partially it is due to the improvement in sports facilities and equipments but mainly due to the development of modern training methods and adaptation of sports training on more scientific lines. Sports training has become more efficient and effective e as a result of the applied and fundamental research in the area of mechanics, physiology, physiological, nutrition and sports medicine. It also aims at understanding and

² S.R. Sergio; ‘Character Violence in Sports governed by Criminal Law’ Olympic Review 1976, p. 44
assessing the athlete in totality. Competition at all levels are so keen that no coach or player can afford to neglect the application of scientific training principles that can give him/her the advantage over or at least keep him/her in place with his opponent.\(^4\)

It is universally accepted that regular physical exercises enable the individual to stay physically fit and to sustain the average individual in his daily activities. However, anybody who wishes to participate successfully in games or sports; aspires to be a champion or to reach at the top level he must go beyond the simple rule of regular exercise. He must engage in intense and frequent physical drills and gear toward developing those physical qualities which are most necessary for success in particular sport endeavor.\(^5\)

Physiological systems are highly adaptable to exercise. Each task has major physiological components and fitness for the task require effective functioning of the appropriate system. Involvement in systematic programme of training brings about desirable changes in the physical and physiological ability which enhances the athlete’s performance in his/her sports.

It is a known fact that adding regular physical activity to one’s daily routine will improve health and well-being. Regular physical activity maintains body’s physiological and physical fitness. Being physically active has also been proven to help build healthy bones, joints, and muscles and helps to perform better performance in competitions.\(^6\)

The teams are prepared not only to play games, but to win the games as well. And for winning the games, it is not only the proficiency in the skills of the games, which brings victory but more important is the spirit and physical fitness of the player with which they play and perform their best in the competition. Physical & physiological variables have always been a concern of man from prehistoric time. Indeed, it was survival of the fittest. Throughout human evolution man has been a named as a hunter and a farmer. His body has a high degree of adaptability for walking, running and throwing. Only recently drastic changes have taken place due to industrialization, automation and motorization and demand to gross motor activities.

Boxing is one of the oldest sports in the world. There is a saying that boxing is an inherited trait in every child. Clinching of fist is a natural movement in infancy and is a natural one of the most strenuous and daring wounde sport of self defence. It is a tradition and a tradition never dies.

**Early History** : When the man started living in groups and the strongest man was the chief. Three sports were in existence: weight lifting – carrying the heavy stone to a particular distance, wrestling and boxing. The strongest man was the chief of the group and he remained chief as long as he remained the strongest. Here lies the origin of boxing as a sport.

**Year 3000 B.C.** : The first proof of pugilism was found in Egypt and dates back to the year 3000 B.C. The fighters were masked and part of the King’s festivities. For years boxing as a sport evolved and was first accepted as an Olympic sport in 688 B.C. at the 23rd Olympiad. Onomastas of Smyrna became the first Olympic Champion. Further Greece boxing is divided into 3 period from 900 B.C. to 600 B.C., 600 B.C. to 400 B.C. and 400 B.C. until the rise of Roman empire.

England is known as the founder of the birth place of modern boxing. All the boxing rules and the boxing gloves were introduced in England. The England boxing also is divided into three periods. (1) Early day of the Prize Ring (2) Great Age of the Prize Ring and (3) Decline of the Prize Ring. There has been some evidence the Pugilism was a form of sport around 300 B.C. in India. It was practiced at the Royal Courts and Professional fighters of lower classes.

Boxing is the “art of attack and defense with the fists practiced as a sport”.

Boxing is an ancient combat sport. During a boxing bout, competitors display their defensive and offensive skills with courage. The strength, speed and endurance are the thrill and beauty of this game. The ability to take quick decisions and act accordingly and efficiently during the bout, reflects the thinking and daring personality of the boxer.

Boxing was introduced, as a sport in the III Olympic Games 1904, of modern times, at St. Louis. Since then, it is one the Olympic scene uninterrupted. During this period of 100 years, great champions paraded in the Ring, leaving behind vivid memories of their excellent performance, and records set by them.
There are a few instances among many which substantiate boxing as a form of elegant physical culture – otherwise Swami Vivekananda, on our own turf, would not have indulged in boxing in his formative years. Amateur boxing today has undoubtedly survived the baptism of fire.

Nowadays boxing is a highly speedy sport in which two participants, superbly coordinated and conditioned attempt to score points generally of similar weight, fight in IABF approved 24 × 24 feet square boxing ring with each other in proper kit with their fists from respective corner. Boxing is supervised by a referee and is typically engaged in during a series of boxing bout of three rounds of three-minute with one minute rest of intervals called rounds. Victory is achieved if the opponent is knocked down and unable to get up before the referee counts to ten seconds or if the opponent is deemed to be injured to continue. If there is no stoppage of the fight before an agreed number of rounds of bout, a winner is determined by jury after the referee’s or judges’ decision.

Bombay could well be said to be the home in Indian Amateur Boxing if only for that the city was the first in the country to conduct the sport on an organized basis in 1925. The first post independence National Championship was held at the Brabourne Stadium Bombay, on March 18, 1950.

A new chapter in Indian Boxing unfolded when nine Boxers represented India at London Olympics in 1948. Dr. Bhatta used to contend in the flyweight category. In his famous semi-final Olympic bout with F.Sadano of the U.S.A, Bhatta lost on a foul punch – a rabbit punch to the back of the neck. P.L. Roy known as the father of Indian Boxing.

Many of the Great Indian boxers are having rural background inspite of the reason that they have very little boxing facilities existing in villages. Most of the time they have come from the nearby villages to the nearest towns are Hawa Singh, Mehtab Singh, Kaur Singh, N.G. Dingho, P.B. Mall, Jatinder Kumar, Raj Kumar Sangwan, Akhil Kumar, Bajender Singh, M.C. Mary Kom, Laxmi, Susham Kumari, Jotshan, Karamjeet Kaur, Chootto and Kavita etc.

Women are moving like never before. They are getting stronger, playing harder and paying more attention to physical fitness. It was until 1960's and 70's that women once again began to fight for their right to participate equally in sports' opportunity both as amateurs and professionals. When women first began banging on
the door to this sports world, they, of course, were able to get sanctioned support for 
team, although their budget were characteristically lesser than to the budget of men.

Since the 1720’s women have been making their mark in boxing (EN23). Women’s boxing first appeared in the Olympic Games at a demonstration in 1904. For most of the 20th century, however, it was banned in most nations. Its revival was pioneered by the Swedish Amateur Boxing Association, which sanctioned events for women in 1988. The British Amateur Boxing Association sanctioned its first boxing competition for women in 1997. The first event was to be between two thirteen-year-olds, but one of the boxers had to be withdrawn because of hostile media attention. Four weeks later, an event was held between two sixteen-year-olds. The A.I.B.A. accepted new rules for Women’s Boxing at the end of the 20th century and approved the first European Cup for Women in 1999 and the first World Championship for women in November 2001, U.S.A. (SCOORTON). Women’s boxing was not featured at the 2008 Olympics, and it is very unlikely to become an official Olympic sport at the 2012 Olympics.7

The ‘Queens of the Square Ring’ may not sound too incongruous an expression these days, especially when it comes to the arena of boxing and, of course, women’s boxing. Interestingly, girls almost all over the world have proven their mettle as breakers of male bastions in the arena of sports. During the last few decades, girls have made a dramatic entry into an exclusively male turf. Boxing, which has always been treated as a male preserve, witnessed enthusiastic feminine participation from the 1990s.

But the boom of women’s boxing came during the 1990s, coinciding with the boom of professional women sports leagues such as the WNBA and WUSA, and with boxers such as Stephanie Jaramillo Delia ‘Chikita’ Gonzalez, Laura Serrano, Christy Martin, Deirdre Gogarty, Laila Ali, Jackie Frazier-Lyde, Lucia Rijker, Ada Velez, Ivonne Caples, Bonnie Canino and Sumya Anani, all world champions, jumping into the scene and Dickson was called the father of world women’s boxing.

In support of the growth of women’s boxing, associations have formed to support and promote female boxers around the world. In April of 1997, the International Female Boxer’s Association (IFBA) was formed to promote and develop female boxing.

7 Andrew Eisele; ‘Women’s Boxing’ (2006), About.com
Boxing as an elegant sport has every reason to invite female participation. "As boxing fans, our aim is not to create a few champions. Champions are few and far between but what we try to do is to utilize the latent natural talents and capacities in the girls to build up a physically tolerant and mentally healthy generation of sportsmen for the country. And if the proverb, 'the hand that rocks the cradle rules the world', proves right, we may hope well that the young girls boxers of today will prove to be ideal mothers in the future".

Due to real differences between the male and female anatomy, additional safeguards are put in place to especially protect the female body. Prior to fight time, a **female boxer must put on a “tailor fitted breast protector”** and submit to a pregnancy test that must show negative results at weight in time. These safety measures are substantiated for the protection of the female accessory organ (breasts) and reproductive health.

Despite the hurt and the safety concerns surrounding boxing, women's boxing is becoming a growing interest among females of all ages because boxing is something more than a sport. Time, physical fitness preparation and training create a skilled boxer of any gender. "Female participation in athletics like (boxing) correlates to greater educational attainment, lower teen pregnancy rates, lower substance abuse rates, greater self-esteem, more positive body image, and a host of other indicators of (positive) physical and physiological health.

Nowadays, fans of women's boxing base are growing with a lot of television exposure and interesting fights. There are a few organizations that recognize world championship bouts, and fights are held in more than 100 countries worldwide. But yet women's boxing is not as well known as men's boxing. Women across the world enter the sport of boxing for many reasons. Some Indian women in New Delhi are entering the ring to help them gain self-confidence 'in hopes that they will go on to find jobs with the police and paramilitary'.

Boxing at present is the most popular game among all the games of the country. The skill of boxing needs endurance, strength, speed, agility, flexibility, quick reflexes and above all, a killer instinct. All these elements are present in the physical and mental makeup of an Indian girl. Competitions are being held from school level to national level. Attempts are being made to put this game on the level.

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8 Reuters, Indian Women Ready to Pack a Punch, The Financial Gazette (February 8, 2001), at http://www.fmgaz.co
of international competition. The national interest in raising the standard of boxing game continues to be high. The first Women's National Boxing Championship was held in Chennai from February 8 to 11, 2001. Even though this was the maiden tournament, there was a record entry of 148 participants in 13 categories and with good start Indian team represent India in 1st Asian Women Boxing Championship held at Bangkok in August 2001 and in 1st Women World Boxing Championship held at Scoorton (U.S.A.) in November 2001.

Life at the dawn of the 21st century for women's team was nothing short of the top of the life. The attitude of media and the crowd has drastically changed towards women games and sports. Women boxing players in any country now have access to national television audiences and national television funding. Women of the 21st century wants to be socially accepted and look good in a crowd of people, with physical fitness. Good physical fitness can also help today's women work more effectively and efficiently as with higher fitness level. Physical fitness is also essential for women for effective living. Although the need for each component of physical fitness is specific to each individual. Regular physical activity is an important parameter of physical fitness and mirror of the achievements. So women should take sports seriously, not necessarily at an national or the international level.

Now a days female boxers are neck to neck to the men boxers in India. Arzoo.com sponsored boxing champion Mary Kom has entered the Lemca books of records became India's first woman pugilist to get the Arjuna Award in 2004 and Padamshri 2005, also bestowed with the prestigious award "The Rajiv Gandhi Khel Ratna Award" in 2009 along with her man counterpart Vijender Singh (Olympian Bronze Medalist), which was also a first for Indian boxing.

Women boxing took the fancy of a good number of enterprising young girls all over the country. Many boxing clubs/centres have recorded a fair number of women boxing trainees hailing from traditional Indian families. Women's boxing is gaining popularity – of course after sailing through initial rough weather. In this arena, girls from the India's north-west region deserve special accolades, Haryana, Punjab, Uttarakhand, Delhi are front runners on this track. The popularity of the women boxing undoubtedly grows high on their graphs.

2001 was declared the Women Empowerment Year. One of the few sports in which India has potential Olympic medalists is in women's boxing. Today, it is only a technical formality before women's boxing is incorporated as an Olympic event.
Indian women's boxing started at around the same time as it took off globally. This has had a great effect on the psyche of the boxer. In the world of men's boxing, Asians have always had a mental barrier against Caucasian boxers in the ring, precisely because the sport started for earlier in the West. In women's boxing our girls have no mental blocks—they have the pioneering spirit and no reputations to fear. The need today is for further development and maintaining the impetus that has given such a tremendous start to women's boxing in India. With an already confident corps of athletes, who are winning top honours internationally, both in Asia and the world stage to be continue highly physically and physiologically strong that will made a name for ourselves in the world of women's boxing.

The Northern states of India have a youthful demographic profile. The women, particularly younger ones, are energetically aware and readily available for mobilization. Women in Northern India have muscular strength and robust physique as compared to other women in the country. The culture is open and competitive. Northern states have distinct advantage of good climate and rising per capita income. So, boxing is very popular in the Northern states as well as in the country, but very less scientific work has been done in this field. Research work is very important for advancement of game through which we can educate the coaches, physical education teachers and boxing players regarding the role played by physical and physiological variables in achieving high performance. There for the present research will helpful to our Indian boxers planting them into the Boxing Gallery of the Olympic movements.

One of the most important factors of success in boxing is physical fitness. In addition to monitoring performance in the ring, the coach should have data that monitor the physical preparedness of the boxer. These are agility, flexibility, muscular endurance, cardio-vascular and respiratory endurance, strength, power, speed and the correct maintenance of body weight. Each one of these makes some independent contribution to the whole rate while women of these components are related. The game of boxing is based on the natural principle of physical development. It is vigorous and it fosters a healthy competitive spirit among the youth and not merely running with speed but also a natural instinct to offence and defence. No doubt speed is the heart of the game and to stand to a relentless pursuit of 11 minutes at a stretch in a bout.

However, it is very difficult to define exactly the concept of physical fitness. Many have tried to define this complicated and complex term in their own way.
According to Thomas (1978) physical fitness has been defined as the total functional capacity of an individual to perform a given task. It is the ability to perform a task without fatigue or exhaustion, bearing always energy to meet heavier demand made on the individual during stress and strain. The basic meaning of physical fitness is the capacity for prolonged hard work and to recover the same state of health in a short duration, which amounts to a degree of strength, speed, agility, flexibility, power and ordination which one possess.

Physiology is the study of the functions of normal human body. The body is made up of many tissues and organs, each having its own particular function to perform and the physiological variables may be defined as those variables which are directly limited with various physiological system and which may be voluntary or in voluntary such as pulse rate, blood pressure, positive breath holding capacity, play a vital role in the performance of female boxers.

Physiological system are highly adaptable to exercise. Each task has major physiological components and fitness, for the task require effective functioning of the appropriate system. Involvement in systematic programme of training brings about desirable changes in the physical and physiological ability which enhances the athletic performance in this sports.

So, the researcher being a Boxing Coach was enamored by this new phenomenon and decided to take a fresh look at the changing of physical fitness and physiological variables scenario within the country which is prompting young women of the present generation to take to an essentially male sport.

The World Medalist Mary Kom also stress on the physical fitness and for that she had arranged separate physical trainer. In this regard most of the researchers, coaches and physical education teachers emphasize that a player or an athlete must possess such characteristics of the body which suit him/her the most in her sport. The physical and physiological characteristics are acknowledged to be fundamental and significant for an individual’s development to achieve Olympic level performance in any sports discipline.

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At last for achieving excellence in the field of boxing these components of physical fitness and physiological variables must be possessed by the boxing players for their top performance in competition and it is clear that the boxing game requires a lot of stamina, speed, strength and mental fitness. All these points are mentioned to serve a timely warning to avoid frustration in future. We have to train our boxers in extra efficiency and to play in all types of conditions and environments. They should be trained so that they may not feel fatigue, stress and humiliation in game. The investigator has tried to find out the physical and physiological variables status of Indian female boxers at different levels and finding of this study will be helpful and useful in the preparation of physical fitness programmes, not only to the boxing but also to the other games too. Keeping in view of the above, the investigator has selected the present study.
1.1.0 Statement of the Problem

The purpose of the present study was to compare the selected physical fitness and physiological variables of northern states junior and senior female Boxers.

1.2.0 Objective of the Study

The main objectives of the study have been summarized as below.

1. The first objective of the present study was to determine the characteristics of physical fitness variables of junior level female boxers of northern state of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

2. The second objective of the present study was to determine the characteristics of physical fitness variables of senior level female boxers of northern state of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

3. The third objective of the present study was to determine the characteristics of physiological variables of junior level female boxers of northern state of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

4. The fourth objective of the present study was to determine the characteristics of physiological variables of senior level female boxers of northern state of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

5. The fifth objective of the present study was to compare the physical fitness variables within state between junior and senior level female boxers of northern states of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

6. The sixth objective of the present study was to compare the physiological variables within state between junior and senior level female boxers of northern states of India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

7. The seventh objective of the present study was to compare the physical fitness variables of junior level female boxer among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

8. The eighth objective of the present study was to compare the physical fitness variables of senior level female boxer among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

9. The ninth objective of the present study was to compare the physiological variables of junior level female boxer among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).

10. The tenth objective of the present study was to compare the physiological variables of senior level female boxer among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand).
1.3.0 Hypotheses

Before pondering over the problem, it is essential to see the problem from the
different points of view. It will not possible for the investigator to analyse his research
work without pre supposition of the problem. To start with the problem
systematically the following hypotheses will frame for the present investigation.

1. The first hypothesis of the present study was that the characteristics of Physical
fitness variables of junior level female boxers of northern states of India would
not be different in nature.

2. The second hypothesis of the present study was that the characteristics of
Physical fitness variables of senior level female boxers of northern states of
India would not be different in nature.

3. The third hypothesis of the present study was that the characteristics of
Physiological variables of junior level female boxers of northern states of India
would not be different in nature.

4. The fourth hypothesis of the present study was that the characteristics of
Physiological variables of senior level female boxers of northern states of India
would not be different in nature.

5. The fifth hypothesis of the present study was that there would be no significant
difference between junior and senior level female boxers within state in
relation to Physical variables (speed, agility, arm and shoulder strength,
abdominal strength, explosive strength, endurance and flexibility).

6. The sixth hypothesis of the present study was that there would be no significant
difference between junior and senior level female boxers within state in
relation to Physiological variables (positive breath holding capacity, resting
heart rate, systolic blood pressure and diastolic blood pressure).

7. The seventh hypothesis of the present study was that in junior level female
boxers there would be no significant difference among different states of
northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand) in relation
to Physical fitness variables (speed, agility, arm and shoulder strength,
abdominal strength, explosive strength, endurance and flexibility).

8. The eighth hypothesis of the present study was that in senior level boxers there
would be no significant difference among different states of northern India
(Delhi, Haryana, Punjab, Rajasthan and Uttarakhand) in relation to Physical
fitness variables (speed, agility, arm and shoulder strength, abdominal strength, explosive strength, endurance and flexibility).

9. The ninth hypothesis of the present study was that in junior level boxer there would be no significant difference among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand) in relation to Physiological variables (positive breath holding capacity, resting heart rate, systolic blood pressure and diastolic blood pressure).

10. The tenth hypothesis of the present study was that in senior level boxer there would be no significant difference among different states of northern India (Delhi, Haryana, Punjab, Rajasthan and Uttarakhand) in relation to Physiological variables (positive breath holding capacity, resting heart rate, systolic blood pressure and diastolic blood pressure).
1.4.0 Limitations of the Study

1. The investigator had procured assistance from a number of experts from Physical Education as well as Medical field for collection of data. Although every attempt was made to standardize the testing procedure, there could have been variations in measuring due to individual differences, which might have affected the study which could be considered as a limitation.

2. Since it was not possible to conduct tests on the same day for all subjects and during the same hours of the day, variations might have occurred in measuring the subjects, which can also be considered as another limitation of the study.

3. Since dietary habits and daily life style of the subjects were not the same, it would also be considered as a limitation for the study.

1.5.0 Delimitation of the Study

1. The present study was delimited to the junior and senior female boxers of Haryana, Punjab, Delhi, Uttarkhand and Rajasthan states participating at National level.

2. The study was delimited to the selected physical fitness variables (speed, abdominal strength, explosive strength, arm and shoulder strength, flexibility, agility, cardio respiratory endurance) and selected physiological variables (resting heart rate, systolic blood pressure, diastolic blood pressure, positive breath holding capacity).

3. The present study was delimited to intra state comparison for junior to senior female boxers.

4. The present study was delimited to inter states comparison among the junior and senior female boxers.

5. The study was delimited to the junior and senior female boxers of the age group of 15 to 25.

6. The study was delimited to 150 boxers (75 junior and 75 senior female boxers (30 from each state with 15 junior and 15 senior boxers) of Haryana, Delhi, Punjab, Uttranchal and Rajasthan states only.
1.6.0 Definitions and Explanations of the Terms

Some of the term often used in the present investigation are defined as under to obtain a clear picture of the study.

1.6.1 Physical Fitness Variables

Physical fitness refers to the athlete's status on those components which are essential for efficient functioning in the psycho-motor domain. These components are performance oriented and are dependent upon functioning of different systems of the body in an integrated manner.

1.6.1.1 Speed

Speed may be defined as rapidity with which successive movements of the same kind are performed.\(^\text{10}\)

1.6.1.2 Agility

Agility is defined as the ability of the body or part of the body to change direction rapidly and accurately.\(^\text{11}\)

1.6.1.3 Strength

Strength can be defined as the force that a group of muscles can exert against a resistance in one maximum effort.\(^\text{12}\)

Explosive strength can be defined as the ability to release maximum force in the fastest possible time. It is the ability of body or segment of it to apply force at rapid rate\(^\text{13}\).

1.6.1.4 Flexibility

Numerous scholars have defined flexibility as the range of movement in a joint or sequence of joint.\(^\text{14}\)

Flexibility also refers to the absolute range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment. Flexibility in some joints can be increased to a certain degree by stretching\(^\text{15}\).

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\(^{10}\) H. Harrison Clarke ed. "Basic Understanding of Physical fitness" Physical Fitness Research Digest 1 (July 1971):2

\(^{11}\) Borrow and Mc Gee. A Practical Approach to Measurement in Physical Education. P.113

\(^{12}\) Phillips and Hornak. Measurement and Evaluation in Physical Education. P.229

\(^{13}\) D.K. Mathew, "Measurement in Physical Education" (Philadelphia; W.H. Saunders Company; 1973); P. 144.


1.6.1.5 Endurance

Endurance can be defined as the ability to continue or persist in strenuous task involving large muscle group for long period of time.\textsuperscript{16}

According to Barrow & McGee\textsuperscript{17} endurance is the result of a Physiological Capacity of the individual to sustain movement over a period of time. It is the ability to continue successive movement in situation where the muscle or muscle groups being used and loaded heavily.

1.6.2 Physiological Variables

The physiological variables may be defined as the variables which are directly limited to various physiological systems and which may be voluntary or involuntary such as resting heart rate, blood pressure, breath hold capacity.

1.6.2.1 Resting Heart Rate

Resting heart rate (RHR) refers to the number of times heart bests in one minute while at rest. The average RHR is 70-80 beats per minute (BPM), through athletes may have resting heart rates as low as 40-50 BPM, RHR is often a measure of fitness – as one becomes more fit, RHR will decrease as heart becomes more efficient.\textsuperscript{18}

1.6.2.2 Blood Pressure (Systolic & Diastolic Blood Pressure)

Ross and Wilson explained that when the left ventricle contracts and pushes the blood into the aorta and which as a result of push produces pressure and that pressure in known as the systolic blood pressure.\textsuperscript{19}

According to Ross and Wilson when complete cardiac diastolic occurs and the heart is resting following the ejection of blood, the pressure is regulated within the arteries and the same is termed as the diastolic blood pressure.\textsuperscript{20}

Blood pressure is the force with which the blood distends the walls of the vessel and with which is would escape if the vessel were cut.

\textsuperscript{17} Barrow & MCgee; Op. cit. P-117
\textsuperscript{20} Ibid., p. 150.
1.6.2.3 Positive Breath Holding Capacity

The breath holding capacity refers to the duration of holding breath after full inspiration till expiratory impulse overtakes i.e. maximum time of holding the breath after full inspiration.

1.7.0 Significance of the Study

Very high degree of physical and physiological fitness are required to be mastered for an outstanding performance in boxing. Based on the research that has been conducted, it is evident that boxing players are very fast, quick and active, having enough speed, endurance, strength as well as balanced state of personality. Sports scientists in many countries are experimenting to find different ways and means to formulate the easiest and accurate methods of treating their female boxing players for maximum output.

However, although many efforts have been made regularly to improve upon the techniques of training sport women, with the help of research evidence and facts, yet very little research has been done to promote this game on scientific terms in India.

A lot is heard and known about the contribution of scientific development in training of boxing players in most advanced countries. But scientific and result oriented investigation analysis as well as assessment has not been undertaken seriously in India to prove the worth of each of them, which perhaps, helps coaches and physical educators to select players.

It has been established that for the attainment of top performance, interaction of many factors is responsible. Under modern conditions for the selection of boxing players and for the training for boxing with the focus on superior performance, emphasis is laid on the Physiological and Physical factors, besides other factors.

The present study, therefore, may make the following significant contributions:

1. By the help of the present study the coaches and boxers can understand the level of physical and physiological characteristics. Based on these, coaches may develop suitable training programme for boxers.

2. By the present study, researchers of physical education and sports science may provide suitable causes of difference between junior and senior level boxer.
3. Moreover, the present study may reveal the difference among the different state of northern India in relation to selected physical and physiological variables in junior and senior level boxer.

4. The study may provide descriptive information of boxing players.

5. The study may help to assess improvement throughout the phase of conditioning.

6. During the preseason period, players normally undergo fitness testing in order to determine each player’s physiological condition. From the results of the testing, the coaches can identify the strengths and weaknesses of the players and train them accordingly. Appropriate testing can be specified to reflect the actual fitness status of the boxing players.

7. The study may help to predict boxing performance.

8. It will also become a part of the literature for the physical educationists as there is very less literature which reveals the major obstacles in the improvement of physical fitness and boxing skills of the female boxers. Accordingly, the sports minister can provide necessary attention towards coaches and boxers.