PERFORMANCE STRUCTURE OF STATE LEVEL MALE KHO-KHO PLAYERS

A Thesis submitted to Jadavpur University
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Dedicated to

My Parents, Husband &

Family Members

Certificate

Certified that the thesis entitled **"PERFORMANCE STRUCTURE OF STATE LEVEL MALE KHO-KHO PLAYERS"** Submitted by me for the award of the Degree of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of **Dr. SUDIP SUNDAR DAS, Professor, Department of Physical Education, Jadavpur University** and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere / elsewhere.

Supervisor:

Dated:

Countersigned by the Candidate:

Dated:

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Place:

Date:

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CHAPTER -I

INTRODUCTION

In this chapter general introduction of the study has been introduced with its historical background and relevance to the field of physical education. It's also contains Statement of the problem, Definition of terms, Delimitation, Limitation and Significance of the study have been described for introducing the subject of investigation of this study.

1.1 GENERAL INTRODUCTION:

Sports performance is understood as an extent to which a motor task limited by rules of a given sports discipline is accomplished. Sports performance factors are understood as relatively independent parts of sports performance.

Performance structure is understood as a process of systematic development of each component in dependence on the duration of preparation which leads to achieving maximum efficiency in senior age within the selected sports discipline.

Performance structure as a concept

Performance structure is the specific make up of performance in general and sports performance in specific with all the constituent factors. Performance structure of any sport is complex in nature with a very high number of influencing variables. It is complex because some of its components are sports person dependent and some others external; some of them can be controlled but some of them are beyond control of the athlete, some are physical and some are psychological.

Reaching maximum efficiency in any activity is not possible over a day. Efficiency is conditioned by several interrelated areas. Sports performance structure focuses on reaching maximum efficiency in motor abilities connected to a certain sports discipline. Supposed performance depends on motor ability and motor skill which are closely related to the sports discipline. Motor abilities can be described as relatively stable sets of inner genetic presuppositions needed to carry out locomotive activities. They include force, speed, endurance, coordination and flexibility. Motor abilities are manifested on the outside by

sports skills. Sports skills are presuppositions needed for implementing performance in a selected sports discipline which is limited by rules. Such presuppositions are gained through motor learning. It, however, would not be possible to implement sports skills or develop locomotive abilities without motivation. Motivation is understood as an inner incentive to carry out certain activity. The final area needed for performance implementation is represented by tactical skills. Tactics means conducting a sports competition in a purposeful way.

The contents of sports performance structure consists of individual key areas which are called components of performance structure:

- Physical component is generally focused on developing motor abilities.
- Technical component focuses on acquiring sports skills through motor learning.
- Tactical component focuses on acquiring and further development of different ways to conduct sports contest on a purposeful basis.
- Psychological component is focused on improving the athlete's personality.

Characteristics of performance structure Components

Physical Component

Physical component is primarily oriented towards systematic development of motor abilities and their manifestation through sports skills in a selected sports discipline. Among the most important areas of motor abilities are the following:

- Force abilities
- Endurance abilities
- Speed abilities
- Coordinative abilities
- Flexibility

Basic differentiation of motor abilities is not sufficient to describe the manifestation of individual abilities within the specific sports discipline. Physical requirements on the athlete during physical training are primarily related to the selected sports discipline. Some sports require carrying out motor activity with a high (e.g., 400-m run) or low (e.g., marathon run) intensity during the whole course of motor task. Other sports, like soccer or basketball require the athlete to carry out different types of motor activity ranging from static positions to running with maximum speed, often accompanied by change of direction; and all that with a different intensity. Requirements of individual sports disciplines are related to physical capacity of the athlete and can be divided into following categories:

- The ability to develop a high power output in single action during competition such as kicking in soccer an jumping in basketball (force).
- The ability to perform prolonged exercise (endurance).
- The ability to sprint (speed).
- The ability to exercise at high intensity which are the basis on acceleration, maximum velocity and multidirectional change of movement (agility).

Well-designed training programs are based on applying five principles during each stage of sports preparation. There are three basic principles: specificity, size of adaptation stimulus and progression.

Technical component

Technical training focuses on acquiring, keeping and transferring motor skills. Generally, from the point of view of sports performance structure, motor skills are divided into two groups:

Fundamental skills are based on natural genetic development of a human. It includes gait, run, jump, climbing, and basic over arm throwing, etc.

Sports skills are based on contents of a specific sports discipline. Like in volleyball, the content of skills is for instance setting, reception, block, service etc. The aim of developing

these skills is acquiring high level of automatization. These skills accompany the athlete during the whole period of his sports carrier regardless of the performance level he or she is at. The athlete keeps such skills for the whole of his sports career regardless of performance level. Acquiring these skills should be in compliance with long-term conception of sports performance structure. According to this conception, training of a specific sports discipline must contain another large group of motor skills which do not form its contents but are important for reaching other aims of sports performance structure. For example, they include gymnastic or athletic skills which are important for recovery, compensation and versatile development of an athlete.

Movement skills can be classified according to three basic motor behavior criteria.

Tactical component

Tactical component of sports performance structure focuses on different ways to conduct sports competition towards victory. Key terms of this component are strategy and tactics.

Strategy means a plan which was created beforehand and is based on experience with a purposeful conduct of sports competition that has proved to lead to an expected result in a specific competition.

Tactics means practical execution of strategy in a specific race situation. Practical execution is based mainly on acquired possible solutions of specific race situation. Progress of acquiring possible solutions of race situations must be in compliance with the duration of sports performance structure within the selected long-term conception of sports performance structure.

Psychological component

Psychological component focuses on positive influence on the athlete's personality as far as fair play is concerned in dependence on the length of sports performance structure with the aim to achieve maximum efficiency in senior age.

There are no two exactly identical people in the world. Everyone is an original who acts as an individual on the outside. Personality of each individual is characterized by a number of factors. Among them, there are the following:

Temperament which is manifested on the outside through emotions and is related to the dynamics of mental processes. In practice, four basic types of temperament are distinguished: sanguine, choleric, phlegmatic, and melancholic.

Motivation is understood as an incentive which supports some kind of behavior and is decisive in the kind and intensity of a person's acting. Acting can be described as an activity carried out to follow a clear-cut aim. Motivation is closely related to activation level. Activation level can be described as the level to which organism is activated. Relationship between activation level and sports performance has been proved to exist. The curve of dependence is in the shape of inverted U. The interpretation is that both very high and very low activation level is of a negative influence on sports performance.

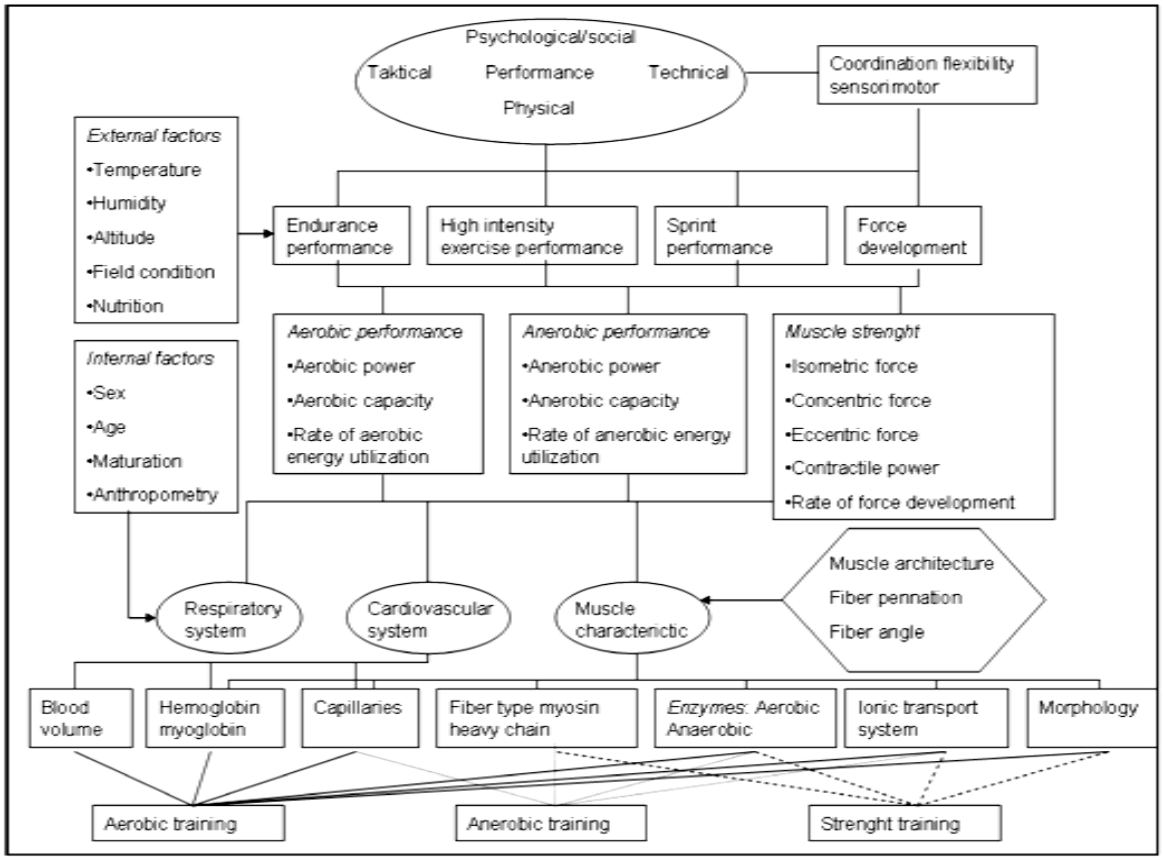
Qualities of an individual are innate and can be divided into two positive (devotion, persistence) and two negative (dependence, selfishness) categories. Qualities of an individual are characterized with four dimensions: direction, intensity, scope and duration.

Attitudes are – as opposed to qualities – acquired and they are repeatedly manifested in given situations. Attitudes originate from echoing, maturing, rationality or on the basis of emotional reactions. All of the above factors make a unity which is referred to as character of an individual.

Both positive and negative qualities are manifested in any situation. In sports, these qualities are manifested much more in situations when the athlete or the team loses. Again, it is upon the coach's feeling and experience to be able to regulate these manifestations in the right way.

Tasks of sports performance structure focus on systematic development of the components of sports performance structure. Development of individual components of training is influenced by the structure of sports performance.

Model of factors determining sports performance is presented here as an example.



As results from the above, performance of an athlete in sport depends on the athlete's technical, tactical, physical, and psychological-social characteristic. These factors are linked with each other, e.g., the technical skills cannot be fully utilized without adequate levels of physical abilities. Conversely tactical component cannot be fully utilized without adequate quality of technical skills.

The physical demands in sport are related to the activities of the athlete. The performance in selected sports discipline is based on the characteristic of the respiratory and cardiovascular systems as well as muscles, combined with the interplay of the nervous system. The muscular system is constituted by a multitude of components, which have important influence on the mechanical and metabolic behavior of the muscle. Muscle morphology and architecture, and myosin isoform composition play a major role in the contractile strength characteristics of the muscle evaluated as maximal isometric,

concentric, and eccentric contraction force, maximal rate of force development, and power generation. Glycolytic muscle enzyme levels and ionic transport systems are major determinants of anaerobic power and capacity. Likewise, mitochondrial enzyme levels and capillary density exert a strong influence on aerobic muscle performance in turn affecting the force development and the maximal power output of human skeletal muscle, while also influencing the endurance performance of the muscle fibers. The respiratory, cardiovascular, and muscle characteristic are determined by genetic factors but they can also be developed by training. A number of environmental factors such as temperature and for outdoor sports, the weather and surface of competition ground also influence on the performance.

Performance structure is the specific make up of performance in general and sports performance in specific with all the constituent factors. Performance structure of any sport is complex in nature with a very high number of influencing variables. It is complex because some of its components are sports person dependent and some others external; some of them can be controlled but some of them are beyond control of the athlete, some are physical and some are psychological.

The performance structure of different games and sports are different. Though there are similarities in groups of influencing factors for different games and sports, their weight age for performance differs from game to game. According to Schnabel (1986), sports performance depends on following groups of factors.

a) Endogenic factors like body structure, height and weight
b) Physical and motor fitness,
c) Technique of the sport,
d) Tactics and strategies of the sport,
e) Material condition like ground condition, equipment
f) External factors like climate, spectators, opponent, official
g) Intelligence, knowledge and personality of the sportsman.

a) **Endogenic factors**: Endogenic means the factors which are gifted with birth. It is inherent components of an individual. In this the body type of an individual like endomorph, mesomorph, and ectomorph. Endomorph means flabby body & mesomorph means muscular body and ectomorph means lean body.

b) Fitness: Fitness was commonly defined as the capacity to carry out the day's activities without undue fatigue. However, as automation increased leisure time, changing in lifestyles following the industrial revolution rendered this definition. In current context physical fitness is considered a measure of the body's ability to function efficiency and effective in work and leisure activities to be healthy to resist hypokinetic diseases and to meet emergency situations.

c) Technique of sports: A technique is a procedure used to accomplish a specific activity or task. The manner and ability with which an artist, writer, dancer, athlete or the like employs the technical skills of a particular art or field of endeavour.

d) Tactics and Strategy of sports: A tactic is a plan that is made before you start playing in a game which considers your own or your opponents' strengths and weaknesses. The method used to put strategies into practice in matches and are often adopted as the game develops. A **strategy** is a plan of action made before a game is played. You need to employ strategy to be successful. In football, the 4-4-2 formation is a strategy.

e) Material condition like ground condition, equipment.

f) External factors like climate, spectators, opponent, official.

g) Intelligence, knowledge and personality of the sportsman.

Generally, it is considered that success in team game is more related to knowledge of the game strategies, technical efficiency, and tactical skills and performance capabilities. Therefore, it becomes difficult to predict potentially talented players. There are number of factors which affect the performance of sportspersons, such as age, sex, physical growth, physiological, biochemical, biomechanical, genetically, anthropological and psychological

factors **(Carter, 1970).** Among these factors, the size, shape, physique, proportions, physical fitness, skill efficiency level also plays significant role in better performance. After an intensive study of anthropometric measures of Olympic athletes, Garay, Levine and Lindsay Carter concluded that level of performance in a particular event demand a particular type of body size and shape, other aspect being similar, they established high relationship between structure of an athlete and the specific task (event) in which he excelled **(Alfonso L. Garay, Louis Levine and Y. E. Lindsay Carter, 1974).**

Anthropometrics measurements were central concerns of the first phase of the scientific era of measurements, which have been began in the 1860's current interest in anthropometrics measurements focus in three areas, girth measures, body type and body composition. Assess of such measures include classification, prediction of growth patterns and prediction of success in motor activities as well as assessment of ability **(Allen Philips and James E. Harnok, 1979).**

As the level of performance increases the players attains high degree of physical fitness. Peter and Haliski (1950) supported this view that the successful participation in any game is directly related to physical fitness.

Bernard (1966) reported that physical fitness improves in those who take regular physical exercises. Regular participation in games significantly contributes to higher level of performance and greater degree of physical fitness amongst the players.

Bosco (1975) found a low heart rate among champion gymnasts. Low heart rate is the outcome of a good endurance.

Dirix, Knuttgen and Title (1988) advocated that it has become a necessity to identify and select a future elite athlet right in childhood or early adolescence. It takes many years of intensive and regular training till an international sports performance level is achieved. The children selected for elite sports activities require suitable conditions, sports facilities, equipment of high quality, rational life style the guidance of expert sports physicians and well educated and experienced coaches. Such conditions can be created for selected children at right age to get quality performance. Therefore, the correct identification,

selection and placement of young talent are becoming important everywhere in the modern competitive sports world. Sports performance is the sum of numbers factors which can vary from individual even if ultimately they achieve similar results in competition. Deficient person can be compensated for by superior technique. Inadequate sprinting speed by superior endurance or inferior technique by aggressiveness. A few cm or fraction of seconds decide between record performances, victory or defeat in tough international competitions; for this reason it is very important to identify and fully realize each individuals potential.

The preparation of an athlete for achievement is a complex dynamic state characterized by high level of physical, Physiological and psychological efficiency and the degree of perfection of necessary skills and knowledge, technical and tactical preparation. Many other factors are also brought into action in this preparation (means of rehabilitating, strength after loads, special nutrition, organization of general regime in accordance with the conditions of sports activity etc).Thus athletes training today is a multi-sided process of expedient use of aggregate factors, means, method and condition .So as to influence the development of an athlete and ensure the necessary level of preparation. (L.Matveyev, Fundamentals of sports training, Moscow progress publishers, 1981), p.22.

Nature of the game Kho-Kho

Kho-kho is a game of speed, stamina, endurance, strength and skill. Dodging and controlled sprinting makes the game exciting. Kho-Kho is a great test of the participants` physical fitness, strength, speed and stamina and dodging ability.

Indian culture is the oldest culture in this world. It has gifted many things to this world. Literature, arts, sports, philosophy, scientific theories and social, political and economic thoughts spread in the world are originated from Indian culture. The most ancient and holy religious treatise 'Rig-Veda' is the national asset of India. Greatest epics Mahabharata and Ramayana are from India. For the welfare of mankind the concept of Ramrajya (utopian world) is derived from Ramayana. In the same way India culture is the mother of various games and sports in this world. Researchers find reference of various games and sports in the ancient treatises of India. Basically Kho-Kho is Indian traditional game. Kho- Kho

game is played particularly in rural and urban areas. This game has become popular in other states also. All states also have their own Kho-Kho Associations, which are affiliated to Kho-kho Federation of India. Kho –Kho game originated in India has considerably long tradition. The Kho-Kho game is , at present ,becoming most popular among the indigenous activities in Physical Education in India & neighboring Countries in South Asia .In our country the competition on Kho-Kho are being held in school , College level interuniversity level , all India interuniversity level occasionally attempts are being made to include this Kho- Kho game in the area of competitive Sports at the international level .Traditionally the Kho –Kho game is played by Indian because it involves less financial requirement & small play field area .Moreover , many participants can play the game together as a team sports & can in rich health & fitness .

Physical fitness, as one aspect of total fitness, is a means for Good health is the parameter of a person's well-being. It comes from the inner balance of the body, mind, and spirit. Our body is our valued possession and good health is our prime asset. Physical education and sports sciences have always been for promotion and improvement of health and physical fitness through muscular activities. Enthusiasm for sports and physical fitness is growing in our country. The governments, and some voluntary sports organizations, are adopting various measures to make people aware of the importance of physical fitness. Fitness of an individual is a measure of its ability too. Fitness is an individual's trait which enables person of live most effectively and potentially.

This game demands a high level of physical fitness, stamina, strength, speed, techniques and self-control. This could also be considered a very aggressive game especially at competitive level in the sense that it incorporates dodging, feinting and bursts of controlled speed which makes this game quite exciting and thrilling. To catch by pursuit – to chase, rather than just run – is the capstone of Kho-Kho. The game develops qualities such as obedience, discipline, sportsmanship, loyalty between team members and brings about and brings about a sense of team spirit.

(Dhondge S. R., 2011)A person who lives a sedentary lifestyle may colloquially be known as a couch potato. It is commonly found in both the developed and developing world. Sedentary activities include sitting, reading, watching television, playing certain video games, and computer use for much of the day with little or no vigorous physical exercise. A sedentary lifestyle can contribute to many preventable causes of death.(en.wikipedia.org/wiki/Sedentary lifestyle) The researcher in the aforesaid research studied the Impact of participation in Kho – Kho on academic performance and impact of sedentary lifestyle of sedentary persons on academic performance and the comparison between the kho kho players and non-sports persons.

Among the traditional sports in India, kho-kho is one of the most important. According to most historians, the game is a modified form of 'Run-Chase', which Mainly includes the act of chasing and touching a person (of opposite team). This Game is simple, inexpensive and highly enjoyable, so it is very popular in developing country like India. It is a game of fitness, timing, reflex and stamina. To catch by pursuit-to chase, rather than run- is the main theme of kho-kho. This game also involves a sense of sportsmanship, loyalty between team members, obedience and discipline. Kho- Kho is a running and catching game that is played in the Sub-continent of Asia, namely India. It has its origin at Pune Gymkana which is in the state of Maharashtra. Kho-Kho is one of the many traditional games played in India. This game involves chasing and touching a person. With its origin in Maharashtra, Kho-Kho in ancient times was played on 'raths' or chariots and was well known as Rathera. Kho-Kho is a simple, inexpensive and an enjoyable game.

The concept of the game: Basically kho-kho is Indian traditional game. Kho-kho game is played particularly in rural and urban areas. This game has become popular in other states also.

Kho-kho is a purely typical Indian game and most probably it was originated from the state of Maharashtra. In ancient time the game was played on Chariots and was known as "Rathera" which has been referred the term "Atyapatya" in his" Abang" which is further considerd as the origin of kho- kho. In some region of Maharashtra the people used to play in this occasion of" Holi/ Diwali" festivals.

The term ‘kho’is derived from the Sanskrit verb’ Syu’(i,e get up/ go). Sometimes the ward Mahapranoccher in yoga is used as equivalent to’ kho’.Therefore every chaser as an ignition point to start fast movement asters the sound kho.

The game of kho-kho is based on natural principles of physical development. It is vigorous and fasters a healthy competitive spirit among youths. It is not merely running with speed but it’s a ‘CHASE’ a natural instinct to overtake to pursue, to catch a kill .No doubt speed is the heart and to stand to a relentless pursuit of 9 minutes at a stretch (turn) this heart demands stoutness, stamina. In turn a physically fit youth enjoy it and the spectators who watch enjoy a thrilling sport to their satisfaction. The game is played in two innings, a team consists of 15 players, however 12 are nominated for a match and only 9 take to the actual game initially. Every team has to chase and defend for 9 minutes each twice in a match that thus consist of 2 innings, chasing or defending once in an innings is termed as ‘turn’ of the particular act. There is a rest of 9 minutes in between two innings and 5 minutes time is allowed for turns in an innings for a change over. Controlled sprinting, dodging and diving are few skills exhibited during the game which is won by a team that scores more points.

The game can played on any surface that suite open field sports. As on today it is played on grounds prepared from earth or even on turf. Needless to say that synthetic ground and playing indoor is on card. (Kho-Kho federation of India ed.1995, p.2)

The game of Kho-Kho can broadly be followed by resolving the basic skills and techniques of chase and skills and techniques of running away and dodging the chasers and not allowing any one of the chasing opponents touch your person or the apparels worn by the defender.

The midline was obliterated by transverse cross lines at eight different places. 3 yards 6 inches from one another. Poles came into existence and defenders were prohibited to touch the squatting chasers one sitting at each cross line but facing opposite sides alternately. The game with its fast pace so fascinated the spectators that the governor of Bombay Presidency H.E. Lord Wallington also admired the merits and potentials of the game.

Chasing needs basic speed in setting up at the instant of Kho-Kho exactly like setting off the blocks in 100 mts. run at the gunshot. You must achieve the maximum acceleration within couple of steps to catch the defender running away converge and clinch him to a narrowest possible runway where he cannot possibly use his dodging tactics by moving on either side to tempt the chaser to change his direction and shoulder line. The chase could be successfully concluded by diving at the defender and touching his heel of the hind foot while running. This is the most sure and safe technique to score a defender.

Other subsidiary skills can be employed time to time when chasing a far away defender the other defenders are comparatively inactive and less alert when the slowly loiter along the side lines. While developing your basic acceleration you may move a little sideways without changing the shoulder line and catch those napping defenders with least efforts. This sudden 'bonus' collected thus can easily turn the tables in a tight match.

Another old technique is to extend your arm across the mid-line and touch the person or defender who is concentrating on turning around the pole and watch about his stepping that he is not touching the central line. This short cut often proves to be very effective in a hotly contested match.

The major change was that the defenders came in the field at a time in batch of 3 and the next three came in when all of the previous batch were scored out. So also the chaser was obliged to render 'Kho' when new batch was to come in. the fouls were dealt severely to curb the tendency of unlawful attack-chase and was compelled to render 'Kho' in the opposite direction to that of the defender. Consequently the 'deduction of 2 points rule' was scrapped. Scoring was simplified by awarding only one point for chaser on scoring each defender.

The panel of officials so far had one referee and one scorer. Now two Umpires, one Chief Referee a scorer constituted the panel. The poles in the playfield were raised to the height of 4 ft. with a maximum circumference of 13 inches.

In case of tie an extra inning of 7 minutes each was scheduled. If the tie was not resolved then the whole match was to be replayed. So also, the former rule of playing out the

remaining time only of a match haulted for some uncontrollable obstruction was replaced by a new rule of playing the whole tie as "Replay" and not only “remaining part “as before.

Today rules stand a little different in that, if the tie is not resolved in an extra inning each, then a rule of " Minimum Chase " is applied for scoring 'one point' by each team.

Other techniques include a joint effort by two or three quick paced chasers and chase two or more defenders and push them close to face these chasers to jump like spring - 'jack in the box'.

So many other skills and techniques could be evolved and adopted to effective use by intelligent chasers. Dr. Satish Desai, Sunil Tambe, Shrirang Inamdar all excelled by their speedy chase while Vijay Bhat, Sharad Bhate excelled in scoring by extreme skilled dives culminating chase to score valuable points. Rajendra Dravid and Satish Desai always featured picking up 'sitting ducks' on the sidelines.

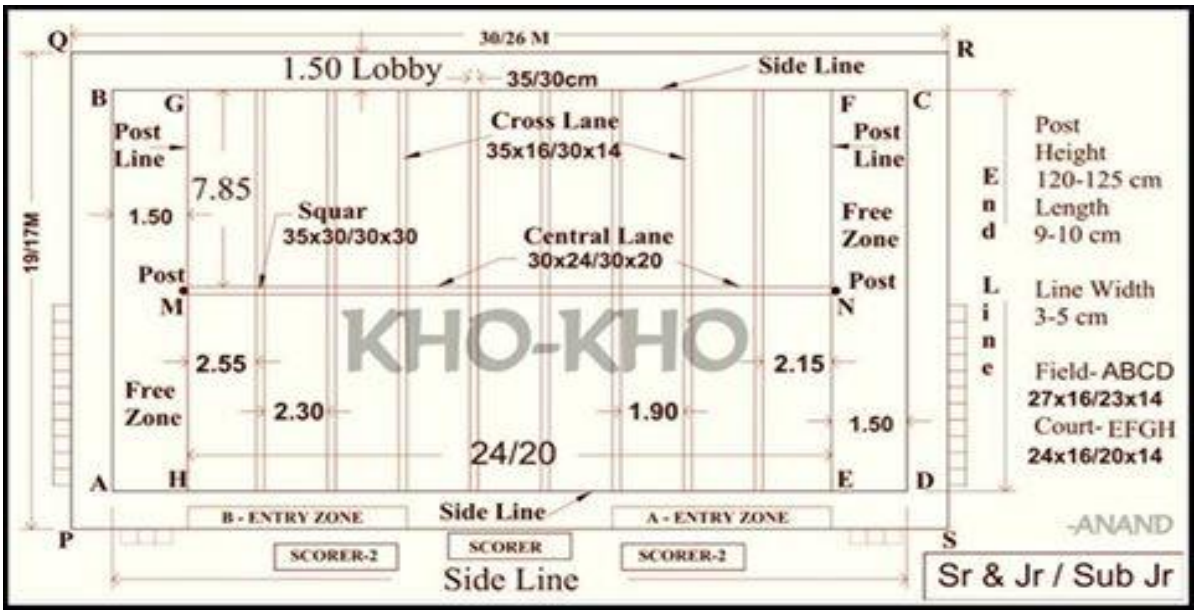
Defence was championed in three basic methods. Running zig-zag in the mid-line in single, double or triple chain is a traditional technique. So also dodging in Atya-Patya style and defending in circles around only two or three chaser squatters is an old technique which is almost getting extinct as its own parental game Atya-Patya. Dinkar Jadhav of Baroda, a tall man over 6 ft. played beautifully in the chain form in spite of his lanky legs and was a treat to watch. Dr. Prakash Sheth and Shyam Pote played single or double chain and almost invariably dodged turning around on the front foot running speedily and defending, always commanded applauses from appreciated crowd which thronged to watch battle raged of Kho-Kho.

Venkat Raju of Karnataka still evolved a new technique of chain game in defending in usual or triple chain always avoided going to end poles and turned back a cross lane or two and started the chain in opposite direction. This always baffled chasers who banked their attack on crowding and jostling the defenders to the pole.

The round pattern defence was a feature of Dilip Bhuleskar, Girish Dande, Arvind Patwardhan, Pramod Gawand's forte in defence. Shyam Purohit, Suhas Wagh, Hemant Jogdeo, Dr.Prakash Sheth, excelled in all types of defence. Seldom anybody ever emulated

'front foot dodge' so effectively employed by Dr.Prakash Sheth, Vilas Deshmukh of Pune in recent years exhibited the pleasing grace of chain game elegance.

The game of chase as was a favourite pasture of many renowned sportsmen like Bapu Nadkarni, Pranav Roy of Cricket, Nandu Natekar of Badminton, Angel Mary, Sunder Shetty. Athletics, Basketball stalwart MeeraDeviyyah, Footballer Alok Mukherji and several others who made their mark in International Sports field.



History of the game Kho-Kho:

The game is played in deferent parts of country with some variations kho- kho game. As it is seen today has under gone a tremendous state of development since its birth in Maharashtra during 17th century. Further Maharashtra sports organizer 'Nurulkar' modified the game as a recreational activity; however, bellows were constituted by the office bearers of two gymnasiums in Maharashtra during the year 1910.

The Deccan gymkhana of Poona a first formulated the rules of the game in 1914 and revised by the some in 1919 and 1928; through they were not published at that time. It was Maharashtra physical education association which published its rules in book form, for the first time in1935. In 1938, the second edition was published with certain modification.

Gradually, the next edition was published in 1943. Further" Akhil Maharashtra Sareerika Sikhshan Mandal" published the new edition of the rules in the year 1949. In 1959, just after the national game at Calcutta the kho- kho federation of India was formed and the first national championship was held at Vijavawada Andhra pradesh in 1960. After that it was held in all categories in national and Inter university level.

The federation amended the rules in 1961 and also started national competition for women in Kolhapur since then the nationals in kho- kho are held every year at some or other place in India. It was decided at Indore in 1964 to give national awards to the best kho- kho players' Eklavya' for men and' Rani Mahalakshmibai' for women since 1971, 16 years old boys are also given national award of 'veer Abhimanyu'. 'Janaki' award for under 18 years girls.

One of the major attributes of a successful animal life is "ACTIVE CHASE" which is a cardinal principle of the Indian game known as Kho-Kho, synonymous with the phrase "Game of Chase". It won't be incorrect or erroneous to state that Kho-Kho was a recognized sport in ancient times even earlier to the oldest mythological writings of the classics, "MAHABHARAT". the game of chase was then also a legend as it is used in literary phraseology as " putting KHO to someone's active chase meaning putting an effective block and stopping the progress ", like we use the phrase " it isn't Cricket " meaning it is unfair and so on... The present appearance of the game was an adoption about the times of the World War - I, in 1914 but all the same lacked exacting rules and regulations that govern the modern games. There were neither any dimensions to the playground nor the poles which demarcate the central line. Time factor was also missing. The Deccan Gymkhana of Pune so named and baptized by the great Indian leader Lokmanya Tilak drafted the first ever rules and regulations which symbolized the metamorphosis of the game soon to follow. This initial stage marked the limitation of the playground and yet sadly lacked the poles demarking the central line in the field. Instead, two less calibered players were posted squatting at the place and chasers to run around them to return to the midfield. But even then the game caught imagination of the experts in field games. The experts took no time to realize that the game demanded highest degree of quick and brisk movements, very high grade of nerve reflexes and tremendous stamina

which all characterize a supreme athlete. 1919 saw the game delimit an elliptical field with 44 yards long midline and 17 yards width of the ellipse.

1923 - 24 saw foundation of the Inter School Sports Organization and Kho-Kho was introduced to develop at the grass roots and consequently popularise the sport. The move certainly showed the results and the game of Kho-Kho mainly owes it to the efforts taken by the Deccan Gymkhana and Hind Vijay Gymkhana.

To develop skills and expertise in Kho-Kho, the then prevalent games of Langdi and Atya-Patya were the supporting factors, especially Atya-Patya which was very popularise because of its suffle skills of defending. Legends and giant personalities in Pune like Cricket Maharshi Prof. D.B. Deodhar, Persian language scholar and redouble researchist historian MahamahoPadhyaya D.V. Potdar and the dozen of Indian games Dr. Abasahib Natu all played Atya-Patya with rare skill.

The Akhil Maharashtra Sharirik Shikshan Mandal(Physical Education Institute) was founded in 1928 when Dr. Abasahib Natu of Pune, Shri. Mahabal Guruji of Nasik, Shri. Karmarkar Vaidya of Miraj and Dr. Mirajkar of Mumbai spared no efforts to negotiate with Kho-Kho experts and drafted the rules and regulations of the game which differed but just a little from the existing rules of the Federation today. Hind Vijay Gymkhana, Baroda and Deccan Gymkhana, Pune had their own codes of rules which were in variance with each other.

Experts from sixty Gymkhanas came together and evolved a joint code of rules under the banner of Akhil Maharashtra Sharirik Shikshan Mandal in 1933 which was circulated all over and with a few suggestions and alterations. A " new code " was adopted in 1935.

Initial scoring system (1914) offered 10 points for every opponent getting out and each innings lasted for nine minutes. 1919 made it to 5 points pre opponent and innings lasted for eight minutes. If the whole team was scored out before time, then the chasers were allotted a bonus of 5 points for every spare minute left unplayed.

1935 saw the major change. Elliptical playground became a rectangle, the distance between two poles shortened to 27 yards and the free zone beyond each pole a rectangle 27 yards x 5 yards also known as 'D' zone. The free zone had no barriers for the chaser who could move to any direction irrespective of change of direction.

The rules had scoring as 10 points per opponent and 2 minutes deduction for every foul committed. But this encouraged tendency to get opponents out even by unfair means, committing fouls of high timing etc. So also 'Kho' was to be rendered by touching the back of the squatting chaser that was often overlooked and done without synchronization and the foul was neglected by the chasers who contemplated getting 10 points at the cost of one of two fouls.

At a time only two defenders took to the field and only one was replaced as one got out. And if all nine defenders got out within the time limit, they had to defend again with a loss of time and with same serial number as before.

The end of 1935 saw again some changes and reforms in the rules based on the experience gathered in adopting the code.

1936 was the golden opportunity for the game of Kho-Kho when Berlin Olympic Games featured an exhibition of Kho-Kho in the main stadium. The Hanuman Vyayam Prasarak Mandal of Amravati were proud exhibitors.

1938 saw one step forward when Akhil Maharashtra Sharirik Shikshan Mandal organised zonal sports which attracted tremendous response from the budding enthusiasts as well as organizers. This needed yet another few reforms which were adopted in 1943 as well as 1945.

1942 saw Brihan Maharashtra Sharirik Shikshan Parishad of Delhi accommodate Akhil Maharashtra Sharirik Shikshan Mandal in their organisation and thus fostering the game of Kho-Kho commenced on an All India basis and the game started with new enthusiasm and zeal.

During the World War - II times Dr. Nash, a renowned U.S sports organiser and technician - cum - expert visited India and saw the game of Kho-Kho. Impressed to the fullest of the coze, Dr.Nash uttered that India should regard Kho-Kho as its National Sport. In that chunk of time the Hind Vijay Gymkhana and Jumma Dada Vyayam Shala in Baroda, the Sanmitra Sangh and Arya Kridoddharak Mandal were the renowned Kho-Kho teams in Pune. Hind Vijay Gymkhana organized the zonal sports.

Inter Versity Sports Body includes Kho-Kho in their schedule of annual tournaments in 1952. The untiring efforts of Shri. Bhai Nerurkar and his colleagues saw Kho-Kho Federation of India come into existence in 1955. Andhra Pradesh politician leader Shri.Gopal Reddi as the President, Shri.S.K. Dubey of Athletic Federation and Kabaddi Federation as Vice-President, Shri.Roy Choudhari of Football Federation as the Hon. Treasurer and Shri.Bhai Nerurkar as the Hon. Gen. Secretary. The meeting of Federation at Kolhapur drafted the first ever code of rules and regulations to be followed in all states of India.

1959 saw the Sanmitra Sangh of Pune open yet a new vista for Kho-kho. The Sanmitra Sangh conducted a first ever match of kho-kho in artificial lighting. The match featured Vijay Club, Mumbai ana Madyasta Ramal of Baroda.

Period wise Para vision of Kho-Kho shows, earliest Kho-Kho features Shri. Shankarrao Patankar, Dr. Abasahib Natu, Dr. K.N. Jejurikar of Arya Kridoddharak, Shri. V.N. Joshi of Joshi Garagestorm the Kho-Kho fields by their extra ordinary displays. 1940 to 1955 featured Shrikant Tilak, Khanderao Date, Dr. A.C. Lagu, as stalwarts of Sanmitra Sangh and Dr. V.T. Athavale, D.K. Joshi took the fields to tumultuous roars from appreciative crowds. Haribhau Sane, Pandurang Palwankar were dreaded chasers. So also was RajabhauVaidya. The decade 1950 - 60 saw Adv. Nandu Ghate, Raju Khondke storm the Kho-Kho fields by their performance. Avinash Bhave made a unique place for himself in Kho-Kho.

The first ever All India Kho-Kho Championships were organised at Vijay Wada in 1959 - 60 under the auspicious of Kho-Kho Federation of India. The then Mumbai province won

the championship under the leadership of Rajabhau Jeste who was a champion player, expert commentator and redoubtable coach made in one. 1960-61 featured Women's Championships for the first time.

Individual prizes were installed in 1963. Man of the Tournament Award "EkalavyaAward"was won by Vishwanath Mayekar. The Woman of the Tournament Award "Rani Laxmibai Award" was claimed by Usha Anantham of Mysore.

1969 - 70 featured the junior age group competitions at Hyderabad. Youth under 18 and Boys under 16 of age were two new categories introduced where Hemant Jogdeo of Maharashtra was adjudged as the best youth player of the year and was honoured by Abhimanyu Award. Women's junior group Girls under 16 were held in 1974 at Dewas when two more sub-junior groups Boys under 14 and Girls under 12 also commenced yearly championship tournament every year where the best sub-juniors were awarded 'Bharat Award' and 'Veer Bala Award' boys and girls respectively.

1982 saw the Federation organise Men's and Women's Championship yearly for Federation Cup. Shri. Kashinath alias Bhai Nerurkar's untimely demise was a jolt to Kho-Kho movement. To commemorate his great effort for the noble cause of Kho-Kho the enthusiasts and admirers of Bhai donated Bhai Nerurkar Gold Trophy. The annual championship for the Trophy were first organised by the Madhyastha Ramal of Baroda who eventually dominated the 1960 - 70 decade by their fine performances.

The Gold Cup Championships never ran smoothly year to year but had periodical haults due to non - availability of sponsor groups. So far the championship has been conducted 14 times for "ALL COMERS "where MadhyasthaRamal Baroda are 3 time winners, Gujarat Kreeda Mandal also of Baroda won 2 times, Sanmitra Sangh of Pune won 1 time and Nav Maharashtra Sangh of Pune won 8 times, achieving 'Hat-Trick' twice.

The decade 1960-70 was dominated by Men of Baroda and Women of Baroda, Indore and Bombay. Sudhir Parab was the first ever Kho-Kho player to be awarded by the coveted "Arjuna Award" of All India. However a new rule drafted by the Federation allowed a player to be declared the Best Player of the Year never more than 'once'. Naturally

therefore Mohan Ajgaonkar, Rajabhau Ajgaonkar (both Vijay Club, Mumbai) YogeshYadav, Bhau Mane, Dinkar Jadhav (all of Baroda) also were awarded the Best Player of the Year with 'Ekalavya Award'. Suresh Dinkar, Shyam Purohit (also a Shiv Chhattrapati Award winner), Dr. MadhusudanZamwar, ArvindPatwardhan, Sunil Tambe in the men's championship were the proud awardees.

Pushpa Bhanorkar of Indor, K. Jayanti of Mysore, VimalKarandikar, etc. in their own way dominated the women's Kho-Kho. Later from 1970 onwards Pune Kho-Kho stalwarts have been dominating beyond the shadow of doubt. Except 1980 - Adilabad, Maharashtra has always been the winner in Mens.

Upto 1975 Indore and Baroda Women dominated the Women's field. Then Pune and Indore dominated almost alternately. All India All Comer's Tournaments are also dominated by Sanmitra Sangh and Nav Maharashtra Sangh of Pune only. 1975 onwards Karnataka Kho-Kho has made remarkable progress and always make their presence feel. Baroda on the contrary has fallen back on a bad patch in spite of their tradition of such skilled players and expert coaches is something beyond imagination.

1970 onwards Maharashtra has contributed a galaxy of star performers in Kho-Kho. The role begins with Dr. Prakash Sheth and Dr. Satish Desai (both Shiv Chhattrapati Award winners), Shrirang Inamdar (Arjuna Award and Shiv Chhattrapati Award winner and nine times representing the state, record unparalleled by any other player so far), Rajendra Dravid (represented the state 8 times), Girish Dande, Hemant Jogdeo (Both Veer Abhimanyu Award and Ekalavya Award winners and also Shiv Chhattrapati Awardee), Hemant Takalkar (Abhimanyu Award, Ekalavya Award, Shiv Chhattrapati Award and Arjuna Award winner), Vilas Deshmukh, Atul Wakankar, Milind Marathe and so on.

Womens field produced extreme skilled players like Bhavana and Kishori Parekh, Achala Devre (Arjuna Awardee) all three of Baroda, Nalini and Sushma Sarolkar of Indore, Veena Parab, Surekha Kulkarni, Usha Nagarkar, Jayashree Deshpande, Sunita Deshpande, Rekha Lunkad, Nirmala Medhekar, Nisha Ambike all of Maharashtra have been the star performers.

Last five or seven years Women of West Bengal and Kerala are also making their presence felt, Manipur and Punjab Women are not far behind.

National Institute of Sports Netaji Subhash Institute included Kho-Kho in their curriculum since 1971 as six weeks schedule. In 1976 it was raised to 10 months schedule.

Indian Olympic Association included Kho-Kho in 1982. 1989 saw Kho-Kho as a 'demonstration' in 'Asian Games' Festival. In 1987 again a demonstration was held in 'South Asian Games' and Asian Kho-Kho Federation came into existence with major membership though of only three countries which soon became a seven nation Federation under the Presidency of Shri. Sharadchandra Saha and Mukund Ambardekar were elected as Hon. Gen. Secretary.

Some new reforms have been incorporated by the Asian Federation in that. The poles have been put a little close distance at 23.50 meters and the play ground also increased in the width of 16 meters. The duration of the innings will last to nine minutes.

1998 saw the first ever International Championship held at Kolkata. Sponsors from various fields have been attached to this great game and Bank of Maharashtra has developed their first ever team of Professional players when others like Indian Railways are about to follow the suit.

Income Tax dept. Reserve Bank etc. also have picked up Kho-Kho players for their regular staff. Inter Bank Kho-Kho Tournaments also have started as a regular feature of calendar year. Late Yash wantrao Chavan was the first president and since then the Federation has always ill-using the persons at the helm. Present Shri.Sharadrao Pawar is the President of the Federation.

Watching the Kho-Kho Championship, prerson no less calibred than Shri. Vijay Merchant, the idol of Indian Cricket uttered " Hm sadly mistaken I was so far when I imagined Cricket as a manly game and Kho-Kho as a feminine enterprise..... how earnestly now I feel exactly the other way round and feel sorry for not having played Kho-Kho in the childhood.."

Little Master Sunil Gavaskar too was so apologetic for having neglected this game in the childhood and uttered " had I ever even the slightest of the idea of this grand spectacle, perhaps I'd have preferred Kho-Kho to Cricket for ever ".

Such a game of skill, strength and extreme elegance coupled with tremendous requirement of tenacity and stamina is a Grand Indian Game of Chase.

Like other games & sports this Kho-Kho game is also organized for competition at most of the junior & tertiary level even the Zonal ,State & inter State intercollegiate & all India university levels. Kho-Kho at competitive level requires high performance, which depend upon the procedure "How the player are selected & way the selection criteria are reliable & valid? Although there is a multiplicity of opinions about this question & as till date there is no solution to this, it was thought desirable by present investigator to design & standardize co-relation of Kho-Kho playing game ability test, which could be of great use in selecting the sport talents in Kho-Kho for exhibiting top performance. Kho-Kho and Sports have an important place in India. Since Ancient times because of several reasons, Sports of many kinds are being played in our Country since a long time. Several kinds of exercises have been in vogue even today. Some sports are played for the growth of our body. Whereas some are played for the purpose of winner in the Tournament and record in this game.

1.2 STATEMENT OF THE PROBLEM

The present study was selected to know the factors on which kho-kho performance is actually depend and that is why the title of the study was "PERFORMANCE STRUCTURE OF STATE LEVEL MALE KHO-KHO PLAYERS".

1.3 DEFINITION OF THE TERMS

In order to understand the basic concept of present study "PERFORMANCE STRUCTURE OF STATE LEVEL MALE KHO-KHO PLAYERS" in following term should specifically understand as mention here under:

i) Performance Structure: As a concept of performance structure means the makeup of sports performance. It involves different constituents of performance such as body height,

Weight, and age; Fitness and conditioning level; Technique &tactics level; Rules of games & sports, climatic factors and psychological makeup of the performance. Performance structure has been identify as a very complex structure with a fairly large no of influencing variables.

With the present study performance structure has been specifically use to indicate the specific make up of kho-kho game performance. The involve factors that have been studied were Anthropometric profile, Motor fitness profile, Physiological profile and Psychological profiles.

ii) State Level kho-kho Players: Participate in national level kho- kho competition.

1.4 DELIMITATIONS OF THE STUDY

Present study was carried out with following delimitation.

i) The present structure of kho-kho game was analyzed with state level players as subjects.

ii) The number of subjects was only 50.

iii) For analyzing performance structure, only the anthropometric parameters, motor fitness parameter, physiological parameters and personality factors were selected.

iv) The present study was confined to male subjects only.

v) Among psychological factors only the personality profile studied and analysed in present investigation.

v) Performance of the subjects was judge by judges rating.

1.5 LIMITATIONS OF THE STUDY

Present study was carried out with following limitation:

i. Equipments & tools used for measuring different selected parameters were not of very high standard.

ii. Inspired of the best effort of the investigator, there was limitations regarding motivation sincerity and all-out efforts on the part of the subject, interest, willingness also limiting factors.

iii. Climatic change for different day's data collection couldn't be control uniformly.

iv. Time and finance were also limiting factors.

1.6 HYPOTHESES OF THE STUDY

Based on the past experience and available knowledge the following hypotheses were formulated:

i. It was hypothesized that selected anthropometric parameters viz. Weight, Standing height, Age, Arm length, leg length, Hand length, foot length, sitting height, body fat %, Lean body mass would possess significant relationship with kho-kho game performance.

ii. It was hypothesized that selected motor fitness components viz. speed, agility, leg power, flexibility, static balance, Eye hand coordination would have significant relationship with kho-kho game performance.

iii. It was hypothesized that selected physiological fitness components viz. Heart rate, Blood pressure - systolic & diastolic, Force vital capacity, and Vo2max would have significant relationship with kho-kho game performance.

iv. There would have differences in Reaction time and personality traits of the kho-kho players than the normal people.

1.7 SIGNIFICANCE OF THE STUDY

It was believed that the result of the present investigation could be of very high significant for physical education in general and the game of kho-kho in special in the following ways:

i. The result of the study will indicate the responsible factors for the performance in kho-kho game.

ii. From result of the study it is also be possible to clearly understand the relative importance of the selective parameters for improvement of kho-kho performance.

iii. The results are also help to understand the anthropometric profile of national state level kho-kho players in detail.

iv. It also to be helpful for selecting kho-kho players.

v. The result of the present investigation also helps coaches for training of state and national level kho-kho players.

vi. The result of information for future investigation to this area of study.

CHAPTER –II

REVIEW RELATED LITERATURE

The review of old literature provides opportunities to the investigator to accumulate an idea of the study that was already been done in that particular field. The study of old related literature helps to avoid the chance of duplication provides theories and ideas for further investigation from the books, journals and reviews. In this chapter a review of some literature which were found to be directly or indirectly related to the present study has been presented below –

2.1 LITERATURE REGARDING ANTHROPOMETRIC PROFILE

Cozen [1](1930) attempted to classify physical education students (N = 200) by anthropometric measurement. These factors are appearing to be height, weight and performance. He stated that there was no relationship between height and weight of girl with fundamental skill achievement in a variety of sports. Whereas administration as found little predictive value in height and weight of track and field performance.

Wettstone[2] (1938) attempted a list of qualities which was thought that a good gymnast would possess that was compiled and sent to twenty five of the country's outstanding coaches and gymnasts (N=25). These authorities ranked the qualities according to importance, test for 15 of the highest ranking qualities were obtained from selected group of 22 gymnasts actively engage in gymnastics at the University of IOWA. Eleven anthropometric components were taken. A test was constructed consisting of three elements, thigh circumference/height strength test (consisting of chinning, dipping and thigh flexion), and the Burpee Test which predicted potential ability in gymnastics with a multiple correlation of .79.

[1] F.w.cozen et al., "A study of stature in Relation to physical performance," Research Quarterly (1930):3845.

[2] Eugene Wettstone, "Test For Predicting Potential Ability in Gymnastics and Tumbling" Research Quarterly 9 Dec. 1938):115.

Hindmarch[3] (1960) administered the following tests two hundred Canadian born white boys (N=100) anthropometric height, weight, height-weight ratio, arm length, sitting height and leg length, performance one minute sit-ups, standing broad jump and one minute squat thrusts, trunk flexibility criteria-Leighton trunk and hip extension- flexion test, cureton trunk flexion test, modified ascot French bobbing test and Kraus Weber flexion test. The correlation between the anthropometric and performance tests and the flexibility criteria were low, the highest was .36 between the standing broad jump and the Scots French Test, and the Kraus-Webs Test correlated .887 with the Scott French Test .830 with the cureton test and .779 with Heighton's test.

Boseworth[4] (1965) conducted as study on (N=187) college Women who were tested for leg strength and vertical jumping ability. Anthropometric measures and ratios were ascertained from photograph. The correlations were computed between the vertical jump and each of the anthropometric variables by strength. A multiple R of (.612) was obtained with the criteria leg left/weight x shape index, bi-iliac width/leg+2, lower leg, and foot width. Neither the anthropometric component as strength variables nor the cumulative effect of the vertical jump to predict performance adequately.

Campbell[5] (1980) selected forty male (N=40) members of the 1978 Springfield College Varsity Football Squad were tested for height, weight, 10, 20, 30, and 40 yard dash, speed, vertical jump, agility, upper body strength and lateral movement. In addition, each player had a game performance score assessed by the grading of a game filling selected at random treated by multiple R and regression and r. No relationship was found between height and weight and performance between agility and performance. No relationship was found between upper body strength and performance speed was found to relate positively to

[3] Robert. G. Hindmarch, "The Relationship between Various Anthropometric and Physical performance Tests and Selected Trunk Flexibility Criteria," Completed Research in Health, Physical Education and Recreation 2 (1960).

[4] Jusice m Boseworth, "Relationship between the Vertical Jump Performance of College Women and Selected Anthropometric Measurements and Strength Variable," Completed Research in Health, Physical Education and Recreation 7 (1965):93.

[5] Donald. w. Campell, "The Relationship of Selected Measures of Physical Performance and Structure to Quality of Performance in Collegiate Football," Completed Research in Health, Physical Education and Recreation 22 (1980):142.

performance. It was concluded that performance in football cannot be effectively predicted by combinations of the structural and physical performance variables utilized in the study.

Sinha's[6](1984) was to find out the relationship of selected motor traits and anthropometric variables to performance in AAHPER basketball skill test, to establish relationship between selected motor traits and anthropometric variables to performance in AAHPER basketball skill test. The finds of this study indicated that performance in AAHPER basketball skill test was significantly related to agility, cardiovascular, endurance, explosive strength, Height and pondral index, Whereas performance in AAHPER basketball skill test was not significantly related to speed, grip strength, back, flexibility, weight and pondral index.

Murlidharan's[7] (1984) was to find out relationship between anthropometric and physical performance variable measures to performance in long jump. The average ages of the subject were 22 years. Pearson Product method was used to compute correlations between performance in each independent variable namely standing broad jump, 50 yards dash, Shuttle run (4x10 yards), sit and reach, vertical jump(leg length), height, weight. From the findings of the study it may be concluded that 1) leg length, height, standing broad jump, 50 mts. Dash, Shuttle run(4x10 yards), sit and reach and vertical jump were most significant independent component in prediction sources in running long jump. 2) Body weight did not prove to be reliable when single independent variable was correlated with the performance of running long jump. Therefore weight should not be used singly for predicting performance in running long jump.

Promoda Devi[8](1984) was studied to determine the relationship of selected physical variables each as strength a) arm strength, b),leg strength, agility, speed, flexibility, anthropometric component weight, height, arm length, leg length, foreleg length, thigh height, pondral index to performance in shot put. Pearson Product Moment Correlation

[6] Shailendra Kumar Sinha, "Relationship of selected motor traits and anthropometric variables to AAHPER basketball skill test (Unpublished thesis Jiwaji University,1984):72-74.

[7] K. Murlidharan, "Relationship of Selected Anthropometric and Physical Performance Variables To Performance in Long Jump," (Unpublished Master Thesis, Jiwaji University, 1984):45-46.

[8] Khandram Promoda Devi, "Relationship of Selected Physical Variables to Performance in Shot put," (Unpublished Master Thesis, Jiwaji University, 1984):59-61

Methods was used to compute correlation and significance of the study. The findings of the study revealed that there was significance correlation between the all variables.

Devaraju & Kalidasan[9] (2012) conducted a study which was to predict the kabaddi playing ability from selected anthropometrical and physical variables among college level players. 144 male inter college kabaddi players were randomly selected from various colleges in Tamilnadu state and their age ranged between 18 and 28 years. These included standing height, body weight, arm length, leg length. Physical fitness components of 50m dash, flexibility, leg explosive strength, muscular power and muscular endurance were taken. The playing ability taken as the performance factor was subjectively assessed by three qualified kabaddi coaches. The result revealed that the inter-relationship exists significantly between the anthropometrical, physical and performance variables among male inter-college kabaddi players. The result also revealed that speed, agility, weight and flexibility become the common characteristics which can predict the playing ability in kabaddi players.

Kumar Mishra and Dr. Vishan Singh Rathore[10](2013) studied on Selected Anthropometric Parameters as a Predictors of Volleyball Playing Ability. Selected Variables were Height, Weight, Arm Length, Upper Arm Circumference, Leg Length, Thigh Circumference (Independent Variables). Total of 48 male Inter-university level Volleyball players were selected from different colleges of R.M.L.A.U Faizabad during inter collegiate tournament. Age of the subjects was ranging between 18 to 25 years. Selected Variables were Height, Weight, Arm Length, Upper Arm Circumference, Leg Length, Thigh Circumference (Independent Variables). Volleyball Performance was considered as Dependant Variable. There was found fructiferous in estimating Volleyball Performance on the basis of selected Anthropometric Variables.

[9] K. Devaraju and R. Kalidasan,. "Prediction of Kabaddi Playing Ability from Selected Anthropometrical and Physical Variables among College Level Players". Asian Journal of Information Technology, 2012 11: 131-134.

[10] Mishra.M.K.& , Rathore. V.S, " Selected Anthropometric Parameters as a Predictors of Volleyball Playing Ability" International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Volume 4 Issue 9, September 2015.436-439.

2.2 LITERATURE REGARDING MOTOR FITNESS PROFILE

Walter and Karl[11] (1952) conducted a study to show the relationship of physique and shape to physical performance. The Motor Fitness test was administered on Indian elementary school boys. The test for the elementary level was composed by four test items i.e. Straddle chin-up, push-up, squat thrust and vertical jump. They concluded that, a) the size and shapes had an influence on physical performance. b) The thin and medium in physique who was large performed equally. The same could be said about the smaller groups.

Gross and Thompson[12] (1957) were found high and significant relation between dynamic balance and speed in swimming, and dynamic balance and ability in swimming. The ratio calculated between these same abilities indicated and that dynamic balance was not a chance factor and may be an important factor in speed and in ability in swimming.

Smith[13] (1961) presented some important current information on relationship of certain structural measures and performance in vertical jump. All the correlation obtained was no-significant and almost zero. Similarly a low correlation was found between the vertical jump and the individual's dynamometric leg strength.

Margaret[14] (1964) studied body structure and design factors in motor performance of college women, pure speed, Sargent jump, 600 yards run/walk, back strength, leg strength and strength index were studied in relation to 43 measures of body structure and design. The correlation was significant beyond 0.01 level obtained between performance criterion and or more variable from each group.

[11] Book Walter and W. Karl, "The relationship of Body Size and Shape to Physical Performance," Research Quarterly 23 (October 1952): 271-279.

[12] Gross, E. & Thompson, H. (1957). Relationship of dynamic balance to speed and to ability in swimming. Research Quarterly, 28, 342-346

[13] L.E. Smith, "Relationship Between Explosive Leg Strength and Performance in the Vertical Jump," Research quarterly 32 (October 1961):405.

[14] Throsen A. Margaret, "Body structure and Design Factors in the Motor Performance of College Women," Research Quarterly 35 (May 1964):418.

Holland[15] (1965) investigated the predictive value of selected variable in determining the ability to play basketball in small high schools. Measures included speed, agility, upper arm strength power, and ball handling ability, reaction time, shooting ability, passing ability, height, weight, age and previous experience. The weighted index with R= .76 was basketball ability score= (1.54) number of year experience + (1.23) score on speed dribble + (.26) score on wall volley + (.15) score on shooting test -10.11.

Johnson[16] (1968) studied the explore the relationship balance, speed, strength, height arm and leg length to success in collegiate wrestling (N=20). All subjects were measured fore arm length and leg length and tested to RT.MT. Static elbow flexion, strength, explosive leg strength and dynamic balance. Analysis by multiple R and regression showed that no combination of the independent variables was useful in predicting success.

Dolores[17] (1970) investigated the relationship of shoulder flexibility and other selected factors to throwing performance by college women. 35 college freshmen were tested on the over-arm throw involving both accuracy and distance throwing. The variables shoulder flexibility, shoulder strength, speed of arm movement, age, height, weight, background, athletic background, and number and sex of children in the family were studied. Those variables which showed a significant relationship to determine throwing, shoulder flexibility was not a significant predictor of throwing, shoulder strength was the best physiological variable flexibility was highly related to strength, either the accuracy of distance test items could have been used and best predictor of throwing was found athletic experience.

[15] Kenneth A. Holland, "The Predictive Value of Selected Variables in Determining the Ability to Play Basketball in Small High School," Completed Research in Health, Physical Education and Recreation 7 (1965):37.

[16] Neil R. Johnson, "The relationship of balance, speed, strength, height, arm and leg length to success in collegiate wrestling,"Completed research in health, Physical education and recreation 20 (1968) :25.

[17] Dromfieldmirriam Dolores, "A Comparison of the Relationship of Shoulders Flexibility and Other Selected factors to Throwing Performance by College Women," Completed Research in Health, Physical Education and Recreation 12 (1970):218.

Gladden and Colacino[18] (1978) were studied on 88 female participants of United States Association National tournament. They were measures the height, weight, skin folds, vertical jump and maximal anaerobic power of female participants. The plying ability was significantly correlated with age, height, vertical jump and maximal height on jump. The partial rank correlation showed that height and vertical jump were the major factors correlated with plying ability.

Vole[19] (1979) reported that the basic modern dance skills could be predicted by measure of selected anthropometric and physical fitness component. The fitness component which were taken by him , were height, weight, sitting vertex height, upper leg length, flexibility abdominal strength, leg strength, cardiovascular fitness and somatotyping. He concluded that ability in modern dance skills can be predicted from selected anthropometric and physical fitness component.

Bandyopdhyay. D.k. et.al.[20] (1982) studied to establish the relationship among soccer ski11 performance and anthropometric measurements, physical fitness and motor ability. Thirty male soccer players were randomly selected from the undergraduate classes of LNIPE, Gwalior. Five subjects were tested in selected anthropometry measurements (Hand girth, thigh girth, calf girth, and height). They concluded that soccer ski11 performance ability was significantly co-related to the above selected parameters.

Joseph[21] (1983) determind the relationship of power, agility, shoulder flexibility, arm length and leg length to volleyball playing ability. 30 male volleyball players of the L.N.C.P.E., Gwalior were selected as subjects. It was concluded that arm length and leg length were reliable variables in predicting playing ability of male volleyball player.

[18] L.B. Gladden and D. Colacino, "Characteristics of Volleyball Players and Success in a National Tournament," Journal of Sports Medicine and Physical Fitness 18 (1978):57-64.

[19] Bonnie M. Vole, "Predicting Ability in Basic Modern Dance Skills Through Selected Anthropometric and Physical Fitness Measurements," Completed Research In Health, Physical Education and recreation 21 (1979):114.

[20] Bandyopadhyay.S.C, "Relation of selected Anthropometric measurement, physical fitness and motor ability to soccer skill performance" (Unpublished masters' thesis, Jiwaji University, Gwalior 1982).

[21] U.K. Joseph, "Relationship of power, agility, flexibility and measurement of selected body segments to volleyball playing ability,"(Unpublished masters'thesis, Jiwaji university, 1983).

Alam's[22] (1983) study was under taken to find out the relationship of reaction time, agility and flexibility to performance in running broad jump of the 51 male students. Pearson product moment Correlation was used to compute correlation. The findings of the study revealed that there was significant correlation between dependent variable and independent variables. He concluded that 1) there was significant correlation between reaction time and running broad jump. 2) There was significant correlation between agility and running broad jump.

Uppal.A.K and Dutta.P[23] (1988) studied the motor fitness components as predictors of hockey performance N= 74. The motor fitness components include speed, strength, power, agility, dynamic balance, flexibility and kinesthetic perception, strait field hockey rating scale served as criterion measure to evaluate the playing ability. He concluded that those motor fitness components were not significant contributors to hockey performance.

Wharton[24] (1988) studied the AAHPER Youth Fitness Test as predictor of skill development in field hockey N=107. A significant relationship was found between the scores on the youth fitness test and field hockey achievement as measured by the schmithals- French Field Hockey Achievement Test.

Shergill[25] (1992) conducted a study on some motor fitness components as predictors of hockey performance (N=43). Seven important motor fitness components, which were selected, there were speed, strength, strength endurance, flexibility, agility and power. The data were analyzed using correlation technique. The correlation analysis shows that from the selected seven motor fitness components only four were significantly selected to playing performance in hockey. He concluded that Hockey performance is significantly

[22] Mohammad fakrul Alam, "Relationship of Reaction Time, Agility and Flexibility to Performance in Running Broad Jump," (Unpublished Master Thesis, Jiwaji University, Gwalior, 1983):45-47.

[23] A.K. Uppal and A.K. Datta, "Motor Fitness Components as Predictors of Hockey Performance Abstract III," New Horizons of Human Movement (Seoul Olympic Scientific Congress, 1988),p.88.

[24] Margaret H. Wharton, "An Investigation Of the Youth Fitness Test as a Predictive Measures of Skill Development in Field Hockey," Completed Research in Health, Physical education and Recreation 22 (1988):100.

[25] Harpreet Shergill, "Some Motor Fitness Components as predictors of Hockey Performance," Indian Journal of Sports Science and Physical Education 4:2 (1992):61-67.

related to speed, endurance, agility, and power, therefore these selected motor fitness components may be considered as valid predictors of hockey playing performance.

Nataraj[26] (2004) undertook a study on 61 junior level Kabaddi players with a view to find out the relationship of selected motor ability variables to the game performance of Kabaddi players. Tests of muscular endurance, muscular power, speed, agility, aerobic endurance and coordinative ability were administered and data was obtained Three specialists did the subjective rating of performance of Kabaddi players. Pearson's product correlation was applied to find out the correlation. A Significant relationship was found at $p< 0.01$ between performance and arm strength($r=0.54$) and arm power($r=0.55$), abdominal strength($r=0.51$), leg power($r=0.38$) and kinesthetic differentiation ability of upper limb($r=0.40$) and negative relationship to lower limb($r=32$).

Dhonge[27] (2011) from his research motor fitness and health fitness of boys selected variables B.M.I., Fat, Speed, Standing Broad Jump, Balance are used for the study. Mean, Standard Deviation, Factorial ANOVA was be used for this study, He concluded that**,** Playing ability and fat have close relationship in Kho -kho players, Playing ability and cardio vascular ability have close co -relation of Kho-kho players. The players of Kho-Kho game have close relationship with playing ability and balance the players of Kho-Kho game have close relationship with playing ability with Explosive strength have close relationship.

Ravikumar & Srinivasa[28] (2012) were conducted a study on "Comparative Analysis of Selected anthropometric and Physical Fitness Variables among Football Players. For this study, they were selected 45 university football players of Bangalore University. Anthropometric and physical fitness were taken as a means of measurements. The Results

[26] H.V.Nataraj, "Relationship between the Motor Ability Variables and Kabaddi Performance,"(Oral presented at the National Seminar cum Workshop on Physical Education and sports Sciences, Tiruchendur, December, 2004).

[27] Dhondge. S. R, "Co-relation of kho-kho playing ability with health fitness and motor fitness of boys" Golden research thoughts ISSN no-2031-5063 vol.1,issue.i/july 11pp.1-4

[28] Ravikumar, V., Srinivasa, R. (2012). Comparative Analysis of Selected Anthropometric And Physical Fitness Variables among Football Players In Relation To Position Play. International Journal of Health, Physical Education and Computer Science in Sports, ISSN 2231-3265, Volume No.6, No.1. pp. 89-93.

were found that defenders, mid-fielders and attackers had significant differences in anthropometric measurements such as calf girth and physical fitness i.e. agility among defenders, mid-fielders and attackers of football players. The study also indicated that defenders, mid-fielders and attackers had no significant differences in anthropometric measurements such as height, weight, arm length, leg length and physical fitness variables such as speed, flexibility and endurance of football players. The midfielders had better thigh girth than attackers and defenders. The attackers had superior agility to midfielders and defenders.

Biddle & Mohan[29] (2012) conducted a study on the topic of "A Comparative Study of Speed among Kabaddi and Kho- kho Players of Osmania University." The study aimed to bring out the level of speed among male kabaddi and male kho-kho players of Hydrabad. The sample for the study was male 20 kabaddi and male 20 kho-kho players from various colleges of Osmania University. The subjects of the study were between the age group of 19 years to 22 years. The data were collected separately from kabaddi and kho-kho players. The subjects were tested in 50 mtrs. for speed.The "t" test was computed to find out the significant difference between the mean of speed of both the groups. It was concluded that due to the kho kho players having good speed compared to kabaddi players.

Dhonge[30] (2012) conducted study on the topic of "Co-relation of Kho-Kho Playing Ability with Health Fitness and Motor Fitness of Boys". The purpose of the study was co-relation of playing kho-kho ability of the player of kho-kho with motor fitness and health related fitness. In the present study, researcher had studied and measured the health related fitness and motor fitness of the Adolescents kho-kho players .For this study and the measurements of Adolescents, the researcher had regularly observed Adolescents play kho-kho game fixed period. The objectives of the study were to find out the relationship of motor fitness.

[29] Biddle, S. K., & Mohan S. J. (2012). A Comparative study of Speed among Kabaddi and Kho-Kho Players of Osmania University. International Journal of Health, Physical Education and Computer Science in Sports, Volume No. 6, No.1, pp. 70-71.

[30] Dhonge, S. R. (2012). Co-relation of Kho-Kho Playing Ability with Health Fitness and Motor Fitness of Boys. Golden research Thoughts, Vol 1:1.

Tanuja S Raut[31] (2012) was studied on relationship between skill performances and selected motor fitness variables of tribal women handball players. The objective of the study was to find out relationship between selected motor fitness variables and skill performance of tribal women handball players .The present study was conducted on 30 thirty women handball players randomly selected as subject from the players undergoing training camps at Pt. Ravi Shankar University Raipur, Guru Ghasidads University Bilaspur, (C.G.). Sarguja University, Ambikapur (C.G) and S.G.B.A.University, Amravati,(MH). For East zone intervarsity handball competition The age of the subject ranged 17 to 23 years old. The results of the study showed that there was a significant correlation between the motor fitness components and the selected handball skills.

Mukesh and Dr. Mahesh Kumar[32] (2013) studied on A Comparative Study of Co-Ordinate Abilities of Kabbadi and Kho-Kho Female Players at College Level. A Study was conducted at S.D. College Hansi and other local colleges in Hisar aiming to achieve the main objectives of comparing the co-ordinate ability variables of kabbadi and kho-kho female players. It also includes the balancing ability and differentiation ability between kabadi and kho-kho games players. The Study concluded that the Kho-kho players possessed better balance ability as compared to the kabaddi player. It also concludes that there was no difference in terms of agility and differentiation ability between kho-kho and kabbadi games players.

Dr. Joseph. Singh[33] (2014) studied Kho-Kho performance with selected coordinative ability of the inter- collegiate players. The purpose of this study was to investigate the relationship of Kho-Kho performance with selected coordinative ability. Eighteen female Kho-Kho players had participated in Inter- collegiate Kho- Kho competition held at Dehradun were randomly selected for this study. Their age ranged from 18-25 years. Findings reveals that coordinative abilities - Reaction ability and Rhythm ability were

[31] Tanuja S Raut, (2012). Relationship between Skill Performance And Selected Motor Fitness Variables Of Tribal Women Handball Players. Indian Streams Research Journal, Vol. II, Issue. VII,

[32] Mukesh and Dr. Mahesh Kumar (2013**)** studied on A Comparative Study of Co-Ordinate Abilities of Kabbadi and Kho-Kho Female Players at College Level. International Journal of New Innovations in Engineering and Technology (IJNIET), ISSN: 2319-6319, Vol. 2 Issue 1 - June 2013

[33] Singh Joseph (2013) "kho-kho performance with selected coordinative ability of the inter-collegiate players: a relationship study" IJPEHSS VOL.3 ISS 1, ISSN 2278-716X.

found significantly related to the kho-kho Orientation ability, Differentiation ability and Balance ability were not found significantly related to the Kho-Kho performance as their calculated Correlation Coefficient.

Anil Kumar[34] (2014) studied on Comparison status of strength and speed between Kho-Kho and Kabaddi male players. The purpose of the study was to compare the physical fitness variable of Kho-Kho and Kabaddi Players. To fulfill the objective of the study, (25 Kho-Kho and 25 Kabaddi) players. Only those male players of K.U.K. were selected who have participated at minimum inter collegiate level of K. U. K. The data were collected in different coaching camps organized by the university. The age of the selected subjects ranged from 19 to 25 years. (Standing Board Jump and 60 yard dash tests) were used to measures the selected physical fitness variables of the players. In order to analyze the data t-test was used to analyze the data and investigator observed the significant different between Kho-Kho and Kabaddi players.

Mahaprasad Ghosh and Prof. Brajanath Kundu[35] (2014) studed on Physical, Physiological and Anthropometric Measures as Determinants of Performance in Kho-Kho Skills**.** The purpose of this study is to find out the relationships of selected physical, physiological and anthropometric variables with skill performance in Kho-Kho game. 18 to 20 years in age ranged fifty (n=50) male kho-kho players, those who participated Zonal, Inter-zonal, District, Inter- District, State and National Games, were selected from four districts in West Bengal. Cardiorespiratory endurance, agility and speed were tested as physical variable, VO_2 max and resting pulse rate as physiological variable and standing height, body weight, BMI, arm length, leg length were measured as anthropometric variables. Different Kho-Kho skills of the subject were also tested using Chair-Kho Test, Squat Run Dodging Test, Ring Game Test, Audio-Visual Reaction Test, Biped Covering the Path Test, and Zig-Zag Play Test. Using Pearson product moment coefficients of

[34] Kumar, Anil.(2014). "Comparison status of strength and speed between Kho-Kho and Kabaddi male players". International Journal of Multidisciplinary Research and Development , e-ISSN: 2349-4182 1(7): 63-66.

[35] Ghosh M and Kundu B., "Physical, physiological and anthropometric measures as determinants of performance in kho-kho skills - a corelational study". *International Journal of Humanities and Social Science Invention*, 3(8), 04-12 (2014).

correlation it was observed that, higher cardiorespiratory endurance, agility, and speed; higher VO2 max and lower resting pulse rate; and average height and weight; higher BMI, arm length and leg length can predict one's kho-kho skills.

Dr.P.Senthilkumar[36] (2015) studied on Relationship between Selected Motor Fitness Components and Overall Playing Ability of College Men Kho-Kho Players. The purpose of the study was to find out the relationship between selected motor fitness variables and overall playing ability of college men kho-kho players. To achieve this purpose, 15 kho-kho players from different colleges in Namakkal were randomly selected, for research. The age group of the subjects was between 18 to 23 years. The investigator selected motor fitness variables, speed, agility and endurance to correlate with kho-kho playing ability of the college men. Single group randomized research design was followed for this study. There was significant relationship between speed and kho-kho playing ability of college men. There was significant relationship between agility and kho-kho playing

Kavita Sharma[37] (2015) studied on Relationship study of selected Anthropometric Measurements and Physical Fitness Variables with Volleyball Playing Ability **.**The players with minimum inter collegiate level participation from Delhi University in Volleyball age ranging between 18-22 years were selected to act as subject for the study. AAHPER Fitness Test and Brady Volleyball Playing Ability Test were used for the collection of the data. Anthropometric Measurements**,** Body Height , Arm Length, Leg length was measured .For selected Physical Fitness Variables, Pull ups, Shuttle run agility Standing Broad Jump was used to measure explosive strength for Playing Ability, Brady Volleyball Test for playing ability was used. To find out the relationship between selected anthropometric measurements and selected physical fitness variables with volleyball playing ability of the players, the Pearson's product moment correlation was used.

[36] Senthilkumar.P, (2015). "Study of Relationship between selected motor fitness component and overall playing ability of college men kho-kho players" .International journal of recent research and applied studies, ISSN: 2349-4891.volume 2, Issue 7 (3) July 2015.

[37] Sharma. Kavita, "A Relationship study of selected Anthropometric Measurements and Physical Fitness Variables with Volleyball Playing Ability" International Educational E-Journal, {Quarterly}, ISSN 2277-2456, Volume-IV, Issue-I, Jan-Feb-Mar2015.

Neeraj Sheoran, Suresh Malik[38] (2015) study on Analysis of selected physical fitness variables associated with playing performance of U-19 volleyball players. The purpose of the study was to find out the relationship between selected physical fitness variables with playing performance of U-19 volleyball players. The sample consists of 96 volleyball players who participating in U-19 School State of Haryana. 20meter dash, Sargent jump, agility, basketball throw, sit and reach, bridge-up and 1500 meter run tests were administered to determine the motor fitness. Playing performance evaluated using four point rating scale. All the measurements were taken using standard equipments and techniques. The data were analyzed using Pearson's Product Moment Coefficient Correlation. The analysis showed that playing performance has significant relationship with speed, agility, jumping ability and hitting strength whereas no significant relationship was found with flexibility and endurance.

2.3 LITERATURE REGARDING PHYSIOLOGICAL PROFILE

Vendel[39](1962) studied the criteria for predicting success in modern penthalon (N=55). Questionnaire returns from 55 pentathaletes active since 1954 showed that successful ones were distinguished by a knowledge of more pentathlon related sports before training on 10 IHI some financial educational assistance, composition in approximately six individual sports, playing chess occasionally, never smoking being lightly underweight for their body build having a low pulse rate (56 at rest), having low blood pressure, having five diseases in their life time, having the family wage earner in the 'service' category being cautions self-sufficient, and self-confident.

Farrell, Wilmore and Coyle[40] (1984) conducted a study of exercise heart rate as a predictor of running performance (N=18). Body density residual lung volume and relative body fat were determined according to the reference procedures. Whenever a subject ran

[38] Sheoran Neeraj, Malik b Suresh , "Analysis of selected physical fitness variables associated with playing performance of U-19 volleyball players". International Educational E-Journal, {Quarterly}, ISSN 2277-2456, Volume-IV, Issue-IV, Oct-Nov-Dec 2015.

[39] William C Vendel, (1962) "Criteria for Predicting Success in the Modern Pentathlon," Completed Research in Health, Physical Education and Recreation:37.

[40] Peter A.Farrell, Jach H.Wimose and Edward F. coyle,(1984) "Exercise heart rate as a predictor of running performance" Research quarterly 51(may):417.

competitive race during the time span of the study state trade mill tests, his time was recorded and the distance verified it possible using a calibrated. The purpose of the study was to determine it a readily observable variable could be used to predict. Performance at several race distances. Many physiological reasons exist for the inability of exercise heart rate accurately predicts performance.

Tanka and Matsura[41] (1982) took anthropometry and physiological variables of 114 japanese young and long distance runners and concluded that the anthropometric attributes would predict the distance running performance to about the same degree as physiological attributes. As a result of factor analysis and the multiple regression analysis, there factors i.e. linearity of physique, girth of physique and subcutaneous fat, were extracted, and the first two factors were equally related to the 800, 1500 and 5000 meters performance. The 10,000 meters, however was best accounted for by the second factor.

Mishra's[42] (1983) study was to find out the relationship of selected physical and physiological variables to performance in fifty meter front crowl swimming. Data on the different variables was collected by administering test adopted standard procedure. Analysis of the data revealed that relationship between speed in swimming and selected physical and physiological variables i.e. arm strength, ankle flexibility, vital capacity and body surface was very high correlated positively. He concluded that, 1) there was significant positive relationship between arm, strength, ankle flexibility and vital capacity to swimming speed. 2) There was no significant relationship between body surface area and swimming speed.

Hagberg and Edward[43] (1983) studied physiological factors that relate to 20 k.m. walk performance of eight competitive walkers. The walking velocity and the blood lactate dreaming steady state exercise was highly correlated to walking pace (r =0.94) and predicted performance time is 6% which agrees previous observation on runners. The two

[41] Tanaka and V. Matsura, " A Multivariate Analysis of the Role of Certain Anthropometric and Physiological Attributes in Distance running," Analysis of Human Biology 9 (1982):473-485.

[42] Lalijee Mishra, "Relationship of Selected Physical and Physiological Variables to performance in Fifty Meter Front Crawl Swimming (Unpublished Master Thesis, Jiwaji University, 1983),p.49-52.

[43] James A. Hagberg and F.Coyle Edward, "Physiological Determinates of Endurance Performance as studied in competitive Race Walkers, "Medicine and science in sports and exercise 15:4 (1984):287-289.

factors that contribute to velocity at lactate threshold are oxygen uptake at lactate threshold (Vo_2 at lt.) and sub maximal walking economy measured as the Vo_2 at a standard velocity. The oxygen uptake at lactate threshold was significantly correlated (R=0.89) to performance in the walkers in the present investigation, which agrees with previous observation of walkers. The sub maximal male economy was significantly correlated to performance of walker's (r=.82). The maximal oxygen uptake measured during walking was not significantly correlated (r=0.62) to performance. These data indicate that the velocity at lactate threshold correlates closely to performance in walkers and that the factor of sub maximal economy, which partly determines velocity at lactate threshold is related more to performance ability in walking than was previously observed in running.

Mosher[44] (1985) examined the relationship of selected body measures to exercise energy cost in women and developed a regression equation to predict energy expenditure during sub maximal exercise (N=100). The body measures recored were age, height, weight, body composition. The sub maximal exercise task was treadmill jogging at predetermined target heart rate oxygen consumption was assessed by the open circuit Method. A significant relationship was found between heart rate, body consumption. And weight with exercise oxygen consumption.

Dwarka[45] (1991) conducted a study to investigate the relationship of physical, physiological and Motor skill variables to Volley ball playing ability and to assess the combined contribution of physical, physiological and motor skill variables to volley ball playing ability. Physical variables includes speed, arm strength, explosive power, dynamic balance, agility, flexibility, age, height and weight are taken physiological variables including pulse rate, systolic blood pressure, diastolic blood pressure and cardio muscular endurance were measured. Motor skill Variables volleying, serving, passing and sit up. 100 women volleyball players who participated in the inter college level tournaments were taken as subjects.

[44] Judy Kay Mosher, "Prediction of Energy Cost of Sub-maximal Exercise in Women," Dissertation Abstract International 46 (1985):1555-A.

[45] Dwarka (1991). Selected Physical, Physiological and Motor Skills Determinants of Performance of Female Inter-College Level Volleyball Players of Himachal state, Unpublished Ph.D. Thesis, Punjab University, Chandigarh.

Siddhu & Kumari[46] (1993) suggested about the relationship between activity and blood pressure level among 500 adult individual of Punjab. Positive association between physical activity and Systolic and Diastolic blood pressure were observed in the study further in majority of age groups. Person with light physical activity show marked higher incidence of hypertension than their medium and heavy physical activity counterpart.

Bhomik [46](1997) conducted a comparative study on selected physiological parameters between Soccer and Kabaddi players. The purpose of the study was to compare and contrast the selected physiological parameters between soccer and Kabaddi players. Total 30 players from the Kabaddi and soccer (15 from each) were selected randomly and only from the Intercollegiate terms of Amravati University. The physiological parameters selected as criterion were blood pressure, vital capacity and resting pulse rate. The "t" test was computed to find out the significance differences between the mean. It was concluded that Kabaddi players were significantly superior in vital capacity whereas soccer players were significantly superior in resting pulse rate in comparison to their counterpart but in case of blood pressure non- significance differences were found between the two groups.

Kala[47] (1999) conducted a study on Kabaddi and Kho-Kho players of Kurukshetra University. He compared physical fitness, physiological and coordinative ability variables of these games players. The physical fitness variables such as agility, speed, power and endurance strength of Kabaddi players were found significantly better in the strength components than the Kho-Kho players. However, Kho-Kho players were significantly better than the Kabaddi players in physical fitness variables such as agility and speed, power and endurance. Kho-Kho players were found better in rhythmic ability in the coordinative ability but in other coordinative ability there is no significant difference in the Kabaddi and Kho-Kho players such as Balance, flexibility, differentiation ability and lateral jumping ability. Kabaddi players were significantly better than the Kho-Kho players

[46] Bhomik, Amit Kr. (1997). "Comparison of Selective Physiological Parameters between Soccer and Kabaddi Players", Unpublished Master's Dissertation Submitted to Jiwaji University, Gwalior.

[47] Kala, D.S (1998),"A Comparative Study of some of the physical fitness and coordinative ability Variable of Kabaddi and Kho-Kho players of Kurukshetra University Kurukshetra," Unpublished dissertation 1998, "Dept. of Physical Education, Kurukshetra University, Kurukshetra.

in physiological variables such as PEF (Peak Expiratory Flow Rate) but Kho-Kho player were significantly better than the kabaddi players in pulse rate.

Christine and Jacob[48] (2000) conducted a study, "Physiological and anthropometric determinants of sport climbing performance" to identify the physiological and anthropometric determinants of sport climbing performance. Methods—Forty four climbers (24 men, 20 women) of various skill levels (self reported rating 5.6–5.13c on the Yosemite decimal scale) and years of experience

(0.10–44 years) served as subjects. The results indicated that these were labelled training, anthropometric, and flexibility on the basis of the measured variables that were the most influential in forming each component. 50 The results of the multiple regression procedure indicated that the training component uniquely explained 58.9% of the total variance in climbing performance. The anthropometric and flexibility components explained 0.3% and 1.8% of the total variance in climbing performance respectively. The variance in climbing performance can be explained by a component consisting of trainable variables. More importantly, the findings do not support the belief that a climber must necessarily possess specific anthropometric characteristics to excel in sport rock climbing.

Singh[49] (2010) conducted a study of anthropometric, physical and physiological parameter as predictors of volleyball performance. The subject for the study were fifty male and fifty female volley ball players selected randomly ,from a population of all the volleyball players who participated at university level. In this study the coefficient of correlation between selected variables of age, weight ,standing height, sitting height, Arm length leg length, shoulder width, elbow width, hip width, knee width, chest circumferences, upper arm circumference, arm circumference, and calf circumference were 63 0.106, 0.227, 0.510, 0.337, 0.257, 0.276, 0.259, 0.092, -0.174, 0.002, -.079, 0.152, 0.129, 0.276 fore

[48]Christine M Mermier, Jeffrey M Janot, Daryl L Parker, Jacob G Swan (2000). Physiological and anthropometric determinants of sport climbing performance, Br J Sports Med; 34:359–366.

[49] Singh,. T.N, , "A study of selected anthropometric physical and physiological parameter as predictor of performance in female volleyball players. Indian journal of movement education and exercise sciences, bi annual refered lournal vol.ii no.1. jan-july. ISSN 2249-6246.

respectively. Only standing height (0.510) and sitting height (o.337) showed a positively significant correlation with volleyball playing ability as assessed by a panel of experts.

Jyoti et. al.,[50] (2011) studied on the topic of "Arterial Blood Pressure and Heart Rate Response to Exercise", The investigation exhibits that exercise stress induces significant changes on systolic blood pressure, diastolic blood pressure, mean arterial pressure and heart rate. The findings of the study were in line with the view of Brooks, Fahey and White (1996) that systolic blood pressure rises steadily during exercise, in a similar trend to that of heart rate. With individual variation systolic blood pressure increases to 180 mm Hg or more during maximal exercise, while, diastolic pressure changes little during exercise in normal people. Typically, there is either no change or a slight decrease of less than 10 mm Hg during exercise.

Tiwari & Singh[51] (2012) in their study were to compare the physical and physiological variables among the inter district and Inter State level of Basketball players. Sixty (60) male basketball players (30 inter district and 30 interstate) were randomly selected from Uttar Pradesh as a subject. The age of the subject ranged from 17 – 28 years. The physical variables chosen were speed, endurance and power sargent jump. The physiological variables were resting heart rate and vital capacity. It was found that the interstate level players were better than inter district players with respect to speed, power and endurance. In terms of physiological variables namely RHR and vital capacity, both the group did not differ significantly.

Nallella & Kumar[52] (2012) conducted a study on "Physical Fitness And its Significance on Physiological Aspects of Football Players in Kakatiya University". The study was formulated based on the simple random sampling. The samples were collected from the 50

[50] Jothi, K., A. Subradeepan, and W. Vinu and Y. Wise Blessed Singh. "Arterial Blood Pressure And Heart Rate Response To Exercise." *Recent Research in Science and Technology* 3.2 (2011), 77-79.

[51] Tiwari, L. M., & Singh, M. (2012). "Comparative Study of Selected Physical and Physiological Variables of Male Basketball Players at Different Levels of Competition"., Asian Review of Social Sciences, Vol.1 No.1 January - June 2012, pp 42 to 46.

[52] Nallella, S. & Kumar, S. B. (2012). "Physical Fitness and Its Significance on Physiological Aspects of Football Players in Kakatiya University"., Asian Journal of Physical Education and Computer Science in Sports, ISSN 0975-7732, July 2012 to December 2012, Volume.7 No.1 pp. 82-85. |

Football players in the age group of 20 – 25 years from Kakatiya University in the age group of 18-21 years were considered. By applying the't' test the result showed that physical fitness have yielded significant differences on the physiological aspects of football players have scientifically proved better that the Kakatiya university football players have major role to prove their physical fitness in the performance of the game the physical fitness variables.

2.4 LITERATURE REGARDING PSYCHOLOGICAL PROFILE

William et al.[53] (1970) administered the 16 PF and the EPPS to thirty female fencers who participated in 1965 National Championship. Comparisons were made between high and low level achievers and they were found to differ only on the measure of dominance since they did not differ on any of the other thirty eight variables, this one variation was probably due to chance. However, this group of female athletes was found to differ from national norms on a number of 16 PF 36 factors and EPPS measures. The authors concluded that a definite fencers personality emerged from their analysis, and this profile was different from that of participants in other sports. In this respect it was reported that the sport type to which their profile was the most related was the male and female competitive race car drivers. In general, these athletes tended to be reserved, self sufficient, autonomous, assertive, and aggressive and they scored below average on affiliation and nurturance.

Rushall[54] (1970) administered 16 PF to 336 swimmers from two Olympic development swim clinics; swim clubs from California, Indiana, New Jersey, five colleges and University teams. The swimmers were pooled from the respective teams in order to form performance and maturational categories. The data were evaluated by means of stepwise multiple discriminate function analysis. He concluded that personality appeared to have no relation to success in swimming.

[53] J.M. William et. al., *"Personality Traits of Champion Level Female fencers",* Research Quarterly, Vol.41: 3 (October, 1970), pp.446-53.

[54] Brent Rushall, S., *"An investigation of the relationship between persoimlity variables and performance categories in sivimmers",* International Journal of Sports Psychology, 1 (1970), pp.93-104.

Donald[55] (1971) used 16 PF questionnaires to study the personality characteristics of different categories of high school female tennis players. Though statistically significant differences did not occur amongst the different levels of players with respect to any psychological dimensions yet certain trends were observed. Successful varsity players did not differ from less successful varsity players on any personality trait The varsity players were more reserved, intelligent, self sufficient and controlled than freshman players. The participants in general were more intelligent, assertive, enthusiastic and tense than the non-participants. Amongst freshman, the participants were more warm hearted, assertive, enthusiastic, conscientious, adventurous resting and socially group dependent than non-participants.

Straub and Davis[56] (1971) administered the 16 PF to 246 Football players from four colleges. It is interesting to note that the purpose of the investigation was to determine if there were significant differences in team personality profiles. Subsequent analysis revealed that the Big ten team differed significantly from the other three teams.

Meiers[57] (1973) administered the Cattell's 16 PF questionnaire to 110 varsity athletes participating in seven different sports. Results of this study indicated that reserve athletes were more outgoing and warm hearted than first string athletes. Specific differences were reported for athletes in swimming, volleyball, waterpolo, wrestling and track.

Buccela and Stone[58] (1975) administered an exercise programme for fourteen weeks on jogging and cycling to two groups of men aged sixty to seventy nine years. They were given a battery of physiological tests and Cattell sixteen PF questionnaires. Results indicated significant improvement in various physiological aspects and in personality, the

[55] Kaya Me Donald, *"A Comparison of the personality traits of participants and non participants in High School Inter scholastic Tennis programme for girls"*, Dissertation Abstracts International, (February, 1971), 3933-A.

[56] W.F. Straud and S.W. Davis, *"Personality Traits of College Football players who participated at different levels of competition"*, Medicine and Science in Sports, Vol.3:4 (March, 1971), pp.39-45.

[57] John C. Meiers, *"Relationship between sixteen personality factor of University first string and reserved varsity athletes"*, Completed Research, Vol.15:1 (1973), pp.49-52.

[58] Victor A. Buccela and William J. Stone, "***Effects of Jogging and Cycling Programme on Physiological and Personality variables and Aged men",*** Research Quarterly, Vol.46: 2 (May, 1975), pp.134-136.

cycleers showed no changes; the 37 joggers became significantly less surgent (Factor F) and more self sufficient (Factor Q2) as a result of exercise programme.

O' Conner and Webb[59] (1976) studied the personality traits of female and male college athletes. Of the fifty five subjects, forty one were inter-collegiate athletic team members selected from such sports as basketball, gymnastics, swimming and tennis. The Cattell's 16 PF test was administered to the athletes and group of non-athletes serving as a control grouP. Results revealed that the subjects differed in four of the personality factors. The athletes were found to be more intelligent (Factor B), more inclined the experiment (Factor 1), more self sufficient (Factor Q2) and more disciplined (Factor Q3) than their non-athlete counterparts.

Young and Ismail[60] (1977) examined male adults who exercised regularly over a four year period. They assessed their physiological status and administered Callell's Personality Factor test to the subjects including the groups who were less active. The two groups who were regularly active increased their physical fitness significantly, and the most active subjects were significantly more self assertive (Factor O) than the less active group.

Montgomery[61] (1977) administered the athletic motivation inventory and Cattel's 16 PF questionnaires to the top 13 inter-collegiate basketball players at BO DC 30 Stale University during the spring of 1976 to determine if there are personality traits differences between men and women. Basket ball players at the college level to result that for the traits of drive aggression determination and self confidence on the AMI significant differences were found between men and women basketball players at the .05 level. No significant differences were found for the traits of quiet proneness leadership emotional control mental toughness coach ability, conscientiousness or trust on the AMI. The result on the 16 PF revealed significantly higher scores for men and factor E (Humble Vs Assertive) and H (Shy Vs Venturesome).

[59]Kathleen A.O. Connor and James L. Webb, "***Investigation of Personality Traits of College Fetnale Athletes and Non Athletes",*** Research Quarterly,Vol.47: 2 (May, 1976), pp.203-206.

[60]John Young and A.H. Ismail, ***"Comparison of Selected Physiological variables in regular and non-regular adult Male Exercises",*** Research Quarterly, Vol.48: 3 (October, 1977), pp.617-619.

[61] **Michael J. Montgomery,** ***Personality traits of men and ivomett Basketball players at the College level",*** **Completed Research, Vol.19 (1977), P.113.**

Bhusan etal.[62] **(1978)** conducted a study to evaluate personality characteristics of high and low achievement of Indian Sportsmen. They administered the Cattell's PF questionnaire to ten high achievement players who had represented India at international level and ten players who had never achieved any distinction in their respective games. The results of the subject indicated that the high achievers scored significantly higher than low achievers on dominance and surgency.

Peterson, Weber and Treusdale[63] **(1982)** administered 16 PF to thirty eight female athletes who participated on the 1964 United States Olympic teams. This sample consisted of individual sports participants in swimming, diving, riding, fencing, canoeing, gymnastics and track and field. These subjects were compared to fifty nine team sport athletes who participated on either the 1964 Olympic Volleyball team or one of the top ten AAU Basket ball teams for 1964. The two groups were found to differ on seven of the sixteen factors. The athletes from the individual sports were significantly more dominant and aggressive, adventurous, sensitive, imaginative, radical, self sufficient, resourceful and less sophisticated than the team sport group. The athletes from the individual sports were more introverted than the team athletes and both groups were characterized by emotional stability. Those female athletes were found to be more intelligent, conscientious, persevering and aggressive than female non-athletes of similar age and educational background.

Kroll[64] **(1982)** administered the 16 PF inventory to ninety four amateur and collegiate wrestlers consisting of twenty eight superior athletes who had been on the United States Olympic team. Thirty three college wrestlers who were rated as excellent by their coaches and had won at least sixty percent of the matches that year and a group of thirty three wrestlers from the same teams who were rated as average or below average. Discriminate

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[62] Bhusan, et al., ***"Personality clmracteristics of high and low achieving Indian Sports Personnel",*** International Journal of Psychology, Vol.9: 3 (March, 1978), pp. 191-195.

[63] S.L. Peterson, J.C. Weber and W.W. Trousdale, ***"Personality Traits of Women in Team Sports*** Vs ***Women in Individtml Sports",*** Research Quarterly, Vol.38 (1967), pp.656-90 as cited by Richard M. Suinn, Psychology of Sports Method and Application (Delhi: Surjeet Publications, 1982), p.153.

[64] W. Kroll, *"Sixteen Persoimlity Factor Profiles of Collegiate Wrestlers",* Research Quarterly, Vol.38:1 (March, 1967), pp.49-57.

function analysis failed to demonstrate differences for the criterion groups. Also the wrestlers differed significantly from established norms only on tough mindedness factor.

Carron[65] (1983) in a recent and exhaustive review of the potential methodological problems surrounding the use of personality tests in sport psychology, cites data from 42 sports teams in 12 sports, ranged from track and field (athletics) through mountain climbing, in karate, rugby, American football and Basketball, in which Cattell 16 PF had been used. These data revealed the marked inconsistency of the group personality trait profile from sport to sport and from subgroup to subgroup (that is, superior Vs average performance).

Bhati and Singh[66] (1988) investigated the personality traits of cricketers. Seventy five players who participated in inter-university level were taken as subjects. Cattell's 16 PF was administered to these players. It was concluded that cricketers were less intelligent affected by feelings, serious and shrewed. On other factors cricketers were found to be just average.

Sharma[67] (1988) administered 16 PF to 100 male and 100 female players. The result revealed that except one factor H i.e. Shy Vs Venture some, in personality make up, the two samples is not different.

Frank[68] (1989) studied psychological profiles of players belonging to six developing countries. Sixteen PF was administered. The study supported the general consensus that male and female displayed different personality profiles.

[65] Carron, A.V., ***Social Psychology of Sport*** (Ithaca, N.Y.: Movement Publications, 1980) cited by Bryant J. Cratty, Psychology in contemporary sport (Englewood Cliffs, N.J: Prentice Hall, Inc., 1983), p.31.

[66] C.P.S.Bhati and Rajinder Singh, "Comparison of personality traits of west zone cricket players" SNIPES journal 11:2 (1988):64-67.

[67] S.K. Sharma, " A comparative study of certain personality traits of players of individual and team games, "SNIPES journal 11:2(1988):42-45.

[68] H. Fw. Frank,"Personality profiles of athlets and non athlets in developing countries". Journal of physical education & sports science 1:1 (1989): 15-20.

Singh and Debnath[69] (1986) administered the Indian adaptation of cattell's 16 PF (S. D. Kapoor) to female gymnasts (N = 12) and female football players (N = 15) of National level to investigate the personality profiles and differences in the personality traits of these players. They concluded that football players differ significantly from gymnasts on 6 of the sixteen personality factors. Gymnasts were found to be more intelligent, more conscientious having stronger super-ego strength and more controlled having higher self-concept control when compared with the National football team. Football players found to be more suspicious, more apprehensive, and moody, and more self-sufficient.

Dr. Arvindo C. Rami .Sh. Neeraj Silawat[70] (2009) were conducted a study on psychological factors, Anthropometric measurement and physical Fitness of selected university players in Gujarat. Data on the different variables was collected by administering test adopted standard procedure. Results of the study revealed that the players of Athletics were proved better level of physical fitness. They showed high scores in anthropometry measurements than other team games. The players of Kabaddi were significantly better in psychological factor, where in Anthropometry measurements showed reliable and have shown lower level in physical fitness than compare to others factors, where in Anthropometry measurements showed reliable and have shown lower level in physical fitness than compare to others factors. In the game of Kho-Kho players were better in physical fitness and psychological factors where as in the Anthropometry measurement they were low.

Paramanik[71] (2001) predicted an equation of physical and physiological variables of playing ability of badminton players out of 22 variables. 25 men badminton players of Maharashtra state were selected to act as subjects. Forward regression was applied to draw out the regression. The equation consisted of four items namely reaction time, height arm

[69] G.Singh and K. Debnath,"Personality profiles and differences in personality traits between national woman football and gymnastics teams, "research Bi annual for movement 8:1(1989) 16-20.

[70] Arvind C. Rami and Sh. Neeraj Silawat, "A study of the psychological factors, Anthropometric measurement and physical 188 fitness of selected university players in Gujarat". Shodh, Samiksha aur Mulyankan (International Research Journal) (2009), Vol. II, Issue-6.

[71] Parmanik, P. "Physical and Physiological Variables as Predictors of Playing Ability of Badminton Players", *Unpublished Ph.D. Thesis*, Jiwaji University, Gwalior(2001).

length and endurance which accounted for 87% of the variance where as reaction time alone contributed 55% of the variance.

Sunil Kumar , Sahajad Singh ,Rajendra Shalikram Gore, Babulal Dhotre[72] (2011) studied "A Comparative study on selected Psycho- Physical fitness components of kabaddi and kho-kho players of Delhi schools" N=100. A significant relationship was found in the Psycho- Physical fitness between kabaddi and kho-kho players.

Pasodi and shiroli[73] (2011) study was to find out the relationship aggression and agility performance between basketball and kho-kho players . Data on the different variables was collected by administering test adopted standard procedure.. He concluded that, 1) The performance of agility of kho-kho players is greater than that of Basketball players. 2. The results of the study shown there was a no significant difference between kho-kho and Basketball players agility performance. 3. There is a significant difference in the aggressive behavior between the two groups of players. 4. Basket players have relatively higher aggressive behavior than the kho-kho players.

Karad and Wahid Abdul[74] (2011) from his study was to find out the relationship between personality characteristics of Kabaddi and and kho-kho players . Data on the different variables was collected by administering test adopted standard procedure. N is 100. He concluded that, There was significant differences in extraversion of Kabaddi and Kho-Kho players. Kabaddi Players having less extrovert tendency than the Kho-Kho players. There was a significant difference in psychoticism of kabaddi and Kho-Kho players. Kho-Kho players having less Neurotic tendency than Kabaddi players. There was no significant difference in neuroticism of Kabaddi and Kho-Kho players.

[72] Kumar, S., Singh, S., Gore R. S., & Dhotre B, "A Comparative Study On Selected Psycho-Physical Fitness Components Of Kabaddi And Kho-Kho Players Of Delhi Schools". International Journal of Research in Social Sciences and Humanities, ISSN: 2249-4642, (2011). (IJRSSH), Vol. No. 1, Issue No. I.

[73] Pasodi. M.S and shiroli .l, "aggression and agility performance between basketball and kho-kho players". ol - i , issue - vii (august 2011).

[74] Karad and Wahid. Personality traits between kabaddi and Kho-Kho players (2011).

CHAPTER –III

METHODOLOGY

The methodology and procedure are closely linked with their purposes and objectives as they provide a framework within the goals are to be achieved. It is a prerequisite and an important method of collecting the appropriate data without which no worthwhile study can be possible. Mauley (1964) remarks, "Scientific problem can be resolved only on the basis of data and a major responsibility of the scientist is to set up a research design capable of providing data necessary to the solution of the problem, while the unity of the research makes it impossible to say that one aspect is more crucial than the other, the collection of data is of paramount importance in the conduct of research science, obviously, no solution can be more accurate than the data on which it is based."

The objective of the present investigation is to find out the prediction of playing ability of Hockey players in relation to their physical fitness and kin anthropometric variables and also tried to find out the combined effect of these variables on the playing abilities. Thus, it involves number -of steps to complete this investigation and these steps have been considered as terms of research design suited to the study, the design of the present study is presented systematically under the following headings:

3.1 Selection of the Subjects

A total of fifty (50) male state level kho-kho players were selected as subjects for this study. All the subjects were active Kho-Kho players and used to practice regularly under the direction and supervision of qualified coaches. They were also bonafide kho-kho players of state level kho-kho game. They were from different districts of west Bengal and regular players of different kho-kho clubs. They were in the age group of 15 to 23 years.

3.2 Selection of the Variables

Anthropometric measurements, motor fitness components, physiological and psychological parameters of the subjects were the criteria for measurement in the present study. Among

anthropometric measurements Weight, Standing height, Age, Arm length, leg length, Hand length, foot length, sitting height, body fat %, and Lean body mass were considered. For the present study selected motor fitness components viz. speed, agility, leg power, flexibility, static balance, Eye hand coordination were considered. Selected physiological components were Heart rate, Blood pressure - systolic & diastolic, Force vital capacity, and Vo_2max. Personality factors proposed by Cattle, and reaction time were selected for psychological profile.

3.3 CRITERION MEASURE

TABLE – I: Selection of variables and tests

Sl. No.	Anthropometric Variables	Test Items Tools	Units of Measurements
1	Arm Length	Steel tape	cm
2	Leg Length	Steel tape	cm
3	Hand Length	Steel tape	cm
4	Foot Length	Steel tape	cm
5	Sitting Height	Steel tape	cm
6	Body Composition Body fat % Lean Body Mass	Skin fold calliper	cm

TABLE – 2

Sl. No.	Physical Fitness Variables	Test Items Tools	Units of Measurements
1	To measure Speed	50m Dash	m
2	To measure Agility	4×10m Shuttle Run	In Sec
3	To measure Leg Explosive Strength	Standing Broad Jump	cm
4	To measure Balance	Stork Stand Test	In Sec
5	To measure Flexibility	Sit and Reach Test	cm
6	To measure Eye Hand Coordination	Alternate Hand Wall Toss Test	No. of Catches

TABLE – 3

Sl. No.	Physiological Variables	Test Items Tools	Units of Measurements
1	To Measure Resting Heart Rate	Pulse count	Beats/m
2	To measure Blood Pressure	Sphygmomanometer	Mm of hg
3	To Measure Force Vital Capacity	Peak Flow Meter	Ml/sec
4	To Measure Vo_2 max	Queens Collage Step Test	Ml/m/kg

TABLE – 3

Sl. No.	Psychological Variables	Test Items Tools	Units of Measurements
1	To Measure Reaction Time	Reaction time ruler test	sec
2	To measure personality	Cattle 16 pf	Stens score

TABLE – 4

Sl. No.	Performance Variables	Test Items Tools	Units of Measurements
1	To Measure Performance factor	Judges rating scale	10 point scale

3.4 EQUIPMENT AND TOOLS USED

In order to collect relevant data for the study following equipment and tools were used:

i) Weighing machine was used to measure body weight in Kg.

ii) Flexible steel tape was used to measure lengths in cm.

iii) Stadiometer was used to measure height in cm.

iv) Sliding Calliper for measuring length.

v) Stop watches for measuring time in seconds.

vi) Skin fold calliper for % body fat and lean body mass in kg.

vii) Scale was used to measure flexibility of the trunk.

viii) Sphygmomanometer was used to measure Blood pressure in mm of hg.

ix) Stethoscope was used to measure heart rate beats/minutes.

x) Peak flow meter was used to measure force vital capacity in ml/min.

xi) A Metronome for measuring Vo_2 max.

xii) 16/25inches tool.

xiii) Tennis ball for eye hand coordination.

xiv) 1 meter long ruler or Yardstick for reaction time.

xv) Cattle 16-PF Questionnaire for assessing personality.

xvi) Lime dust.

xvii) A kho-kho field.

3.5 DESIGN OF THE STUDY

In the present investigation 50 male kho-kho players belonging to West Bengal were selected as subjects of the study and planned to analyze the anthropometric variables , Physical fitness variables, Physiological variables, Psychological Variables and the status of playing ability. The investigator endeavour to find out the relationship among these variables with playing ability. In this study, the playing ability was dependent variables, and the anthropometric variables, Physical fitness variables, Physiological variables; Psychological Variables become the independent variables of the study. The playing ability was judged by the judges rating scale.

3.6 RELIABILITY OF DATA

The reliability of data was censured by establishing the instrumental reliability, tester's competency and reliability of test and the subject reliability before collection of data.

3.6.1 Instrument Reliability:

Stop watches, measuring tape, stadiometer, weighing machine, metronome, peak flow meter, Sphygmomanometer were manufactured by renowned companies with adequate reliability and these have been used from the Department of Physical Education J.U.

The cattell's 16 P.F. questionnaire was a standardized test for assessing personality.

3.6.2 Tester's competency and Reliability:

To ensure that the investigator become well versed with the technique of conducting the tests. The investigator had a number of practice sessions with the experts.

3.7 PROCEDURE FOR COLLECTION DATA

At the beginning of the collection of the data, the investigator gathered all the subjects to explain them the purpose of the present investigation. Necessary instructions and demonstrations were given to the subjects before the conduct of each of the test. All the

necessary equipments were presented before administering the test. The procedure of tests and use of equipments were explained to the subjects.

3.7.1 Measurement of Anthropometric Parameters

Age and the selected anthropometric measurements were measured following standard procedure as described by **Sodhi** (1991).. The process of measurement was as follows.

i) Age:

The age of the subjects was determined from the date of birth of the subjects obtained from birth certificates available or from the school records.

ii) Measurement of Height:

Purpose: To measure the standing height of the subject.

Equipments: Stadiometer.

Procedure: The subject was barefooted and stood erect with heels together and arms hanging naturally by the sides. The heel, Buttocks, Upper part of the back and head were in contact with the upright to look straight ahead. The head piece was brought down to the vertex of the subject. The vertical distance between the ground and vertex was the body height. The measurement was expressed in centimetre.

iii) Measurement of Body Weight

Purpose: To measure the body weight of the subject.

Equipment: Weighing machine.

Procedure: The weight of all the subjects was taken using a standard weighing machine. The subject stood barefooted erect with heels together and hanging naturally by the sides on the platform of weighing machine without any movement. The measurement indicated by the pointer on the scale of the weighing machine was considered as the body weight of the subject. It was expressed in Kg.

iv) Leg length:

Purpose: To measure the length of the leg of the subject.

Equipment: Sliding Calliper.

Procedure: The subject was asked to stand erect bare footed on the floor stretching as far as possible. Then the distance between floor and trochanterion was measured by a scale.

Score: Length was recorded in cm.

v) Arm length:

Purpose: To measure the length of the arm of the subject.

Equipment: Sliding Calliper.

Procedure: The subject stood erect with the arms in a normal position hanging sideways. The distance from the most lateral point of the acromion process to the dactylion was measured with tape as the arm length. It was expressed in cm.

Score: Length was recorded in cm.

vi) Hand length :(Midstylion-dactylion)

Purpose: To measure the length of the hand of the subject.

Equipment: Sliding Calliper.

Procedure: The subject assumes a relaxed standing position with the left arm hanging by the side. The right elbow is partially flexed, forearm supinated, and the fingers extended (but not hyper extended).The measurement is taken as the shortest distance from the marked Midstylion line to the Dactylion. One branch of the caliper is placed on the marked Midstylion line while the other branch is positioned on the Dactylion (most distal point of the third digit).

Score: Length was recorded in cm.

vii) Foot length:

Purpose: To measure the length of the foot of the subject.

Equipment: Sliding Calliper.

Procedure: The subject assumes a relaxed standing position with the feet comfortably apart and weight evenly distributed. The arms are hanging by the sides. This is the distance from the Akropodion (the tip of the longest toe —which may be the first or second phalanx) to the Pternion (most posterior point on the calcaneus of the foot). Minimal pressure is applied to the large sliding caliper.

Score: Length was recorded in cm.

viii) Sitting height:

Purpose: To measure the sitting height of the subject.

Equipment: Stadiometer

Procedure: The subject is seated on a measuring level platform. The hands were resting on their thighs. The subject is instructed to take and hold a deep breath and while keeping the head in the Frankfort plane the measurer applies gentle upward lift through the mastoid processes. The recorder places the head board firmly down on the Vertex, crushing the hair as much as possible. Care must be taken to ensure the subject does not contract the gluteal muscles nor push with the legs

Score: Length was recorded in cm.

ix) Measurement of skin fold:

A) Biceps skin fold site:

Definition*:* The most anterior part of the Biceps.

Subject position*:* When marking the sites for the Biceps skin fold the subject assumes the anatomical position.

Location*:* The Biceps skin fold site is marked over the most anterior part of the Biceps when viewed from the side at the marked Mid-acromiale-radiale level.

B) Triceps skin fold site:

Subject position*:* The subject assumes a relaxed standing position with the left arm hanging by the side. The right arm should be relaxed with the shoulder joint slightly externally rotated and elbow extended byt he side of the body.

Method*:* The fold is parallel to the long axis of the arm.

C) Sub scapular skin fold site:

Subject position*:* The subject assumes a relaxed standing position with the arms hanging by the sides.

Method*:* The line of the skin fold is determined by the natural fold lines of the skin.

D) Supraspinale skin fold site:

Subject position*:* The subject assumes a relaxed standing position with the arms hanging by the sides.

Method*:* The fold runs medially downward at about a 45° angle as determined by the natural fold of the skin.

Note: ISAK's Supraspinale site was termed the Suprailiac by Parnell (1958) and Tanner (1964). ISAK's Supraspinale skin fold site is a site used in the Heath-Carter somatotype system (Carter & Heath, 1990)

3.7.2 Measurement of Motor Fitness

Different selected components of motor fitness were measured using standard tests. The procedure was as follows.

i) 50 m Dash:

Purpose: To measure Speed of the subject.

Equipment: Stop watches, clapper.

Procedure: Speed was measured using 50m dash. The subject warmed up for the test. Time keepers were posted at the finish line of the 50m course. The subject took standing start with the signal of the starter and ran as fast as possible to the finish line. The time taken as recorded by the time keeper to complete the race was considered as the measure of speed. Two subjects ran at a time.

Score: The performance was recorded in sec.

ii) 4×10 m shuttle run :

Purpose: To measure agility of the subject.

Equipment: Stop watches, two wooden blocks.

Procedure: Mark two lines 10 meters apart using marking tape or cones. The two blocks are placed on the line opposite the line they are going to start at. On the signal "ready", the participant places their front foot behind the starting line. On the signal, "go!" the participant sprints to the opposite line, picks up a block of wood, runs back and places it on or beyond the starting line. Then turning without a rest, they run back to retrieve the second block and carry it back across the finish line. Two trials are performed.

Scoring: Record the time to complete the test in seconds to the nearest one decimal place. The score is the better of the two times recorded.

iii) Standing broad jump

Purpose: The purpose of this test is to measure the explosive power of leg extensor muscles.

Equipment: Measuring tape, lime powder and score sheets.

Procedure: body weight of the subject was equally distributed on both feet, placed little apart and parallel behind the take off line. With the signal of the tester the subject flexed the knees, lowered the CG little ahead and jumped ahead by taking of both feet following an arm swing. The subjects were motivated to jump as far as possible. There successive trails were provided to each subject.

Scoring: The best distance of the three trials from the take off line to the nearest break, with any part of his body, was measured in meters.

iv) Sit and reach test (Flexibility in Centimeters)

Purpose: To measure the development of hip and back flexion as well as extension of the hamstring muscles of the legs. The object is to see how far you can extend your finger tips beyond your foot line with the legs straight.

Equipment: yard stick and tape.

Procedure: Lined up the 15-inch mark of a yard stick with a line on the floor and taped the stick to the floor. Then sat down and lined up the (subject) heels with the near edge of the 15-inch mark and sided his seat back beyond the zero end of yardstick. With knees locked and heals not more than 5(five) inches apart, stretched forward and touched the fingertips so both hands as many inch down the stick was as possible.

Scoring: The best of three trials measured to the nearest quarter of an inch is your test score.

v) Balance (the stork balance stand test):

Purpose: To assess the ability to balance on the ball of the foot.

Equipment: Flat, non-slip surface, stop watch, paper & pencil.

Procedure: Remove the shoes and place the hands on the hips, then position the non-supporting foot against the inside knee of the supporting leg. The subject is given a minute to practice the balance. The subject raises the heel to balance on the ball of the foot. The stop watch is started as the heel is raised from the floor. The hands come off the hips. The supporting foot swivels or move (hops) in any direction. The non-supporting foot loses contact with the knee. The heel of the supporting foot touched the floor.

Scoring: The total time in seconds is recorded.

vi) Alternate Hand Wall Toss Test

Purpose: to measure hand-eye coordination

Equipment required: tennis ball or baseball, smooth and solid wall, marking tape, stopwatch.

Procedure: A mark is placed a certain distance from the wall (2 meters, 3 feet). The person stands behind the line and facing the wall. The ball is thrown from one hand in an underarm action against the wall, and attempted to be caught with the opposite hand. The ball is then thrown back against the wall and caught with the initial hand. The test can continue for a nominated number of attempts or for a set time period (30 seconds). By adding the constraint of a set time period, you also add the factor of working under pressure.

Scoring: This table lists general ratings for the Wall Toss Test, based on the score of the number of successful catches in a 30 second period.

Rating	Score (In 30 seconds)
Excellent	>35
Good	30-35
Average	20-29
fair	15-19
Poor	<15

3.7.3 Measurement of Physiological parameters

i) Resting Heart rate:

Purpose: To measure pulse rate per minute.

Equipment: chair and a stop watch were used to conduct this test.

Procedure: The subject was asked to sit in a comfortable chair. The pulse rate was measured by lightly pressing the finger tips against the carotid artery in the neck and the pulse rate was for counted for duration of one minute.

ii) Blood pressure:

Purpose: To measure the systolic and diastolic blood pressure of the subjects.

Equipment: sphygmomanometer and a stethoscope.

Procedure: The test was taken immediately after the pulse count test to ensure that the circulatory system had reached steady state. The cuff of the sphygmomanometer was wrapped around the base of the upper arm (above the elbow) and edge approximately one inch above the auricular space. The tester then fixed the earphones of the stethoscope in the ears and its drum was placed on brachial artery just above the hollow part of the elbow. Then the air pressure was inflated into the cuff till the pulse sound disappeared. Then the pressure was gradually released till heard the sound. The reading was recorded on the mercury column of the sphygmomanometer as the systolic blood pressure (mm./hg.) the air pressure was further released until a feeble and dull beat was noticed, at this point again the mercury column was red and recorded as the diastolic blood pressure (mm,/hg.) of the subject.

Score: The systolic and diastolic blood pressure was recorded in milimeter of mercury (mm. /hg.).

iii) Measurement of Force vital Capacity:

Purpose: To measure Lung capacity.

Equipment required: Peak flow meter.

Procedure: Step 1: Before each use, made sure the sliding marker or arrow on the Peak Flow Meter is at the bottom of the numbered scale (zero or the lowest number on the scale). Step 2: Stand up straight. Remove gum or any food from mouth. Taken a deep breath (as deep as he can). Put the mouthpiece of the peak flow meter into mouth. Close the lips tightly around the mouthpiece. Be sure to kept the tongue away from the mouthpiece. In one breath, blow out as hard and as quickly as possible. Blow a "fast hard blast" rather than "slowly blowing" until he has emptied out nearly all of the air from your lungs. Step 3: The force of the air coming out of lungs causes the marker to move along the numbered scale. Noted the number on a piece of paper. Step 4: Repeat the entire routine three times. Step 5: Recorded the highest of the three ratings. Do not calculate an average. This is very important. He can't breathe out too much when using peak flow meter but he could breathe out too little. Record his highest reading.

Scoring:

PEAK EXPIRATORY FLOW (PEF) IN ADULT MEN: NORMAL VALUES (l/min)

Height cm	Age (years)													
	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Men														
135	454	508	541	559	566	563	554	540	523	503	481	458	434	410
140	467	522	557	575	582	579	570	556	538	517	494	471	446	422
145	479	536	571	590	597	594	585	570	551	530	507	483	458	433
150	491	549	585	604	611	609	599	584	565	543	519	495	469	443
155	502	561	598	618	625	622	612	597	578	555	531	506	480	453
160	512	573	611	631	638	636	625	610	590	567	542	516	490	463
165	523	585	623	644	651	648	638	622	602	578	553	527	500	472
170	532	596	635	656	663	660	650	633	613	589	564	537	509	481
175	542	606	646	667	675	672	661	645	624	600	574	546	518	490
180	551	616	656	678	686	683	672	655	634	610	583	555	527	498
185	559	626	667	689	697	694	683	666	644	619	592	564	535	506
190	568	635	677	699	707	707	693	676	654	628	601	572	543	513
195	576	644	686	709	717	714	703	685	663	637	610	580	551	520

Normal values for EU scale peak flow meters; derived from modified Nunn and Gregg values/Miller MR. Airways J 2004; 2(2):80-2.

iv) Queens college step test:

Purpose: To measure Vo_2max (Maximal oxygen consumption) this sub-maximal test provides a measure of cardio respiratory or endurance fitness

Equipment required: 16.25 inches / 41.3 cm step, stopwatch, metronome
Procedure: The athlete steps up and down on the platform at a rate of 24 steps per minute for males. The subjects are to step using a four-step cadence, 'up-up-down-down' for 3 minutes. The athlete stops immediately on completion of the test, and the heart beats are counted for 15 seconds from 5-20 seconds of recovery. Multiply this 15 second reading by 4 has given the beats per minute (b/pm) value in calculation is given below.

Scoring: An estimation of Vo_2max can be calculated from the test results, using this formula (McArdle et al., 1972).

men: Vo_2max (ml/kg/min) = 111.33 - (0.42 x heart rate (b/pm))

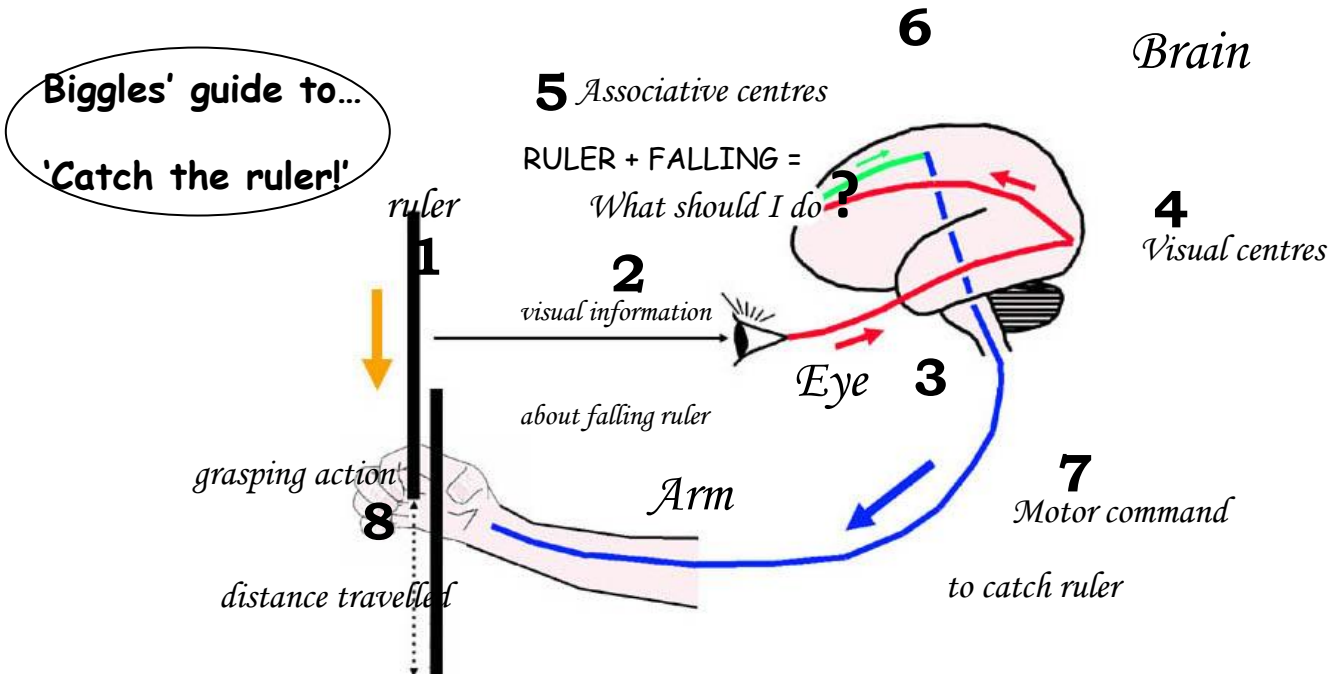
3.7.4 Measurement of Psychological parameters

i) Reaction Time Ruler Test:

Purpose: To measure reaction time.

Equipment required: 1 meter long ruler or Yardstick,

Get a 30cm ruler. One person holds the ruler near the 30cm mark and lets it hang vertically. The other person places their thumb and index finger either side of the 0cm mark ready to catch it when it falls - their fingers shouldn't touch the ruler. Without warning the person holding the ruler lets go and the subject tries to catch the ruler as soon as possible. The level (in cm) just above the subject's first finger where the ruler was caught is recorded.



Procedure: The person to be tested stands or sits near the edge of a table, resting their elbow on the table so that their wrist extends over the side. The assessor holds the ruler vertically in the air between the subject's thumb and index finger, but not touching. Align the zero mark with the subject's fingers. The subject should indicate when they are ready. Without warning, release the ruler and let it drop - the subject must catch it as quickly as possible as soon as they see it fall. Record in meters the distance the ruler fell. Repeat 10 times and take the average score.

Scoring: The mean score has converted to the final score by using the following norms. This norms also prepared by using the calculation. **Calculation:** Calculate the average distance the meter stick fell. Use the table below to determine how long it took the ruler to fall the measured distance (distance in cm, time in seconds). The table is based on the following formula, where d = the distance the ruler fell in meters, g = the acceleration of gravity (9.8 m/s^2), and t = the time the ruler was falling (seconds). $t = sqrt(2d / g)$

distance dropped	reaction time
2 inches	0.10 seconds
4 inches	0.14 seconds
6 inches	0.18 seconds
8 inches	0.20 seconds
10 inches	0.23 seconds
12 inches	0.25 seconds
14 inches	0.27 seconds

ii) Measurement of Personality:

Cattell 16 P.F. Questionnaire

Purpose: To measure the personality of the players.

Equipment required: The Bengali version cattell sixteen personality Factor Questionnaire Form-C.

Procedure: A copy of questionnaire along with the answer sheet had been provided to each of the subjects. The questionnaire provided to the subjects was the Bengali translation of cattell's 16 P.F.questionnaire (Form-c), standardized by prof. Sukumar Ghosh and Dr. A. K. Chatterjee (Department of Applied Psychology, University of Calcutta). In the questionnaire there were one hundred five questions and each question had three alternatives. Before giving answers the subjects were instructed to answer the questions as frankly and truly as possible and don't skip any question. After completion of instructions, the subjects started to answer the questions. The answer sheets were collected from the subjects when they finished their input of information.

Scoring: After checking the answers, marks were given according to the chosen options and adding points for marked choices factor by factor using norm. Raw scores have transformed to standard scores (STENS).

3.8 Kho-kho Playing Ability

Purpose: Assessment of playing ability of kho-kho players.

Equipment and materials: Stop watch, recording materials and kho-kho ground with marking.

Procedure: The subjects were informed to get assembled on the ground, then they were divided in two groups. One group was chaser and another group was runner. A game situation was created according to follow the all rules and standard norms. Three coaches were incorporated in the competition as judges. The game was started by the judges. During the competition the judges are follow detect and find act the degree of their playing ability like all skill (from beginning to advance skill). Then the judges graded that player according to their playing ability. The grading paint of the game are covered 1 to 10 point scale. I indicate very bad and ascending number indicates their supremely and 10 indicates very good.

3.98 STATISTICAL ANALYSIS OF THE DATA

For statistical analysis standard procedures have been adapted. Mean & SD were first computed then test data were analyzed by ANOVA method (Garrett, 1973). For obtaining Co-efficient correlation, Pearson product moment method (Garrett, 1973) was adapted. Regression equation was developed as the tool for prediction of independent variables using dependent variables.

CHAPTER – IV

RESULT AND DISCUSSION

In this chapter the data of the present study that were collected using procedure mentioned in previous chapter have been presented. Statistical analysis of data, result obtained out of analysis of data, interpretation of results in the light of available knowledge and testing of hypothesis have also presented in this chapter.

In this chapter researcher was compare the west Bengal male kho-kho players with Maharashtra male kho-kho players. But one thing researcher should be clearly stated here that the comparison between two states was not the prime consideration of the present study. Although in this study comparison had done. Through this comparison researcher's motto was to show the present status of west Bengal male kho-kho players. For this comparison researcher was chosen the state Maharashtra as because Maharashtra is the mother of kho-kho land and this state hold the first position (2016) in India according to Indian kho-kho association.

Further researcher should mention one another thing; regarding the comparison of psychological parameter 16 PF between two states .Comparison of 16 PF was not possible due to absence of research work on Maharashtrian kho-kho players.

4.1 THE DATA

In the present study performance of kho-kho players in competitive matches was considered as the dependent variable and scores of selected anthropometric, motor fitness, physiological, and psychological parameters were considered as independent parameters. The selected anthropometric parameters were Weight, Standing height ,Age ,Arm and leg lengths, hand length, foot length, sitting height, Body fat %, Lean body mass .The selected motor fitness parameters viz. speed, agility, leg power, flexibility, static balance and eye hand coordination. The Selected physiological parameters were Heart rate, Blood pressure - systolic & diastolic, Force vital capacity, and Vo_2max. Personality factors proposed by Cattle and reaction time were selected for psychological profile. All these parameters were

measured by using standardized tests. Numerical scores for each of these parameters were considered as the data for the present study.

4.2 PRESENTATION OF DATA

The data were analyzed using appropriate statistical tools. The data have been presented in this chapter separately one after other in following sections for better understanding.

4.3 DATA REGARDING ANTHROPOMETRIC PARAMETERS

The mean and standard deviation of selected anthropometric parameters of state level male kho-kho players have been presented in Table-1.

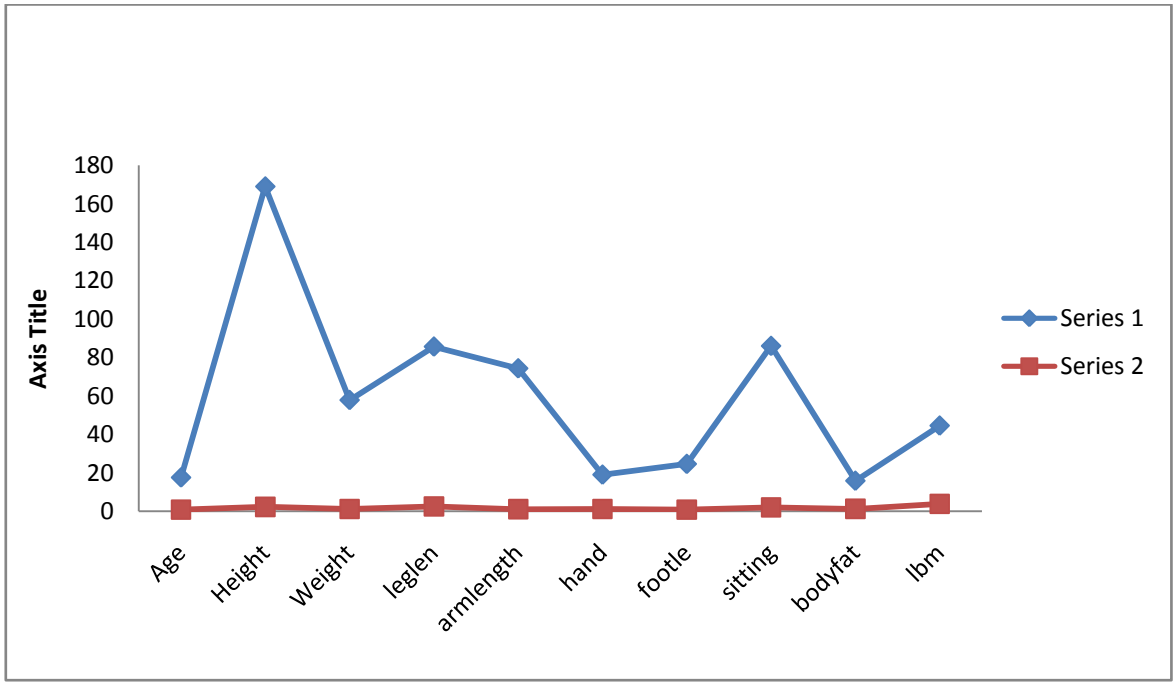
Table-1 Mean and S.D. of Selected Anthropometric parameters of state level male kho-kho players

Sl. No.	Parameters	Mean	Standard Deviation
1	Age	17.56	±.86971
2	Height	169.06	±2.28384
3	Weight	57.88	±1.16325
4	Leg length	95.70	±2.54986
5	Arm length	74.36	±1.10296
6	hand	19.02	±1.16358
7	foot length	24.60	±.91945
8	sitting	86.05	±2.08819
9	%body fat	15.83	±1.25551
10	Lean body mass	44.56	±3.84194

Table-1 shows the mean and standard deviation value of selected anthropometric parameters of state level male kho-kho players. It was found that mean and S.D. of Age was 17.56 yrs with SD of ± .87 yrs, mean and S.D. of Standing height was 169.06 cm. with SD of ± 2.28 cm , mean and S.D. of Weight 57.88 kg , with SD of ±1.16 kg , mean and S.D. of Arm and leg lengths was 74.37 and 95.70 c.m., with S.D.of ±1.10 and ±2.55 cm , mean and S.D. of hand length was 19.02 c.m. with S.D. of±1.16 cm, mean and S.D. of foot length was 24.60 c.m. with S.D. of ±.92 c.m , mean and S.D. of sitting height was 86.05 c.m. with S.D. of ±2.09c.m, mean and S.D. of body fat % was 15.83 % with S.D. of

±1.26 %, mean and S.D. of Lean body weight of the kho-kho players were 44.56 kg with S.D. of ±3.84 kg.

Graphical Representation I: Mean and S.D. of Selected Anthropometric parameters of state level male kho-kho players



With the mean values of selected anthropometric parameters the researcher became interested to compare them with other state.

Table-2 Comparison of mean and standard deviation of selected anthropometric parameters state level male kho-kho players in respect of other state male kho-kho players

STATE	age	height	weight	Leg length	Arm length	Hand length	Foot length	Sitting height	% body fat	lean body weight
Mean of West bengal	17.56	169.06	57.88	95.70	74.37	19.01	24.60	86.05	15.83	44.56
Mean of Maharashtra	21.5	171.33	61.48	99.72	73.13	17.74	25.64	83.08	13.60	51.26
S.D. of West bengal	±.87	±.2.28	±1.163	±2.55	±1.10	±1.16	±.92	±2.09	±1.26	±3.84
S.D. of Maharashtra	±1.86	5.84	4.33	± 6.36	± 3.96	0.52	0.66	1.57	2.60	2.05

4.4 DATA REGARDING MOTOR FITNESS PARAMETERS

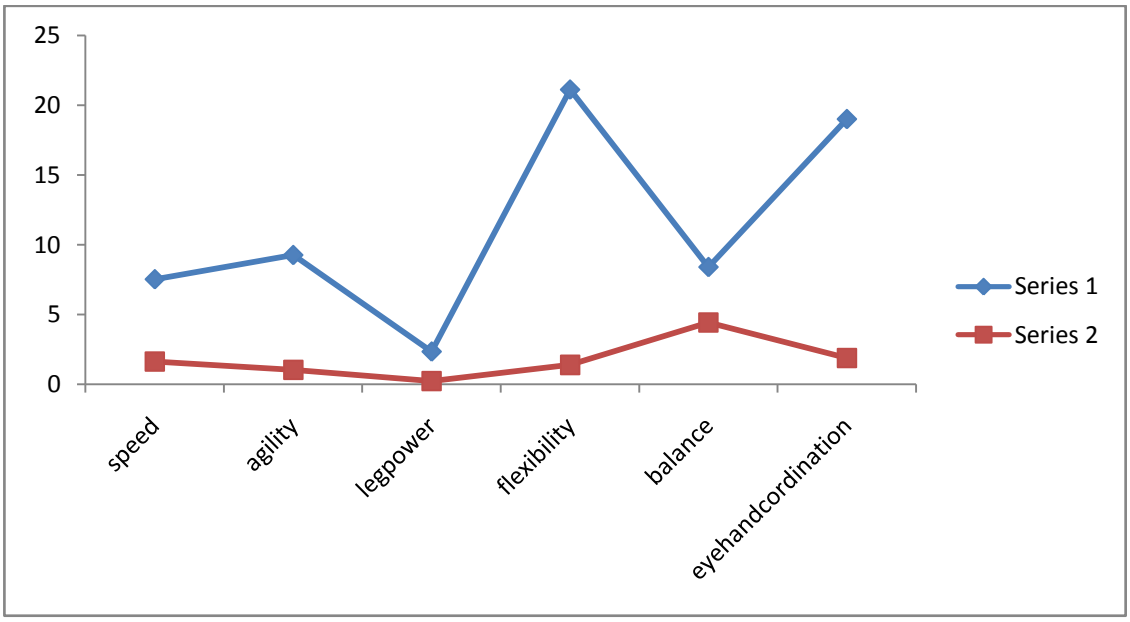
The mean and standard deviation of selected motor fitness parameters of state level male kho-kho players have been presented in Table-3.

Table-3 Mean and S.D. of Selected Motor Fitness parameters of state level male kho-kho players

Sl. No.	Parameters	Mean	Standard Deviation
1	speed	7.52	±1.63
2	agility	9.26	±1.04
3	Leg power	2.34	±.24
4	flexibility	21.11	±1.39
5	balance	8.39	±4.43
6	Eye hand coordination	19.00	±1.88

Table-3 shows the mean and standard deviation value of selected motor fitness parameters of state level male kho-kho players. It was found that mean and S.D. of Speed was 7.52sec, with SD of ±1.63 sec, mean and S.D. of Agility was 9.26 sec. With S.D. of ±1.04 sec. & mean and S.D. of Leg power was 2.34 mt.With S.D. of ±.24 mt. mean and S.D. of Static Balance was 8.39 with S.D. of ±4.43 and mean and S.D. of flexibility was 21.1118 with S.D. of ±1.39418 . Mean and SD of eye hand coordination was 19 and SD was 1.88.

Graphical Representation II: Mean and S.D. of Selected Motor Fitness parameters of state level male kho-kho players



With the mean values of selected anthropometric parameters the researcher became interested to compare them with other state.

Table-4 presents the comparison of mean and standard deviation of selected Motor fitness parameters state level male Kho-Kho players in respect of other state male Kho-Kho players.

State	AGILITY	SPEED	LEG POWER	FLEXIBILITY	BALANCE	EYE HAND COORDINATION
Mean of West bengal	9.26	7.52	2.34	21.11	8.39	19.00
Mean of Maharashtra	9.23	6.83	2.29	22.31	25.90	29.01
S.D. of West bengal	±1.04	±1.63	±.24	±1.39	±4.43	±1.88
S.D. of Maharashtra	±.58	±0.80	±14.81	±2.65	±16.38	±1.17

4.5 DATA REGARDING PHYSIOLOGICAL PARAMETERS

The mean and standard deviation of selected physiological parameters of state level male kho-kho players have been presented in Table-5.

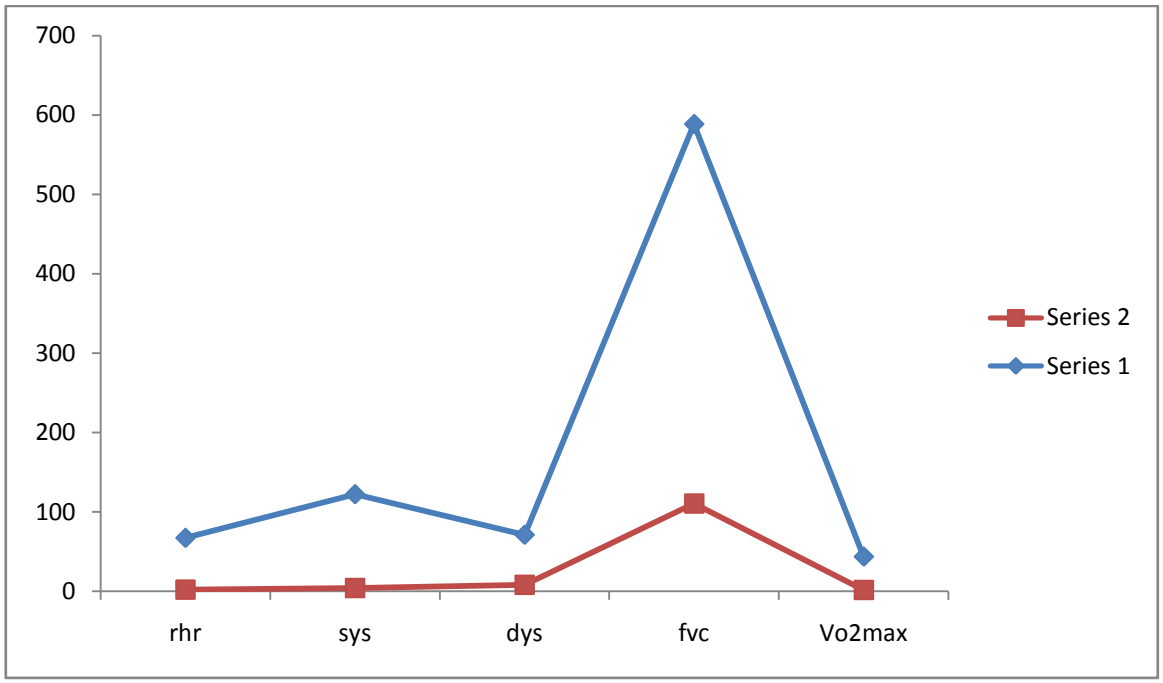
Table-5 Mean and S.D. of Selected physiological parameters of state level male kho-kho players

Sl. No.	Parameters	Mean	Standard Deviation
1	Resting heart rate	67.34	±2.15
2	Systolic blood pressure	122.36	±4.41
3	Diastolic blood pressure	71.24	±8.28
4	Force vital capacity	588.50	±110.58
5	Vo_2max	43.76	±1.93

Table-5 shows the mean and standard deviation value of selected physiological parameters of state level male kho-kho players. It was found that mean and S.D. of Resting Heart rate was 67.34 beats/min with SD of ±2.15 beats/min, mean and S.D. of Systolic Blood pressure was 122.36 mm of hg. With S.D. of ±4.41 mm of hg. & diastolic Blood pressure was 71.24mm of hg. With S.D. of

±8.28 mm of hg. mean and S.D. of Force vital capacity was 588.50 ml/sec with S.D. of ±110.58 ml/sec and mean and S.D. of Vo_2max was 43.76 ml/m/k.g. with S.D. of ±1.93 ml/m/k.g.

Graphical Representation III: Mean and S.D. of Selected physiological parameters of state level male kho-kho players



With the mean values of selected physiological parameters the researcher became interested to compare them with other state.

Table-6 Comparison of mean and standard deviation of selected physiological parameters state level male kho-kho players in respect of other state male kho-kho players

State	Resting heart rate	Systolic blood pressure	Diastolic blood pressure	Force vital capacity	Vo_2max
Mean of West bengal	67.34	122.36	71.24	588.50	43.76
Mean of Maharashtra	69.40	117.93	77.9	385.33	39.47
S.D. of West bengal	±2.15	±4.41	±8.28	±110.58	±1.93
S.D. of Maharashtra	±4.68	±3.06	±2.90	± 55.81	±4.07

4.6 DATA REGARDING PSYCHOLOGICAL PARAMETERS

The mean and standard deviation of selected psychological parameters of state level male kho-kho players have been presented in Table-7.

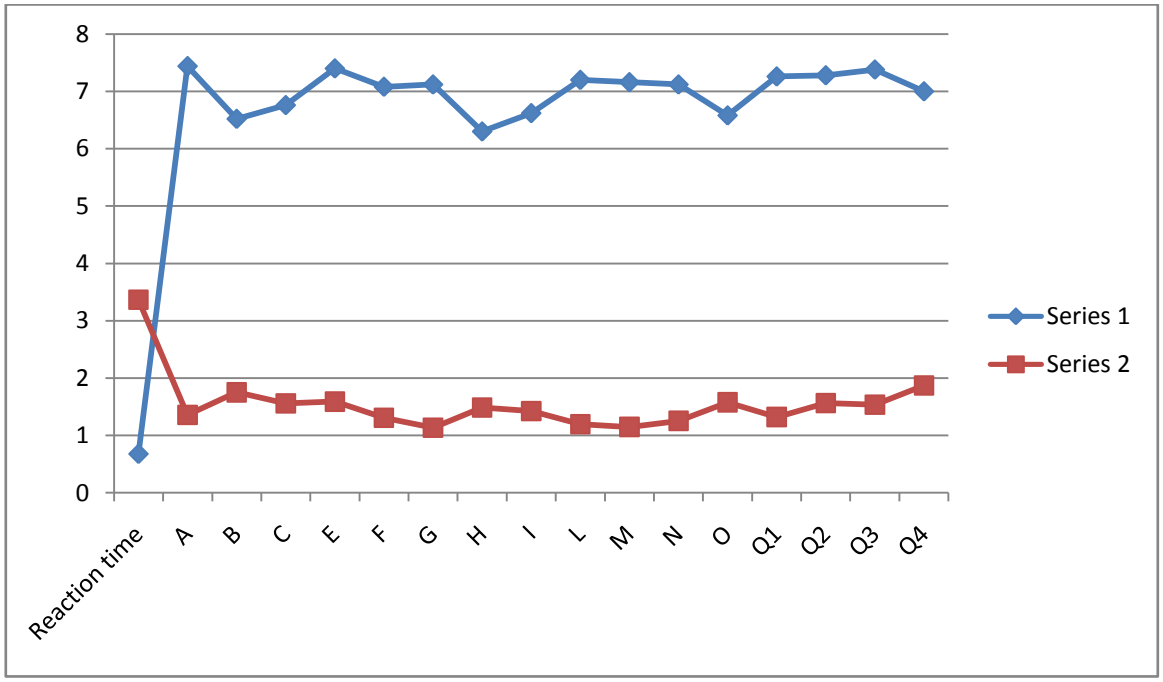
Table-7: Mean and S.D. of Selected psychological parameters of state level male kho-kho players

Sl. No.	Parameters	Mean	Standard Deviation
1	Reaction time	.23	±.04
2	A	7.44	±1.36
3	B	6.52	±1.75
4	C	6.76	±1.56
5	E	7.40	±1.59
6	F	7.08	±1.31
7	G	7.12	±1.14
8	H	6.30	±1.49
9	I	6.62	±1.43
10	L	7.20	±1.20
11	M	7.16	±1.15
12	N	7.12	±1.26
13	O	6.58	±1.58
14	Q1	7.26	±1.32
15	Q2	7.28	±1.57
16	Q3	7.38	±1.54
17	Q4	7.00	±1.87

Table-7 shows the mean and standard deviation value of selected psychological parameters of state level male kho-kho players. It was found that mean and S.D. Of reaction time was .23 sec with SD of ±.04 sec, mean and S.D. of A was 7.44 With S.D. of ±1.36. mean and S.D. of B was 6.52 With S.D. of ±1.75. mean and S.D. of C was 6.76 with S.D. of ±1.56. mean and S.D. of E was 7.40 with S.D. of ±1.59. mean and S.D. of F was 7.08 With S.D. of ±1.31. mean and S.D. of R was 7.12 With S.D. of 1.14. mean and S.D. of H was 6.30 with S.D. of ±1.49. mean and S.D. of I was 6.62 with S.D. of ±1.42. mean and S.D. of L was 7.20 With S.D. of ±1.95 . mean and S.D. of M was 7.16 With S.D. of ±1.49. mean and S.D. of N was 7.12 with S.D. of ±1.26. mean and S.D. of O was 6.58 with S.D. of ±1.58. mean and S.D. of Q1 was 7.26 With S.D. of ±1.32. mean and S.D. of Q2 was 7.28

With S.D. of ±1.57. mean and S.D. of Q3 was 7.38 with S.D. of ±1.54. mean and S.D. of Q4 was 7.0 with S.D. of ±1.87.

Graphical Representation IV Mean and S.D. of Selected psychological parameters of state level male kho-kho players



4.7 DATA REGARDING KHO-KHO PERFORMANCE

The mean and standard deviation of kh0-kho performance of state level male kho-kho players have been presented in Table- 8

Table-8 Mean and S.D. of kho-kho players of state level male kho-kho players

Sl. No.	Parameters	Mean	Standard Deviation
1	Kho-kho performance	56.8	±3.5216

Table-8 shows the mean and standard deviation value of kho-kho performance of state level male kho-kho players. The mean and S.D. of kho-kho performance was 56.8 with the S.D of 3.5216.

With the mean values of kho-kho performance the researcher became interested to compare them with other state.

Table-9 Comparison of mean and standard deviation of kho-kho performance state level male kho-kho players in respect of other state male kho-kho players

State	mean	s .d
West Bengal	56.8	±3.52
Maharashtra	64.5	±4.26

4.8 STATISTICAL ANALYSIS REGARDING CORRELATION COEFFICIENT

The relationship between selected anthropometric parameters and kho-kho game performance have been presented in Table – 10

Table – 10 Co-efficient of Correlation between selected anthropometric parameters and kho-kho game performance

relationship between selected anthropometric parameters and kho-kho game performance	Co-efficient of Correlation
age	.383**
height	.280*
weight	.320*
Leg length	.286*
Arm length	.290*
Hand length	.304*
Foot length	.330*
Sitting height	.279*
Body fat %	.326*
lean body weight	.314*

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The coefficient of correlation between playing ability and age was .383** and it was statistically significant .The coefficient of correlation between playing ability and Height .280* and it was statistically significant. The coefficient of correlation between playing ability and Weight was .320*and it was also statistically significant. The coefficient of

correlation between playing ability and Arm length was .290* and it was also statistically significant. The coefficient of correlation between playing ability and leg length was .286* and it was also statistically significant. The coefficient of correlation between playing ability and hand length was .304* and it was also statistically significant. The coefficient of correlation between playing ability and foot length was .330* and it was also statistically significant. The coefficient of correlation between playing ability and sitting height was .279* and it was also statistically significant. The coefficient of correlation between playing ability and body fat % was .326* and it was also statistically significant. The coefficient of correlation between playing ability and lean body mass was .314* and it was also statistically significant.

The relationship between selected physical fitness parameters and kho-kho game performance have been presented in Table – 11

Table – 11 Co-efficient of Correlation between selected physical fitness parameters and kho-kho game performance

relationship between selected physical fitness parameters and kho-kho game performance	Co-efficient of Correlation
speed	.360*
agility	.341*
Leg power	.286*
flexibility	.391**
balance	.285*
Eye hand coordination	.301*

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation between playing ability and Speed was .360*.The correlation between playing ability and Agility was .341*which was positive and significant. The correlation between playing ability and Standing Broad Jump was -.286*.The correlation between playing ability and Flexibility was .391**which was negative and significant. The correlation between playing ability and Static Balance was .285*which was positive and significant. The correlation between playing ability and eye hand coordination was .301*which was positive and significant.

The relationship between selected physiological parameters and kho-kho game performance have been presented in Table – 12

Table – 12 Co-efficient of Correlation between selected physiological parameters and kho-kho game performance

relationship between selected physiological parameters and kho-kho game performance	Co-efficient of Correlation
Resting heart rate	.295*
Systolic blood pressure	.283*
Diastolic blood pressure	.567**
Force vital capacity	.289*
vo_2max	.503**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The coefficient of correlation between playing ability and heart Rate was .295* which was positive and significant. The coefficient of correlation between playing ability and Systolic Blood Pressure was .283* which was positive and significant .The correlation between playing ability and Diastolic Blood Pressure was .567* which was positive and significant. The correlation between playing ability and force vital capacity was .289* which was positive and significant *. The correlation between playing ability and vo_2max was .503* which was positive and significant.

The relationship between selected psychological parameters and kho-kho game performance have been presented in Table – 13

Table – 13 Co-efficient of Correlation between selected psychological parameters and kho-kho game performance

relationship between selected psychological parameters and kho-kho game performance	Co-efficient of Correlation
Reaction time	.324*
A (Warmth)	.285*
B (Reasoning)	.277
C (Emotional Stability)	.280*
E (Dominance)	.164

F (Liveliness)	.015
G (Rule Consciousness)	.129
H (Social Boldness)	.112
I (Sensitivity)	.349*
L (Vigilance)	.293*
M (Abstractedness)	.298*
N (Privateness)	.333*
O (Apprehension)	.288*
Q1 (Openness to change)	.306*
Q2 (Self reliance)	.293*
Q3 (Perfectionism)	.297*
Q4 (Tension)	.288*

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation between playing ability and reaction time was .324(*).The correlation between playing ability and Factor A was .285(*). The correlation between playing ability and Factor B was .277. The correlation between playing ability and Factor C was .285(*).The correlation between playing ability and Factor E was .164.The correlation between playing ability and Factor F was .015.The correlation between playing ability and Factor G was .129.The correlation between playing ability and Factor H was .112.The correlation between playing ability and Factor I was .349(*). The correlation between playing ability and Factor L was .293(*).The correlation between playing ability and Factor M was .298(*).The correlation between playing ability and Factor N was .333(*)..The correlation between playing ability and Factor O was .288(*).The correlation between playing ability and Factor Q1 was .306(*).The correlation between playing ability and Factor Q2 was .293(*). The correlation between playing ability and Factor Q3 was .297(*). The correlation between playing ability and Factor Q4 was .288(*).

4.9 STATISTICAL ANALYSIS REGARDING MULTIPLE REGRESSIONS

With the knowledge of relationship of different factors with the game performance, it was needed to find out multiple correlation and regression equation of kho-kho game performance.

Table-14 Multiple correlation and regression equation of selected anthropometric parameters and kho-kho game performance

Dependent Variable(Y)	Selected Independent Parameters(Xs)	Regression Coefficient (Bx)	Multiple Correlation (R)	Determinant Of Multiple Correlation (R^2)	Percentage Percentage Of Each Parameters
Kho-Kho Game Performance	age	1.036	.702[a]	.492	9.80
	height	.171			3.11
	weight	.739			7.81
	Leg length	.332			6.88
	Arm length	.185			1.68
	Hand length	.414			4.16
	Foot length	.297			2.56
	Sitting height	.320			5.30
	%Body fat	.273			3.17
	lean body weight	.139			4.76

Pcx = (Beta Weight) × (r) × (100), where: Beta Weight = Bx. SD of x / SD of y and r = Coefficient of correlation between x and Y.

Table – 14 shows that multiple correlation (R=.702) between Age , height, Weight, leg lengths, Arm lengths, hand length, foot length, sitting height, % body fat, lean body weight with kho-kho game performance was significant at 0.00 level. It showed that the combined effect of these parameters taken together to contribute the kho-kho performance. These parameters could be put into the regression prediction equation of kho-kho performance.

Table –1 4 further illustrates that the multiple regression analysis performed to developed equation for the prediction of kho-kho performance on the basis of x1. X2, x3, x4, X5, x6, x7, x8, x9, x10 anthropometric measures of parameters. Resulted multiple regression equation in scores form is :

$Y = B_1.X_1 + B_2.X_2 + B_3.X_3 + B_4.X_4 + B_5.X_5 + B_6.X_6 + B_7.X_7 + B_8.X_8 + B_9.X_9 + B_{10}.X_{10} - 128.511$

$Y = 1.036\ X_1 + .171\ X_2 + .739\ X_3 + .332\ X_4 + .185\ X_5 + .414X_6 + .297X_7 + .320X_8 + .273X_9 + .139X_{10}$

Where Y = predicted score of kho-kho performance.

X_1 = Age, $_{X2}$ = Height, X3 = Weight, X4 = leg length, X_5 = arm length, x6 = hand length, x7 = foot length, x8 = sitting height, x9 = body fat, x10 = lean body mass.

R^2 can be broken up as.

R^2 = 49.2 = 9.80+3.11+7.81+6.88+1.68+4.16+2.56+5.30+3.17+4.76

Moreover, the value of multiple coefficient of determinant (R^2 = .492) suggests that 49.2 of variance of kho-kho game performance could be predicted on the basis of regression equation developed by these ten parameters, i.e. of Age , height, Weight, leg lengths, Arm lengths, hand length, foot length, sitting height, % body fat, lean body weight. Hence, the developed regression equation could be put into the prediction of kho-kho performance.

Standard error of estimate 2.8129 indicates that percentage of obtained kho-kho performance lies within ±2.8129 points of the predicted kho –kho performance.

Table-15 Multiple regression analysis for prediction of kho-kho performance on selected Anthropometric parameters

Predictor	Coefficient
Intercept	-128.511
age (x1)	1.036
height (x2)	.171
weight(x3)	.739
leg length (x4)	.332
arm length(x5)	.185
hand length (x6)	.414
foot length (x7)	.297
sitting height (x8)	.320
%body fat (x9)	.273
lean body weight (x10)	.139

The regression analysis was performed in the table no – 15 and result revealed that p value Corresponding to factors Age, height, Weight, leg lengths, Arm lengths, hand length, foot length, sitting height, % body fat, lean body weight.

Table-15 shows the multiple correlation and regression equation of selected anthropometric parameters, motor fitness parameters, physiological parameters, psychological parameters and performance factor based on kho -kho game performance.

Table-16 Multiple correlation and regression equation of selected motor fitness parameters and kho -kho game performance

Dependent Variable(Y)	Selected Independent Parameters(Xs)	Regression Coefficient (Bx)	Multiple Correlation (R)	Determinant Of Multiple Correlation (R^2)	Percentage Of Each Parameters
Kho-Kho Game Performance	speed	.465	.612	.374	7.73
	agility	1.188			11.93
	Leg power	1.315			2.51
	flexibility	.457			7.07
	Balance	.076			2.73
	Eye hand coordination	.337			5.43

Pcx = (Beta Weight) × (r) × (100), where: Beta Weight = Bx. SD of x / SD of y and r = Coefficient of correlation between x and Y.

Table – 16 shows that multiple correlation (R=.612) between speed, agility, leg power, flexibility, static balance and eye hand coordination with kho-kho game performance was significant at 0.00 level. It showed that the combined effect of these parameters taken together to contribute the kho-kho performance. These parameters could be put into the regression prediction equation of kho-kho performance.

Table – 16 further illustrates that the multiple regression analysis performed to developed equation for the prediction of kho-kho performance on the basis of x1. X2, x3, x4, X5, x6 physical fitness measures of parameters. Resulted multiple regression equation in scores form is :

$Y = B_1.X_1 + B_2.X_2 + B_3.X_3 + B_4.X_4 + B_5.X_5 + B6.x6_- 22.550$

$Y = .456\ X_1 + 1.188\ X_2 + 1.315\ X_3 + .457\ X_4 + .076X_5 + .337\ x6 - 22.550$

Where Y = predicted score of kho-kho performance.

X_1 = Speed, $X2_=$ Agility, X3 = Leg power, X4 = flexibility, X_5 = Balance, x6 = eye hand coordination

R^2 can be broken up as.

$R^2 = 37.4 = 7.73+11.93+2.51+7.07+2.73+5.43$

Moreover, the value of multiple coefficient of determinant (R^2 = .374) suggests that 37.4percent of variance of kho -kho game performance could be predicted on the basis of regression equation developed by these five parameters, i.e. of speed, agility, leg power, flexibility, static balance and eye hand coordination. Hence, the developed regression equation could be put into the prediction of kho-kho performance.

Standard error of estimate 2.97370indicates that percentage of obtained kho-kho performance lies within ±2.97370 points of the predicted kho –kho performance.

Table-17 Multiple regression analysis for prediction of kho-kho performance on selected physiological parameters

Predictor	Coefficient
Intercept	22.550
Speed(x1)	.465
Agility(x2)	1.188
Leg power(x3)	1.315
Flexibility(x4)	.457
Balance(x5)	.076
Eye hand coordination(x6)	.337

Table-18 Multiple correlation and regression equation of selected physiological parameters and kho-kho game performance

Dependent Variable(Y)	**Selected Independent Parameters(Xs)**	**Regression Coefficient (Bx)**	**Multiple Correlation (R)**	**Determinant Of Multiple Correlation (R^2)**	**Percentage Of Each Parameters**
Kho-Kho Game Performance	Resting heart rate	.302	.696	.484	5.45
	Systolic blood pressure	.071			2.52
	Diastolic blood pressure	.162			21.60
	Force vital capacity	.003			2.72
	Vo_2max	.584			16.14

Pcx = (Beta Weight) × (r) × (100), where: Beta Weight = Bx. SD of x / SD of y and r = Coefficient of correlation between x and Y.

Table – 18 shows that multiple correlation (R=.696) between Heart rate Systolictolic Blood pressure, diastolic Blood pressure, Force vital capacity, Vo_2max with kho-kho game performance was significant at 0.00 level. It showed that the combined effect of these parameters taken together to contribute the kho-kho performance. These parameters could be put into the regression prediction equation of kho-kho performance.

Table – 18 further illustrates that the multiple regression analysis performed to developed equation for the prediction of kho-kho performance on the basis of x1. X2, x3, x4. X5 physiological measures of parameters. Resulted multiple regression equation in scores form is :

$Y = B_1.X_1 + B_2.X_2 + B_3.X_3 + B_4.X_4 + B_5.X_5 - 11.088$

$Y = .302\ X_1 + .071\ X_2 + .162\ X_3 + .003\ X_4 + .584\ X_5 - 11.088$

Where Y = predicted score of kho-kho performance.

X_1 = Resting heart rate, $X2 =$ Systolic blood pressure, X3 = Diastolic blood pressure, X4 = force vital capacity, $X_5 = Vo_2max$.

R^2 can be broken up as.

$R^2 = 48.4 = 5.45+2.52+21.60+2.72+16.14$

Moreover, the value of multiple coefficient of determinant ($R^2 = .484$) suggests that 48.4percent of variance of kho -kho game performance could be predicted on the basis of regression equation developed by these five parameters, i.e. of Heart rate, Systolic Blood pressure, diastolic Blood pressure, Force vital capacity, Vo_2max. Hence, the developed regression equation could be put into the prediction of kho-kho performance.

Standard error of estimate 2.66981 indicates that percentage of obtained kho-kho performance lies within ±2.66981 points of the predicted kho –kho performance.

Table-19 Multiple regression analysis for prediction of kho-kho performance on selected physiological parameters

Predictor	Coefficient
Intercept	-11.088
Resting heart rate(x1)	.302
Systolic blood pressure (x2)	.071
Diastolic blood pressure (x3)	0162
Force vital capacity(x4)	.003
Vo_2max(x5)	.584

The regression analysis was performed in the table no – 19 and result revealed that p value Corresponding to factors Heart rate, Systolic Blood pressure, Diastolic Blood pressure, Force vital capacity, Vo_2max.

Table-20 Multiple correlation and regression equation of selected psychological parameters and kho -kho game performance

Dependent Variable(Y)	Selected Independent Parameters(Xs)	Regression Coefficient (Bx)	Multiple Correlation (R)	Determinant Of Multiple Correlation (R^2)	Percentage Of Each Parameters
Kho-Kho Game Performance	reaction time	23.210	.780	.608	8.99
	A	.331			3.64
	B	.493			6.80
	C	-.122			-1.51
	E	-.174			-1.29
	F	-.463			-.26
	G	.696			2.78
	H	.117			.55
	I	.849			12.01
	L	-.020			-.19
	M	.202			1.96
	N	-.056			-.66
	O	.535			6.91
	Q1	.286			3.28
	Q2	.927			12.07
	Q3	.135			1.75
	Q4	.254			3.89

Pcx = (Beta Weight) × (r) × (100), where: Beta Weight = Bx. SD of x / SD of y and r = Coefficient of correlation between x and Y.

Table – 20 shows that multiple correlation (R=.780) between reaction time, A, B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3, Q4 with kho-kho game performance was significant at 0.00 level. It showed that the combined effect of these parameters taken together to contribute the kho-kho performance. These parameters could be put into the regression prediction equation of kho-kho performance.

Table – 20 further illustrates that the multiple regression analysis performed to developed equation for the prediction of kho-kho performance on the basis of x1. x2, x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15, x16, x17 psychological measures of parameters. Resulted multiple regression equation in scores form is :

$Y = B_1.X_1 + B_2.X_2 + B_3.X_3 + B_4.X_4 + B_5.X_5 + B_6.X_6 + B_7.X_7 + B_8.X_8$

$+ B_9.X_9 + B_{10}.X_{10} + B_{11}.X_{11} + B_{12}.X_{12} + B_{13}.X_{13} + B_{14}.X_{14} + B_{15}.X_{15} + B_{16}.X_{16} + B_{17}.X_{17} - 23.889.$

$Y = 23.21\ X_1 + .331X_2 + .493X_3 + (-).122X_4 + (-).174\ X_5 + (-).463X_6 + .696X_7 + .117X_8 + .849X_9 + (-).020X_{10} + .202X_{11} + (-).056X_{12} + .535X_{13} + .286X_{14} + .927X_{15} + .135X_{16} + .254X_{17}$

Where Y = predicted score of kho-kho performance.

X_1 = reaction time $_{X2 = A}$, X3 = B, X4 = C, X_5 = E, x6 = F, x7 = G, x8 = H, x9 = I,

x10 = L, x11 = M, x12 =N, x13 = O, x14 = Q1, x15 = Q2, x16 = Q3, X17= Q4

R^2 can be broken up as.

R^2=60.8= 8.99+3.64+6.80+(-)1.51+(-)1.29+(-).26+2.78+.55+12.01+(-).19+1.96+

(-).66+6.91+3.28+12.07+1.75+3.89

Moreover, the value of multiple coefficient of determinant (R^2 = .608) suggests that 60.8 of variance of kho -kho game performance could be predicted on the basis of regression equation developed by these ten parameters, i.e. of Reaction time, A B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3 Q4.Hence, the developed regression equation could be put into the prediction of kho-kho performance.

Standard error of estimate 2.8129 indicates that percentage of obtained kho-kho performance lies within ±2.8129 points of the predicted kho –kho performance.

Table- 21 Multiple regression analysis for prediction of kho-kho performance on selected physiological parameters

Predictor	Coefficient
Intercept	-128.511
reaction time(x1)	.278
A(x2)	.127
B(x3)	.245
C (x4)	-.054
E(x5)	-.079
F (x6)	-.172
G (x7)	.224
H (x8)	.050
I (x9)	.344
L(x10)	-.007
M(x11)	.066
N(x12)	-.020
O(x13)	.240
Q1(x14)	.107
Q2(x15)	.412
Q3(x16)	.059
Q4(x17)	.135

The regression analysis was performed in the table no –22 and result revealed that p value Corresponding to factors Reaction time, A B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3 Q4.

4.10 RESULT OF THE STUDY

A) Result regarding selected anthropometric parameters:

i. Kho-kho performance was significantly related to Weight, Standing height, Age, Arm and leg lengths, hand length, foot length, sitting height, % body fat, and lean body weight.

ii. Weight, Standing height, Age, Arm and leg lengths, hand length, foot length, sitting height, % body fat, lean body weight were found the most significant predictor parameters to the kho-kho performance.

B) Result regarding selected physical parameters:

i. Kho-kho performance was significantly related to speed, agility, leg power, flexibility, static balance and eye hand coordination.

ii. Speed, agility, leg power, flexibility, static balance and eye hand coordination were found the most significant predictor parameters to the kho-kho performance.

C) Result regarding selected physiological parameters:

i. Kho-kho performance was significantly related to Heart rate, Systolictolic Blood pressure, diastolic Blood pressure, Force, vital capacity, Vo_2max.

ii. Diastolic Blood pressure, Vo_2max. Heart rate, Force vital capacity, Systolictolic Blood pressure were found the most significant predictor parameters to the kho-kho performance.

D) Result regarding selected psychological parameters:

Kho-kho performance was significantly related to reaction time, warmth (factor-A), Emotional Stability (factor-C), Sensitivity (factor-I), Vigilance (factor-L), Abstractedness (factor-M), Privateness (factor-N), Apprehension (factor-O), Change (factor-Q1), Self Relience (factor-Q2), Perfectionism (factor-Q3) and Tension (Factor-Q4).

Kho-kho performance was not significantly related to Dominance (factor-E), Liveliness (factor-F), Rule Consciousness (factor-G), Social Boldness (factor-H).

4.11 DISCUSSION ON FINDINGS:

Regarding Anthropometry:

Anthropometry is the study of the measurement of human body in terms of the dimensions of bone muscle and adipose tissue. The above observation may probably attributed to the following facts that establishing through the result obtained from Pearson product moment of coefficient analysis that out of seven anthropometrical parameters i.e., Weight, Standing height ,Age ,Arm and leg lengths, hand length, foot length, sitting height, %

body fat, lean body weight selected for the study. For analysis anthropometrical profile researcher used multiple correlations.

Monohor. L (2015) shows his study that kho -kho players in generally taller and heavier than normal individual and anthropometric profile significantly related to performance. In present study it have been found that the Weight, Standing height ,Age ,Arm and leg lengths, hand length, foot length, sitting height, % body fat, lean body weight all are significantly related to the playing ability. It could be inferred that only foot length significantly contributed to kho-kho playing ability. Longer the foot less would be the kho-kho playing ability perhaps shorter foot would enable the player to take faster steps and speed thus generated might very well increase the playing ability in kho-kho game. These findings were partially in contrast to those reported by Hammes (1969) who stated that foot length had no significant relationship and partially in line with other findings of the investigation according to which hand length, total leg length, total arm length were not significantly related to the playing ability.

According to the study of Burris B, (1973) kho-kho players show significantly higher lean body weight values than the non sporting population. In present study medalist kho- kho players were also have higher bone mass and less fat deposits, which is considered a major precondition for a good performance in kho-kho.

Silvestre et al., and Gomez, have also found that athletic performance of players is often negatively associated with body fat%.

The rational for current stands for body weight and body composition in the kho- kho players that these measure are correlated with playing ability and overall health.

Friedl. Vogel studied that excess weight diminishes running performance and conversely lower body weight is associated with relatively better running performance because too much weight cannot raise the speed.

Therefore supported by the work present that smaller, lighter weight individual well with these tasks of muscular strength and endurance.

The component of body weight may be divided into lean body weight and fat mass. So many researcher and sports scientist repeatedly mention their various kind of sports journal that lean body weight is the best predictor of sports performance. Harman and Frykman reported that lean body weight is the indicator of good performance. These studies pointed out that body fitness is not a strong predictor of run time of an individual. Fitness was associated with longer load carrying time to cover a given distance. Lean body weight is positively associated with the ability to push, carry and exert torque. Harman and Frykman concluded that minimum lean body weight standards may be mere important to performance than are maximum percentage body fat standards.

The present study lean body weight and body fat both are significantly correlated with playing ability of the male kho-kho players. This higher fat mass probably because they could use their fat mass to generate momentum.

DISCUSSION REGARDING PHYSICAL PARAMETER

The present study indicated that a relationship between playing ability and other physical fitness parameters i.e. speed, agility, leg power, balance, flexibility and eye hand coordination. In the present study all the physical fitness parameters were highly significantly correlated with the playing ability.

Strength is one of the most important parameters of kho-kho (dey 2015). Every sports demands more ability at various level above the average. Specific fitness is achieved when a player acquires the required motor abilities at the intensified level for the particular sports. For example specific fitness in kho -kho is with reference to agility, speed and leg power (verma 2011). Kho -kho fevers agile athlete with strength and endurance because of it frequent change of direction like dodging, running and chasing skill. The specialty of Indian game kho-kho is that it make players light bodied, agile, ready witted, supple and daring. It is vigorous and fosters a healthy competitive spirit among youths. It is not merely running with speed but its “chase”, a natural instinct to overtake, to pursue to catch ‘a kill’. In kho-kho there is skill like chasing, dodging, faking, taping, diving etc. Agility is the foremost pre-requisite for kho-kho players. The runners have to run fast in zigzag manner to escape from the chaser. The runner cannot run in a straight line, otherwise he can be

easily one put out. So, agility is very essential for kho-kho players. Kho-Kho deserves the most prominent place in field games. It gives very good exercise to both the team simultaneously never allow the defenders to take rest.

On the other hand physical skill like speed, leg power, flexibility, balance, coordination between hand and eye and limbs require for attacking for speed, sitting in the box for leg strength.

Agility is the prime physical fitness parameters for runner also chaser because in running situation all the players have to move fast to defense the attacking players. On the other hand chaser have to more agile for the defensive skill like covering, pole dive, drive and also in the pole turn. Jadav (2011)

In Kho-Kho there are many skills like chasing, dodging, faking, taping, diving, etc. Agility is the foremost pre-requisite for a kho-kho player. The runner has to run fastin zigzag manner to escape from the chaser. The runner cannot run in a straight line, otherwise he can be easily put out. So, agility is very essential for kho-kho players. Kho-Kho deserves the most prominent place in Indian National field Games. It gives very good exercises to both the team simultaneously never allow the defenders to take rest. The slow and dull players are quickly knocked out. (**Dr. M.S. Pasodi 2011)**

Kho-kho favors body development with a muscular strength stamina and endurance; Fine flexibility and agility is developed as one needs to move faster in a small area. Player's eyes and body movement become quicker. On the other hand in physical skills speed, power [strength], endurance, flexibility, swift action, and proper coordination between hand eyes and limbs. If athlete body is flexible then only he can dodge, tapping covering. Here more than speed acceleration is paramount; strong leg muscles give more punch to the player. Agility and stamina are also very essential. These findings are in accordance with the Jadhav (2011).

Kho-kho players have leg power, because the games involve backward and forward movements and also jumping all through the play. These actions help in the development of the leg power. The duration of the play and the movements of speed are almost same in

the games. However, leg power and speed ability of Kho-kho players is better this may be because; backward and forward movements and jumping actions are involved in kho-kho game. In Kho-kho, the players have to face the attack of a chaser, who executes many skills with speed- all type of chain like single chain, double chain, pole turning. **(Singh Raspal and Singh Hoshiyar 2013)**

Physiological discussion

In kho -kho, physiological parameters play a lot of crucial role in executing optimum performance during play situation. Few exercise physiologists studied that physiological parameters like heart rate, blood Pressure both systolictolic and diastolic, maximum oxygen consumption (vo_2max), force vital capacity played Very significant role in securing success of an athlete. In the present study it was evident from the mean values in the table no 1 that WB kho -kho players have higher resting heart rate, blood Pressure systolictolic , oxygen consumption (vo_2max), Force vital capacity than Maharashtrian National level kho -kho players. It was no relevance. The above result might be due to the reason that Maharashtra players have more experience of participation and in competition that helps them to achieve high performance because lowering heart rate below 60 indications of Bradycardia as well as athletic heart. But in reference to the normal heart rate of human being, the W.B kho -kho players considering have lower heart rate which also significant with playing ability at 0.01 level. Durwin and Womerseley found lower heart rate among sports person individual which is the outcome of a good endurance. In case of Blood pressure the W.B players showed systolictolic blood pressure was 122.36 mm of hg, diastolic blood pressure was 71.24 mm of hg and maharashtrian players have 117mm of hg and 77 mm of hg which indicate that average systolictolic blood pressure was higher than Maharashtra and vise versa in diastolic blood pressure. Grassi et al. studied young normal blood pressure individuals and verified that after 10 weeks of physical exercise, besides the decrease on the systolictolic and diastolic blood pressure, a significant reduction on the sympathetic nerve activity was also observed (36%), which was not observed for the control group composed of those who did not perform physical exercises. In this case, it is possible that the blood pressure drop is due to the decrease on the peripheral vascular resistance and this fact may even be related to the vasodilatation in the active and inactive

musculature caused by physical exercise as result of the accumulation of muscular metabolites (potassium, lactate and adenosine) or due to the dissipation of the heat produced by the physical exercise. Alternatively, the increase on the blood flow may be a result of the reduction on the sympathetic tonus and the consequent increase on the peripheral vasodilatation, which seems to be related to the increase on secretion of endogen opioids caused by exercise, presenting direct vasodilator effect. Above studies also supported the present study of lowering diastolic blood pressure is significantly correlated with the playing ability. In the case of force vital capacity according to British Thorasic Society (BTS) the normal value of force vital capacity in height was 165-170 c.m. is 37.20 lt. In present study W.B. kho -kho players have 43.73lt. Force vital capacity and maharashtrian players have 37.37lt. Force vital capacity which were significantly correlated with the playing ability. According to Resperonic New Jersey, inc. the normal value of force vital capacity is 594 l/min whose age was 20 and height was 175 c.m. A number of studies have been made by eminent physical education scientists namely Clarke and Stall (1970), Lefghton (1967), William (1969), Mac Intyre (1967) and Chiu (1950) to evaluate the effect of different types of physical education programmes (Chiu Edward 1950). Possible explanation for this could be regular forceful inspiration and expiration for prolonged period during training leads to strengthening of the respiratory muscles. This helps the lungs to inflate and deflate maximally. This maximum inflation and deflation is an important physiological stimulus for the release of surfactant (Hildebrean *et al.*, 1981).

A study by Douglass G, Stuart and Callings WD showed that mean VC score of athletes was higher than the non athletes. The difference in VC score of alveolar tissues, hyperplasia of alveolar tissues, formation of new alveoli and also increase in the micro circulation in the lungs which results in formation of "sport lung". McCurdly and Larsen (1940) in their studies, working with trained subjects and untrained controls have shown that trained subjects had significantly higher vital capacity as compared to untrained.

From above study it can be said that kho-kho player also have greater amount of Vo_2max and this amount was more than maharashtrian players. The normal, Maharashtrian players, W.B. players Vo_2max was respectively-42.5ml/kg/min, 43.580ml/kg/min, 39.47ml/kg/min.

Maximum oxygen consumption quantitatively defines a person maximum capacity to resynthesis ATP aerobically. This serves as an important indicator of physiologic functional capacity to sustain intense aerobic exercise. (William D.McArdle, et.all 2010).

Vo_2max is the parameter of physiology which is the most valuable parameter for any kind of exercise or games. By using Vo_2max and seeing the result we could justify and classify the level of sports person of any event as well as any games, Highering Vo_2max indicates of an athlete, excellent energy liberating system, good metabolic rate and near about full utilization of ATP through aerobic glycolysis.

PSYCHOLOGICAL DISCUSSION:

Psychomotor parameters were inversely related to kho-kho playing ability. That is, quicker the reaction time better was the playing ability in kho-kho game thus indicating that like in any other game. In kho-kho also quick reaction time would lead to success in the game. Normal net work involving early detection of stimulus through receptors (sense organs), quick processing of the information and ultimately appropriately responding to the impulses through effectors, (glands and muscles more the latter) has got B -2.76 -0.61 SEB 0.88 0.30 Beta -0.14 -0.08 't' 3.14 2.01 i P 0.0029 (S) 0.0470 (S) to be strong. Only then ability of the kho-kho player would be reflected in the game. Like reaction time, movement time was also universally related to kho-kho playing ability. Faster the movement time, better was the playing ability. Thus movement time was also found to be a significant predictor. It wouldn't be merely quick reaction time leading the player to better performance along with quick reaction time, fast movement time also has got to be present. Then only can the kho-kho player can come out with good performance exhibiting one's basic ability in the game. Thus thinking (psychological function) and acting (motor function) lead to successful performance in the game. As both these psychomotor parameters have been found to be significant predictors of kho-kho playing ability, hypothesis 3 was accepted. These findings were in line with those obtained by Norrie (1974) Singh and Verma (1983) Raj (1992).

Westerlund and Turtle (1931) that their exist high level of correlation between reaction time and shorts distance running, as in our study the subjects has to react very quickly to

cover short distance after getting kho from team mates. The obtain result in the study shows that the quality of neuro-muscular coordination (reaction ability and rhythm ability)which is the integral part of the coordinative abilities required for performance in kho-kho was adequately developed in the subjects.

Ramesh Kumar (2013) studied that the big five personality trait were generally closely associated each other. In the present study kho-kho of big five personality trait that is A (Warmth), F (Liveliness), H (Social Bold), N (Privateness), Q2 (Self Reliance) out of A, N, Q2 were significantly correlated with the performance of the kho-kho players. F, H was not significant but r value near to significant level.

The Sixteen Personality Factor Questionnaire (16PF) is a comprehensive measure of normal range personality found to be effective in a variety of settings where an in-depth assessment of the whole person is needed.

In the onset of discussion it was mention that kho-kho is such kind of games where required a good and strong psychological traits along with the physical and physiological parameters.

Thus, the Sportsmen of Kho-Kho players are proved to be more outgoing, intelligent, emotionally stable, assertive, and self sufficient and controlled than Badminton players. This significant difference may be due to the nature of game situations which warrants specialized training to improve their personality, that is, Kho-Kho players are trained only for team games while Badminton players are trained both for individual as well as team games.

The male kho-kho group in comparison to their female counterpart is warm-hearted, more intelligent, stable, humble, conscientious, tender-minded, socially-aware, conservative and controlled. The female Kho-kho group on the other hand has been found to be reserved, less intelligent, emotionally less stable, competitive, expedient, tough-minded, forthright, experimenting and undisciplined.

In the present study West Bengal kho-kho players shows a significant and showed high level of emotional stability may due such strong and good psychological setup. Kho-Kho

players were well as mentally in form of interpretation, perception, analysis, decision making in competitive situation."(2015)

Morgan (1978) reported that emotional stability is the key trait of human psychology which maintains the liazeo to execute full power of an individual. On the other hand Walter (1967) proposed that emotional stability was a process of continuity striving for greater sense of emotional health both intra psychologically and intra personality. Kaplan and Baron (1988) think that the emotionally stable person has a capacity to withstand and delay in satisfaction of needs and have ability to tolerate a reasonable amount of frustration. The set of questions administered under this head is Factor A of the Cattle's 16 Personality Test is aimed to determine whether the individual sportsman is Reserved or Outgoing. mean sten score (or 5) the average tendency as far as this personality factor is concerned, that they are not too reserved type or too much of warm hearted / Outgoing. The set of questions administered under this head is Factor C of the Cattail's16 Personality Test aimed to determine whether the individual sportsman is affected by feelings or he is emotionally stable. the continuum of this Personality trait extends from affected by feelings (Emotionally less stable, easily upset) at the lower end of the sten to Emotionally Stable (Faces Reality, Calm, Mature) at the upper end. Thus, the Sportsmen of Kho -Kho players are proved to be more outgoing, intelligent, emotionally stable, assertive, self sufficient and controlled. This significant difference may be due to the nature of game situations which warrants specialised training to improve their personality, that is, Kho - Kho players are trained only for team games.

Thus, the sportsmen of the Athletics also proved to be more outgoing, intelligent, emotionally stable, venturesome, trusting and experimenting than the Badminton players. This significant difference may be due to the fact that these sportsmen are participating in competitions under different circumstances, that is, athletes are trained for individual competitions while Badminton players are trained for individual as well as team sports.

Vaillant (2003) conceptualized positive mental health in terms of positive psychology which includes emotional, social and physical well-being. It shows that achievements in

sports or any field is dependent on physical, emotional, social and psychological well-being which is integral part of positive mental health.

4.11 TESTING HYPOTHESEIS

It was hypothesized that selected anthropometric parameters viz. height, weight, B.M.I, Leg length, Arm length would possess significant relationship with kho-kho game performance.

It was hypothesized that selected motor fitness parameters viz. speed, agility, leg power, flexibility, static balance and Eye hand coordination would have significant relationship with kho-kho game performance.

It was hypothesized that selected physiological fitness parameters viz. Heart rate, Blood pressure -Systolic & diastolic, Force vital capacity, and Vo_2max would have significant relationship with kho-kho game performance.

There would have differences in personality traits of the kho-kho players than the normal people.

CHAPTER-V

SUMMARY, CONCLUSION, & RECOMMENDATION

5.1 SUMMARY

Kho-Kho is an indigenous game for our country. Basically it was a traditional game use to be played in different parts of our country with different variations. During last fifty years the game was structured as a formal game with late down rules and regulations. At present this game is one of the popular games in our country specifically in the rural areas.

This game is included in Inter-District and Inter-State levels of competition. This is also an important game for school children. The Government has declared different national awards for this game. Thus Arjun Award, Eklavya Award for men, Rani Laxibai Awards for women, Beer Abhimunya Award for under nineteen years boys and Janaki Award for under nineteen years girl's. Like all others team game the performance of Kho-Kho demands on many groups of factors. To study these factors separately and in relation to their contribution to overall performance of Kho-Kho game is essential for the purpose of teaching and training.

Performance structure broadly indicates the 'Make Up' of performance of the game. Study of performance structure is an important area of study and research, Holland (1965) as studied performance structure of Basketball, Shergill (1992) as studied performance structure of Hockey, Promoda Debi (1983) as studied performance structure of parting the short. Tiwari and Singh (2010) studied performance structure of volleyball. The study of performance structure for Kho-Kho game has not been studied extensively by physical Educator and Sports Scientist. Therefore present study was planned with the purpose of analysing the performance structure of kho-kho game.

The total of fifty male junior Kho-kho players were selected as subject as per availability. There were four groups of parameters selected in present study. Among anthropometric measurements Weight, Standing height, Age, Arm, leg lengths, Hand length, foot length, sitting height, % Body fat, lbw were considered. For the present study selected motor

fitness components viz. speed, agility, leg power, flexibility, static balance and Eye hand coordination were considered. Selected physiological components were Heart rate, Blood pressure - systolic & diastolic, Force vital capacity, and Vo_2max. Personality factors proposed by Cattle, and reaction time were selected for psychological profile.

All this parameters were measured using standard test &tools.

The data were analysed using statistical procedure. Mean & SD were calculated as the measured of central tendency & variability respectively. Correlation co-efficient was computed.

On the basis of analysis of data the measured were obtained.

5.2 CONCLUSION

On the basis of the results and within the limitation of the study it is observed that Anthropometric, Psychological, Physical and Physiological variables are helps to make performance structure stronger. Regarding anthropometric parameters namely Weight, Standing height, Age, Arm length, leg length, Hand length, foot length, sitting height, body fat %, Lean body mass are significantly contribute for kho-kho performance. In physical parameters namely speed, agility, leg power, flexibility, static balance, Eye hand coordination are significantly related with performance of kho-kho. In physiological parameters namely Heart rate, Blood pressure - systolic & diastolic, Force vital capacity, and Vo_2max are significantly contribute of making performance structure in kho-kho. In this study researcher shows the level of the west Bengal male kho-kho players comparing the mean value of the Maharashtrian male kho-kho players. Comparison was taken with the state Maharashtrian kho-kho players because Maharashtra holding the 1^{st} position in India.

The mean of performance comparing with Maharashtrian player, following conclusion were drawn.

A) Result regarding selected anthropometric parameters:

i. Kho-kho performance was significantly related to Weight, Standing height, Age, Arm and leg lengths, hand length, foot length, sitting height, % Body fat, and Lean body mass.

ii. Weight, Standing height, Age, Arm and leg lengths, hand length, foot length, sitting height, % Body fat, lbw were found the most significant predictor variables to the kho-kho performance.

B) Result regarding selected physical parameters:

i. Kho-kho performance was significantly related to speed, agility, leg power, flexibility, static balance and eye hand coordination.

ii. Speed, agility, leg power, flexibility, static balance and eye hand coordination were found the most significant predictor variables to the kho-kho performance.

C) Result regarding selected physiological parameters:

i. Kho-kho performance was significantly related to Heart rate, Systolictolic Blood pressure, diastolic Blood pressure, Force, vital capacity, Vo2max.

ii. Diastolic Blood pressure, Vo_2max. Heart rates, Force, vital capacity, Systolictolic Blood pressure were found the most significant predictor variables to the kho-kho performance.

D) Result regarding selected psychological parameters :

Kho-kho performance was significantly related to reaction time, warmth (factor-A), Emotional Stability (factor-C), Sensitivity (factor-I), Vigilance (factor-L), Abstractedness (factor-M), Privateness (factor-N), Apprehension (factor-O) , Change (factor-Q1), Self Relience (factor-Q2), Perfectionism (factor-Q3) and Tension (Factor-Q4).

Kho-kho performance was not significantly related to Dominance (factor-E), Liveliness (factor-F), Rule Consciousness (factor-G), Social Boldness (factor-H).

5.3 RECOMMENDATION

On the basis of conclusion drawns following recommendations were made for future studies/research work and practical application.

5.3.1 RECOMMENDATION FOR FUTURE STUDIES

1. Future research work may be planned to analyse performance structure of Kho-Kho game with Female subjects.
2. Studies of similar nature may also be planned to analyse the performance structure of other level of Kho-Kho players (Sub junior & senior).
3. Future research works may also be undertaken to analyse performance structure considering other influencing factors of Kho-Kho game.
4. Future studies may also be conducted to analyse performance structure of other games.

5.3.2 RECOMMENDATION FOR FUTURE APPLICATION

1. The results of the study may be used for selecting Kho-kho players specifically in relation to their Anthropometric parameters.
2. The results of the study may also provide guide lines for developing fitness and condition of Kho-kho players.
3. The results of the study may also be used for psychological development for Kho-Kho players.
4. The results of the study may also be used for coaches' development for Kho-Kho players.
5. Imputing other different variables in order to investigate to kho-kho performance ability.

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ব্যক্তিত্ব-নিরূপণ অভীক্ষা

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সুকুমার বসু এবং অরুণ কুমার চ্যাটার্জী
ফলিত মনোবিজ্ঞান বিভাগ, কলিকাতা বিশ্ববিদ্যালয়

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১৯৮৪ — ৮৫

		(১)	(২)	(৩)
১।	আমার মনে হয় আমার স্মৃতিশক্তি অন্যের তুলনায় উন্নত হয়েছে।	হ্যাঁ	সঠিক বলা যায় না	না
২।	আমি লোকালয় থেকে দূরে সাধু সন্ন্যাসীদের মত একলা থাকতে পারব।	হ্যাঁ	মাঝে মাঝে	না
৩।	যদি আকাশকে নীচু এবং শীতকে গরম বলা হয় তাহলে একজন অপরাধীকে বলা হবে (ক) লম্পট (খ) সাধু (গ) মেধা।	ক	খ	গ
৪।	আমি যখন কোন অগোছালো ও অপরিচ্ছন্ন লোককে দেখি তখন আমি :			
	ক) কোন রকমে তাকে মেনে নিই			
	খ) বিরক্ত হলেও মানিয়ে নেবার চেষ্টা করি			
	গ) রুষ্ট ও বিরক্ত হই	ক	খ	গ
৫।	লোকে যখন বলে সে অন্যের চেয়ে ভালভাবে কাজ করতে পারে তখন আমি বিরক্ত বোধ করি।	হ্যাঁ	কখনো কখনো	না
৬।	আনন্দ উৎসবের জায়গায় আমি অন্যদের গল্প ও রসিকতা করতে সুযোগ দিই।	হ্যাঁ	কখন কখন	না
৭।	আমার আয় প্রয়োজনের অতিরিক্ত হলে আমি সেই অতিরিক্ত অংশ কোন ধর্মীয় প্রতিষ্ঠানে দিতাম বা কোন সৎকাজে দান করতাম।	হ্যাঁ	সঠিক বলা যায় না	না
৮।	আমাদের কোন আনন্দ অনুষ্ঠানে যোগ দিতে দেখলে প্রায় সবাইকে আমি নিঃসন্দেহে আনন্দিত হতে দেখি।	হ্যাঁ	ঠিক বোঝা যায় না	না
৯।	আমি শরীরচর্চা করতে চাই :			
	ক) খালি হাতে ব্যায়াম করে, যোগব্যায়াম করে, ব্রতচারী করে, নৃত্যে অংশগ্রহণ করে।			
	খ) 'ক' ও 'গ' মধ্যে কিছু কিছু করে।			
	গ) ক্যারাটে, ভলিবল, বাস্কেটবলে অংশগ্রহণ করে।	ক	খ	গ
১০।	লোকে যা বলে আর যা করে তার মধ্যে বিরাট তফাৎ দেখে আমি মনে মনে হাসি।	হ্যাঁ	কোন কোন ক্ষেত্রে	না

	(১)	(২)	(৩)
১১। ছোটবেলায় প্রতিদিন বাড়ি ছেড়ে স্কুলে যেতে খারাপ লাগত।	হ্যাঁ	মাঝে মাঝে	না
১২। আমার কোন ভাল মন্তব্য কেউ না শুনলে ঃ ক) তাতে আমার কিছু মনে হয় না খ) পরিস্থিতি বুঝে চুপ করে থাকি অথবা অন্যরা মন্তব্যটি করি। গ) আমি সাগ্রহে অন্ততঃ আরও একবার মন্তব্যটি করি।	ক	খ	গ
১৩। যখন কারও খারাপ আচরণ লক্ষ্য করি তখন আমি ভাবি ঃ ক) আমার এত কিছু করার নেই। খ) অবস্থা বুঝে যা করণীয় তাই করি। গ) আমি তাকে বুঝিয়ে দিই যে লোকে এটা বরদাস্ত করবে না।	ক	খ	গ
১৪। যখন নতুন কারোর সঙ্গে আলাপ হয় তখন ঃ ক) তার রাজনৈতিক ও সামাজিক মতামত সম্পর্কে আলোচনা করি। খ) লোক বুঝে আচরণ করি। গ) তাকে নতুন কোন ভাল মজার কথা বলতে বলি	ক	খ	গ
১৫। আমি যখন কোন কাজের পরিকল্পনা করি তখন তা অন্যের সাহায্য ছাড়া নিজে একা করতে পছন্দ করি।	হ্যাঁ	কখন কখন	না
১৬। 'কি হতে পারত' - - এই ভাবনা করে সময় কাটানো আমি এড়িয়ে চলতে চাই।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
১৭। হারানো যাওয়ার কথা থাকলে হাতে যথেষ্ট সময় থাকা সত্ত্বেও আমি উদ্বিগ্ন হই ও তাড়াহুড়ো করি।	হ্যাঁ	কখন কখন	না
১৮। কখন কখন সাধারণের জন্য হলেও কোন কোন ব্যাপারে সব বাবার ওপর নির্ভরতার ভাব আসে।	হ্যাঁ	সঠিক বলা যায় না	না
১৯। সমস্ত দিন কাজের খাতিরে কর্মচারীদের বা ক্রেতাদের কাছ থেকে অপ্রীতিকর অভাব অভিযোগের কথা শুনতে হবে এমন একটা চাকরি যদি পাই তাহলে আমি ঃ (ক) খুশী হতে পারি (খ) খুশী হব কিনা বলা শক্ত (গ) খুশী হব না	ক	খ	গ

	(১)	(২)	(৩)
২০। আমার বলে হয় 'অযথার্থ' শব্দটার বিপরীত শব্দ হল তার বিপরীত শব্দের অর্থ হল ঃ ক) অপ্রত্যাশিত (খ) সঠিক (গ) যথার্থ নয়	ক	খ	গ
২১। আমার প্রয়োজনে সব সময়েই আমি প্রচুর কর্মশক্তি পেয়ে থাকি।	হ্যাঁ	যেকোন কোন ক্ষেত্রে	না
২২। যৌন আবেগপূর্ণ বই পড়ার পরে বা ওই ধরণের সিনেমা দেখার পরে আমি তা অপরকে বলতে ভীষণ বিব্রত বোধ করি।	হ্যাঁ	সঠিক বলা যায় না	না
২৩। কোন অনুষ্ঠানে অনেক লোকজনের সমাবেশে আমার যেতে খুব ভাল লাগে।	হ্যাঁ	কখন কখন	না
২৪। আমার মনে হয় যে ঃ ক) কতগুলো কাজ অন্য কাজের মত অত যত্ন নিয়ে না করলেও হয়। খ) আমার এ বিষয়ে সঠিক কোন নীতি নেই। গ) যদি কোন কাজ করতেই হয় তাহলে তা বিশেষ যত্ন নিয়ে করা উচিত।	ক	খ	গ
২৫। রাস্তায় ঘাটে বা বাজারে কিছু লোক অন্যের দিকে হাঁ করে তাকিয়ে থাকে ঃ ক) এটা আমি অপছন্দ করি। খ) এই ধরণের ঘটনায় আমার করার কিছু নেই। গ) এই ধরণের ঘটনায় আপত্তিকর কিছু নেই।	ক	খ	গ
২৬। যদি আমায় জিজ্ঞাসা করা হয় আমি কি হতে চাই, তাহলে আমার উত্তর হল ঃ ক) মঠের অধ্যক্ষ (খ) প্রশাসনিক অধিকর্তা (গ) সৈন্যাধ্যক্ষ	ক	খ	গ
২৭। ছোটখাট ব্যাপারে যদি আমার প্রতিবেশী আমাকে ঠকায় তাহলে আমি তার সঙ্গে চটাচটি না করে বরং রসিকতা করি।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
২৮। আমি যে সব ছবি দেখতে ভালবাসি তা হল ঃ ক) অতীত দিনের কঠোর ও সংগ্রামপূর্ণ জীবনের ছবি, খ) এমন ছবি যাতে সবকিছুই থাকবে। গ) ভবিষ্যৎ সমাজজীবন সম্পর্কে অবাস্তব কল্পনার অথবা ব্যঙ্গাত্মক ছবি।	ক	খ	গ

	(১)	(২)	(৩)
২৯। যখন আমার ওপর কোন কাজের দায়িত্ব দেওয়া হয় তখন আমি চাই আমার কথামত কাজ হোক নয়ত আমি দায়িত্ব নেব না।	হ্যাঁ	কখন কখন	না
৩০। অত্যধিক উত্তেজনা আমার পক্ষে এড়িয়ে চলা ভাল কেননা তাতে আমার অবসাদ আসে।	হ্যাঁ	কখন কখন	না
৩১। যদি দাবা ও ফুটবল এই দুটোতেই আমার সমান দক্ষতা থাকে তাহলে আমি খেলতে চাইব ঃ (ক) দাবা (খ) দুটোর যে কোন একটা (গ) ফুটবল	ক	খ	গ
৩২। রোগ যতই সংক্রামক হোক শিশুদের তার প্রতিষেধক টীকা দেওয়ার ব্যাপারটা একটা নিষ্ঠুরতা। এ বিষয়ে শিশুর পিতামাতার ঃ (ক) বাধা দেওয়ার অধিকার থাকা উচিত। (খ) নিরপেক্ষ মনোভাব পোষণ করা উচিত। (গ) বাধা দেওয়ার চেষ্টা অনধিকার চর্চা।	ক	খ	গ
৩৩। ভবিষ্যতে আর্থিক স্বাচ্ছন্দ্যের জন্য আমি বিশেষ আস্থা রাখি ক) জীবনবীমার ওপর। খ) 'ক' অথবা 'গ' এর অনুরূপ যে কোন পরিকল্পনার ওপর গ) লটারীর টিকিটের মাধ্যমে অর্থপ্রাপ্তির ওপর	ক	খ	গ
৩৪। প্রয়োজনে আমি আমার ব্যক্তিগত দুশ্চিন্তা ও দায়দায়িত্বগুলোর কথা ভুলে যেতে পারি।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৩৫। আমার ভুল হলে তা সহজে স্বীকার করা আমার পক্ষে কষ্টকর হয়।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৩৬। শিল্প প্রতিষ্ঠানে থাকতে চাই ঃ ক) যন্ত্রপাতি সংক্রান্ত কাজের দায়িত্বে অথবা তথ্যাদি সংরক্ষণের পদে। খ) যে কোন দায়িত্বপূর্ণ পদে। গ) জন সংযোগ অথবা কর্মী নিয়োগের পদে	ক	খ	গ
৩৭। নিম্নলিখিত শব্দগুলোর মধ্যে কোনটার সঙ্গে অন্য দুটোর মিল নেই ক) বিড়াল খ) নিকটে গ) সূর্য	ক	খ	গ

	(১)	(২)	(৩)
৩৮। একটু এদিক ওদিক হলেই আমার শরীর খারাপ হয় আর তার জন্যে আমাকে আমার কর্মসূচী পাল্টাতে হয়।	হ্যাঁ	কখন কখন	না
৩৯। আমার কাজের সময় বাড়ীর কাজের লোক সব কিছু প্রভুর কাছে যোগান দিলে আমি খুশী হই।	হ্যাঁ	কখন কখন	না
৪০। সঙ্গীদের সঙ্গে থাকতে আমি অস্বস্তি অনুভব করি কারণ সেখানে নিজের কথা যতটা বলা উচিত ততটা বলতে পারি না।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৪১। আমার মনে হয় নৈতিক নিয়মগুলো লোকেদের আরও কঠোরভাবে পালন করা উচিত।	হ্যাঁ	মাঝে মাঝে	না
৪২। কোন কোন ব্যাপারে আমার এত রাগ হয় যে তখন আমার কোন কথা বলতে ইচ্ছে করে না।	হ্যাঁ	কখন কখন	না
৪৩। দৈহিক পরিশ্রমের ব্যাপারে বেশীরভাগ লোকেদের মত আমি সহজেই ক্লান্ত হই না।	হ্যাঁ	কখন কখন	না
৪৪। আমার মনে হয় বিপ্রতিবোধ করলেও বেশীরভাগ সাক্ষীই আদালতে সত্য কথা বলে।	হ্যাঁ	সঠিক বলা যায় না	না
৪৫। কোন চিন্তা করার সময় পায়চারি করলে আমার সুবিধে হয়	হ্যাঁ	কখন কখন	না
৪৬। আমার মনে হয় যে আমাদের দেশের পক্ষে নিম্নলিখিত খাতে অধিকতর ব্যয় বরাদ্দ করা হিতকর হবে ঃ (ক) যুদ্ধের সাজ সরঞ্জাম (খ) যুদ্ধ বা শিক্ষা (গ) শিক্ষা	ক	খ	গ
৪৭। আমি সন্ধ্যের পর অবসর মুহূর্তগুলো কাটাতে চাই (ক) ব্রিজ বা ঐ রকমের কোন তাসের খেলা খেলে (খ) ঘরে বসে কেস ভাবে (গ) ছবির এ্যালবামের পাতা উল্টিয়ে অতীতের স্মৃতিচারণ করে	ক	খ	গ
৪৮। সুযোগ পেলে আমি পড়তে ভালবাসি (ক) ভাল ঐতিহাসিক উপন্যাস (খ) যে কোন গল্প বা রচনা (গ) প্রাকৃতিক শক্তি ও সম্পদ সদ্ব্যবহার সম্পর্কে লেখা বৈজ্ঞানিক প্রবন্ধ	ক	খ	গ

	(১)	(২)	(৩)
৪৯। প্রকৃতপক্ষে জগতে খারাপ লোকের চেয়ে ভাল লোকই বেশী	হ্যাঁ	হলেও হতে পারে	না
৫০। আমার মত প্রতিষ্ঠিত ব্যক্তিদের তুলনায় আমি অনেক বেশী চিন্তাশীল, উৎসাহী এবং উচ্চাকাঙ্ক্ষী	ঠিক	বলা চলে	ভুল
৫১। সময় সময় আমার মন মেজাজ এমন খারাপ থাকে যে কারও সঙ্গে দেখা সাক্ষাৎ করার ইচ্ছে থাকে না।	কদাচিৎ	মাঝে মাঝে	প্রায়ই
৫২। যখন আমি জানি যে আমি ঠিক কাজ করছি তখনই আমার মনে হয় কাজটা সহজ।	সর্বদা	মাঝে মাঝে	কদাচিৎ
৫৩। সুযোগ পেলে আমি হতে চাই ক) কোন ব্যবসায়ী প্রতিষ্ঠানের সংগঠক ও পরিদর্শক খ) ক ও গ এর মধ্যে একটা কিছু গ) কোন প্রকল্প বা পরিকল্পনার নেপথ্য স্রষ্টা	ক	খ	গ
৫৪। 'কল্পনা'র সঙ্গে 'বুদ্ধির' যে সম্পর্ক, যন্ত্রণার সঙ্গে সেরকম সম্পর্ক হল ঃ ক) ব্যথার খ) অনুভূতির গ) অস্বস্তির	ক	খ	গ
৫৫। আমার খুব ভাল ঘুম হয় এবং ঘুমের মধ্যে আমি কখনও চলাফেরা করি না বা কথা বলি না।	হ্যাঁ	সঠিক বলা যায় না	না
৫৬। কোন ভাল কাজের জন্য আমি নির্দ্বিধায় মিথ্যে কথা বলতে পারি।	হ্যাঁ	কখন কখন	না
৫৭। ক্লাব, খেলার দল বা সামাজিক দল গঠনের ব্যাপারে আমি উৎসাহী।	হ্যাঁ	মাঝে মাঝে	না
৫৮। আমি অপেক্ষাকৃত বেশী পছন্দ করি ঃ ক) নির্ভরযোগ্য নয় অথচ চতুর ব্যক্তিকে। খ) যেই আমার সঙ্গে ঘনিষ্ঠতা করে তাকে। গ) একজন সাধারণ কিন্তু নির্লোভ ব্যক্তি।	ক	খ	গ
৫৯। ঠিকভাবে অভিযোগ জানাতে পারলে আমি স্বস্তি পাই।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৬০ হতাশার পরিস্থিতিতে আমার কান্না পেয়ে যায়।	হ্যাঁ	কখন কখন	না
৬১। অনেক বিদেশী রাষ্ট্রই আমরা যতটা মনে করি তার চেয়ে বেশী বন্ধুভাবাপন্ন।	হ্যাঁ	কখন কখন	না

	(১)	(২)	(৩)
৬২। দিনের মধ্যে কিছুক্ষণ আমি নির্বিঘ্নে আত্মচিন্তায় মগ্ন থাকতে চাই।	হ্যাঁ	মাঝে মাঝে	না
৬৩। ছোটখাটো আইন কানুনের বাধা আমার বিরক্তির উদ্রেক করে, যদিও স্বীকার করি সেগুলো সত্যিই প্রয়োজনীয়।	হ্যাঁ	মাঝে মাঝে	না
৬৪। আগেকার দিনে 'শাস্তি দিয়ে শেখানো'র পদ্ধতি অপেক্ষা তথাকথিত আধুনিক প্রগতিশীল শিক্ষাপদ্ধতি কম ফলপ্রসূ।	হ্যাঁ	বলা শক্ত	না
৬৫। আমি স্কুলজীবনে বেশী শিখেছি : ক) ক্লাশের পড়া শুনে (খ) ক্লাশের পড়া শুনে ও বই পড়ে (গ) বই পড়ে।	ক	খ	গ
৬৬। আমি সামাজিক দায় দায়িত্বের সঙ্গে জড়িয়ে পড়া এড়িয়ে চলতে চাই।	হ্যাঁ	কখন কখন	না
৬৭। যখন কোন সমস্যা কঠিন ও শ্রমসাধ্য হয়ে পড়ে তখন আমি চেষ্টা করি: ক) অন্য কোন সমস্যা সমাধানের। খ) সুবিধা অনুযায়ী 'ক' অথবা 'গ' গ) সেই সমস্যাকে অন্যভাবে সমাধানের	ক	খ	গ
৬৮। প্রকৃত তেমন কোন কারণ না থাকলেও উদ্বেগ, রাগ, হাসি প্রভৃতি গভীর আবেগের বশীভূত হয়ে পড়ি।	হ্যাঁ	কোন কোন সময়	না
৬৯। আমি যেন কোন কাজ যতটা মন দিয়ে করতে পারি সব কাজ ততটা মন দিয়ে করতে পারি না।	হ্যাঁ	বলা চলে	না
৭০। আমার অসুবিধা হলেও লোকের সুবিধে মত সময়ে তার সঙ্গে দেখা করতে পারলে আমি খুশী হই।	হ্যাঁ	কখন কখন	না
৭১। আমি মনে করি ১, ২, ৩, ৬, ৫ এই শ্রেণীটির পরের সঠিক সংখ্যাটা হবে : ক) ১০ খ) ৫ গ) ৭	ক	খ	গ
৭২। অপরের কাজের সমালোচনা করতে আমার ইচ্ছে হয়	হ্যাঁ	কোন কোন সময়ে	না
৭৩। বাড়ীর কাজের লোকেদের বাড়তি খাটুনির চেয়ে আমি কোন জিনিষের অভাব সত্ত্বেও কাজ চালিয়ে নিতে পারি।	হ্যাঁ	কোন কোন সময়ে	না

	(১)	(২)	(৩)
৭৪। আমি ভ্রমণ করতে ভালবাসি।	যে কোন সময়ে	মাঝে মাঝে	না
৭৫। খুব যন্ত্রণা হলে বা রক্তপাত দেখলে আমি অজ্ঞানের মত হয়ে যাই।	হ্যাঁ	মাঝে মাঝে	না
৭৬। স্থানীয় সমস্যা নিয়ে আলোচনা করতে আমি উৎসাহ বোধ করি।	হ্যাঁ	কখন কখন	না
৭৭। যদি আমার জিজ্ঞাসা করা হয় আমি কি হতে চাই, তাহলে আমার উত্তর হল :			
ক) একজন নির্মাণকুশল ইঞ্জিনীয়ার।			
খ) যে কোন গঠনমূলক কাজের উপদেষ্টা।			
গ) সমাজ সংস্কারক	ক	খ	গ
৭৮। আমাকে নিজেকে অন্যের সমস্যা সমাধানের মধ্যে অতিমাত্রায় জড়িয়ে পড়ার থেকে সামলে চলতে হয়।	সবসময়	কখন কখন	না
৭৯। প্রতিবেশীদের আলোচনা আমার কাছে নীরস ও একঘেয়ে মনে হয়:			
ক) সবক্ষেত্রেই। খ) কোন কোন ক্ষেত্রে।			
গ) খুব কম ক্ষেত্রে।	ক	খ	গ
৮০। আমি যে সমস্ত বই বা কাগজপত্র পড়ি তার মধ্যে প্রচ্ছন্ন প্রচারগুলোকে যদি না কেউ ধরিয়ে দেয় তাহলে ধরতে পারি না।	হ্যাঁ	কখন কখন	না
৮১। আমার মনে হয় প্রত্যেক গল্পে ও চলচ্চিত্রে একটা নৈতিক উপদেশ থাকা উচিত।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৮২। লোকেরা বেশী গণ্ডগোল বাধায় :			
ক) প্রতিষ্ঠিত কর্মপদ্ধতিতে রদবদল করতে গিয়ে।			
খ) ক ও গ এর মাঝামাঝি কোন ব্যাপারে।			
গ) নতুন এবং প্রগতিশীল কর্মনীতিগুলোকে নস্যাৎ করে দিয়ে।	ক	খ	গ
৮৩। যদি আমার ধারণাগুলো অবাস্তব হয় এই ভয়ে আমার চিন্তাধারা অনুযায়ী কাজ করতে আমি ইতস্ততঃ বোধ করি।	হ্যাঁ	কখন কখন	না

	(১)	(২)	(৩)
৮৪। আমার মনে হয় খুব ফিট্‌ফাট্ এবং নিয়মানুবর্তী লোক আমার সঙ্গে ভালভাবে চলতে পারবে না।	হ্যাঁ	কোন কোন সময়	না
৮৫। দিন দিন আমার স্মৃতিশক্তি খুব বেশী পরিবর্তন হচ্ছে বলে আমি মনে করি না।	ঠিক	ঠিক বলা চলে	ভুল
৮৬। অপরে আমার প্রতি যতটা সহানুভূতিশীল আমি হয়ত তাদের প্রতি তার চেয়ে কম সহানুভূতিশীল।	হ্যাঁ	কখন কখন	না
৮৭। আমার মনে ভাব প্রকাশে আমি বেশীরভাগ লোকের চেয়ে অনেক সংযমী।	হ্যাঁ	কোন কোন সময়	না
৮৮। যদি কোন ঘড়ির দুটো কাঁটা ঠিক প্রতি ৬৫ মিনিট অন্তর একত্রিত হয় তাহলে বুঝতে হবে ঘড়িটা। ক) আস্তে চলছে। খ) ঠিক চলছে গ) জোরে চলছে	ক	খ	গ
৮৯। যখন লোকে আমাকে বিনা কারণে দেরী করিয়ে দেয় তখন আমার ধৈর্যের বাঁধ ভেঙ্গে রাগে ফেটে পড়ার অবস্থা হয়।	হ্যাঁ	কখন কখন	না
৯০। লোকে বলে আমি চাই আমার মতে কাজ হোক।	হ্যাঁ	কখন কখন	না
৯১। কাজের উপযোগী রিনিবপত্র না পেলেও আমি কোন অভিযোগ না করে কাজ চালিয়ে যাই।	হ্যাঁ	মাঝে মাঝে	না
৯২। বাড়ীতে একটু অবসর পেলে আমি : ক) গল্পগুজব ও বিশ্রাম করি। খ) যা হোক একটা কিছু করি। গ) বিশেষ কোন কাজ করি।	ক	খ	গ
৯৩। অপরিচিত লোকের সঙ্গে বন্ধুত্ব করতে প্রথমে আমার লজ্জা ও ভাবনা দুইই আসে।	হ্যাঁ	কখন কখন	না
৯৪। আমার মনে হয় কবিতায় কোন কথা যেভাবে প্রকাশ করা যায় তরল গদ্যেও সেইভাবে প্রকাশ করা যায়।	হ্যাঁ	মাঝে মাঝে	না
৯৫। আমার সন্দেহ হয় সামনে যারা আমাকে বন্ধু বলে মনে আড়ালে তারা আমাকে তা নাও মানতে পারে।	হ্যাঁ	কোন কোন ক্ষেত্রে	না
৯৬। আমার মনে হয় যে, বছরের বিশেষ উল্লেখযোগ্য নাটকীয় ঘটনার পরও আমি যা ছিলাম তাই আছি।	হ্যাঁ	কখন কখন	না

		(১)	(২)	(৩)
৯৭	আমার ধীরে ধীরে কথা বলার একটা ঝোঁক আছে।	হ্যাঁ	কখন কখন	না
৯৮।	কেন কেন বিষয়ে আমি বৃথা ভয় পাই বা অকারণে ঘৃণা করে যেমন — কোন কোন জীবজন্তুকে দেখলে বা কোন কোন জায়গায় গেলে, আমার যা হয়ে থাকে।	হ্যাঁ	কোন কোন সময়	না
৯৯।	দল বেঁধে কাজ করবার সময় আমি চেষ্টা করি :			
	ক) দলের সংহতিকে নষ্ট করতে।			
	খ) যে কোন ভাবে কাজ চালিয়ে যেতে।			
	গ) নিয়মমাফিক কাজ হচ্ছে কিনা দেখতে এবং সবকিছুর বিবরণী রাখতে।	ক	খ	গ
১০০।	কোন সামাজিক বিষয়ে ভালভাবে অভিমত দিতে হলে আমি :			
	ক) সে সম্পর্কে উল্লেখযোগ্য উপন্যাস পড়ব।			
	খ) সে সম্পর্কে যে কোন বিবরণী পড়ব।			
	গ) সে সম্পর্কে পরিসংখ্যান ও অন্যান্য তথ্যভিত্তিক বিবরণগুলো পড়ব।	ক	খ	গ
১০১।	আমি রাতে ঘুমের মধ্যে অদ্ভুত মজার স্বপ্ন দেখি।	হ্যাঁ	কখন কখন	না
১০২।	নির্জন বাড়ীতে কিছুক্ষণ থাকার পর আমার ভয় করতে থাকে।	হ্যাঁ	কখন কখন	না
১০৩।	যাদের আমি প্রকৃতপক্ষে অপছন্দ করি তাদের আমি বন্ধুত্বের মুখোস পরে ঠকাতে পারি।	হ্যাঁ	কখন কখন	না
১০৪।	নিম্নলিখিত শব্দ তিনটির মধ্যে কোনটির সঙ্গে অন্য দুটির মিল নেই :			
	ক) দৌড়ান খ) লেখা গ) স্পর্শ করা	ক	খ	গ
১০৫।	যদি সুমিতার মা প্রদীপের বাবার বোন হয় তাহলে প্রদীপের সঙ্গে সুমিতার বাবার কি সম্পর্ক হবে :			
	ক) পিসতুতো ভাই খ) জ্যেঠু গ) পিসেমশাই	ক	খ	গ

ব্যক্তিত্ব-নিরূপণ অভীক্ষা

প্রাপ্ত স্কোরকে স্টেন স্কোরে পরিণত করার তালিকা

প্রাপ্ত স্কোর	স্টেন স্কোর																প্রাপ্ত স্কোর
	বৈশিষ্ট্য																
	A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4	
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	3	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2
3	2	4	2	3	2	2	2	3	3	3	3	3	3	3	3	3	3
4	3	5	3	4	3	3	3	4	4	4	4	4	4	4	4	4	4
5	4	7	4	5	4	4	4	5	5	5	5	5	5	5	5	5	5
6	5	8	5	6	5	5	5	6	6	6	6	6	6	6	6	6	6
7	6	9	6	7	6	6	6	7	7	7	7	7	7	7	7	7	7
8	7	10	7	8	7	7	7	8	8	8	8	8	8	8	8	8	8
9	8		8	9	8	8	8	9	9	9	9	9	9	9	9	9	9
10	9		9	10	9	9	9	10	10	10	10	10	10	10	10	10	10
11	10		10	10	10	10	10	10	10	10	10	10	10	10	10	10	11
12	10		10	10	10	10	10	10	10	10	10	10	10	10	10	10	12
	A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4	
	বৈশিষ্ট্য																

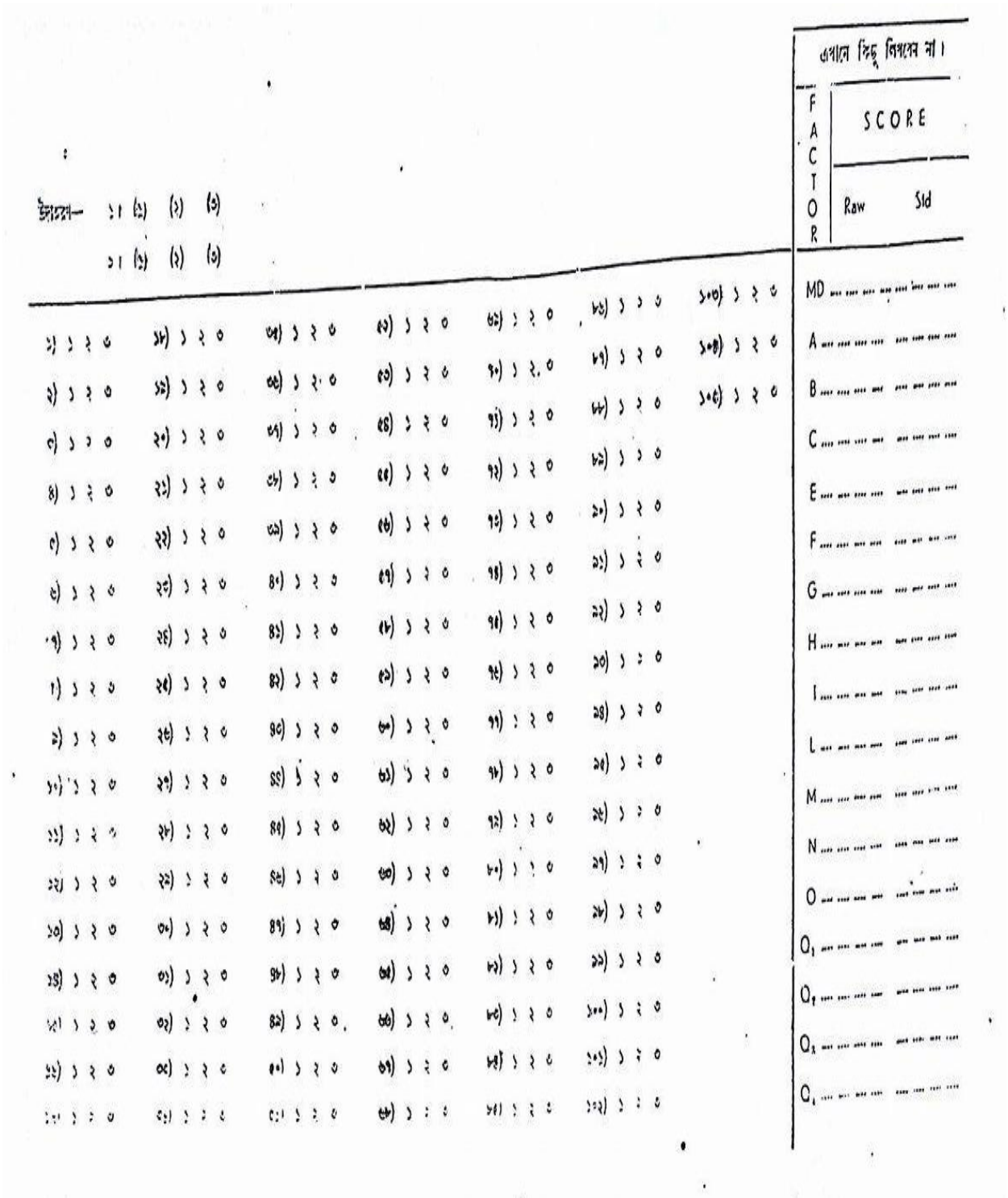
16 Pf Test --- SCORING KEY

Score for three responses of each item

FACTORS																							
MD	1	2 1 0	18	0 1 2	35	0 1 2	52	2 1 0	69	0 1 2	86	0 1 2	103	0 1 2									
A	2	0 1 2	19	2 1 0	36	0 1 2	53	2 1 0	70	2 1 0	87	0 1 2											
B	3	0 1 0	20	0 0 1	37	2 1 0	54	0 0 1	71	1 0 0	88	0 0 1	104.	1 0 0									
													105.	0 0 1									
C	4	2 1 0	21	2 1 0	38	0 1 2	55	2 1 0	72	0 1 2	89	0 1 2											
E	5	0 1 2	22	0 1 2	39	2 1 0	56	2 1 0	73	0 1 2	90	2 1 0											
F	6	0 1 2	23	2 1 0	40	0 1 2	57	2 1 0	74	2 1 0	91	0 1 2											
G	7	2 1 0	24	0 1 2	41	2 1 0	58	0 1 2	75	2 1 0	92	0 1 2											
H	8	2 1 0	25	0 1 2	42	0 1 2	59	2 1 0	76	2 1 0	93	0 1 2											
I	9	2 1 0	26	2 1 0	43	0 1 2	60	2 1 0	77	0 1 2	94	0 1 2											
L	10	2 1 0	27	0 1 2	44	0 1 2	61	0 1 2	78	2 1 0	95	2 1 0											
M	11	0 1 2	28	0 1 2	45	2 1 0	62	2 1 0	79	2 1 0	96	0 1 2											
N	12	0 1 2	29	2 1 0	46	2 1 0	63	2 1 0	80	0 1 2	97	0 1 2											
O	13	0 1 2	30	2 1 0	47	0 1 2	64	2 1 0	81	0 1 2	98	2 1 0											
Q	14	2 1 0	31	2 1 0	48	0 1 2	65	0 1 2	82	0 1 2	99	2 1 0											
Q2	15	2 1 0	32	0 1 2	49	2 1 0	66	2 1 0	83	0 1 2	100	0 1 2											
Q3	16	2 1 0	33	2 1 0	50	2 1 0	67	0 1 2	84	0 1 2	101	0 1 2											
Q4	17	2 1 0	34	0 1 2	51	0 1 2	68	2 1 0	85	0 1 2	102	2 1 0											

MD - 7 Items ; A - 6 Items ; B - 8 Items including 104 & 105 ; C -to- Q4 ..... 6 Items each ;

Each



এখানে কিছু লিখবেন না।

FACTOR	SCORE	
	Raw	Std
MD		
A		
B		
C		
E		
F		
G		
H		
I		
L		
M		
N		
O		
Q_1		
Q_2		
Q_3		
Q_4		

Primary Factor	Ref	Low	High
Warmth	A	Reserved, impersonal, distant, cool, reserved, impersonal, detached, formal, aloof	Warm, outgoing, attentive to others, kindly, easygoing, participating, likes people
Reasoning	B	Concrete-thinking, lower general mental capacity, less intelligent, unable to handle abstract problems	Abstract-thinking, more intelligent, bright, higher general mental capacity, fast learner
Emotional Stability	C	Reactive, emotionally changeable, affected by feelings, emotionally less stable, easily upset	Emotionally stable, adaptive, mature, faces reality, calm
Dominance	E	Deferential, cooperative, avoids conflict, submissive, humble, obedient, easily led, docile, accommodating	Dominant, forceful, assertive, aggressive, competitive, stubborn, bossy
Liveliness	F	Serious, restrained, prudent, taciturn, introspective, silent	Lively, animated, spontaneous, enthusiastic, happy-go-lucky, cheerful, expressive, impulsive
Rule-Consciousness	G	Expedient, nonconforming, disregards rules, self-indulgent	Rule-conscious, dutiful, conscientious, conforming, moralistic, staid, rule-bound
Social Boldness	H	Shy, threat-sensitive, timid, hesitant, intimidated	Socially bold, venturesome, thick-skinned, uninhibited, can take stress
Sensitivity	I	Utilitarian, objective, unsentimental, tough-minded, self-reliant, no-nonsense, rough	Sensitive, aesthetic, sentimental, tender-minded, intuitive, refined

Vigilance	L	Trusting, unsuspecting, accepting, unconditional, easy	Vigilant, suspicious, skeptical, wary, distrustful, oppositional
Abstractedness	M	Grounded, practical, prosaic, solution-oriented, steady, conventional	Abstracted, imaginative, absent-minded, impractical, absorbed in ideas
Privateness	N	Forthright, genuine, artless, open, guileless, naive, unpretentious, involved	Private, discreet, non-disclosing, shrewd, polished, worldly, astute, astute, diplomatic
Apprehension	O	Self-assured, unworried, complacent, secure, free of guilt, confident, self-satisfied	Apprehensive, self-doubting, worried, guilt-prone, insecure, worrying, self-blaming
Openness to Change	Q1	Traditional, attached to familiar, conservative, respecting traditional ideas	Open to change, experimenting, liberal, analytical, critical, free-thinking, flexibility
Self-Reliance	Q2	Group-oriented, affiliative, a joiner and follower, dependent	Self-reliant, solitary, resourceful, individualistic, self-sufficient
Perfectionism	Q3	Tolerates disorder, unexacting, flexible, undisciplined, lax, self-conflict, impulsive, careless of social rules, uncontrolled	Perfectionist, organized, compulsive, self-disciplined, socially precise, exacting will power, control, self-sentimental
Tension	Q4	Relaxed, placid, tranquil, torpid, patient, composed, low drive	Tense, high energy, impatient, driven, frustrated, over-wrought, has high drive, time-driven