ANALYSIS OF SOFTBALL PERFORMANCE IN RELATION TO ANTHROPOMETRIC PROFILE

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By

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DECLARATION

I declare that dissertation entitled study of "***Analysis of softball performance in relation to anthropometric profile***" has been prepared by me under the guidance of Mr. Hukum Singh, Professor of Physical Education, Lovely Professional University. No part of this thesis has formed the basis for the award of any degree or fellowship previously.

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CERTIFICATE

I certify that Aarti Sen has prepared her dissertation entitled study of "***Analysis of softball performance in relation to anthropometric profile***" for the award of M. P. Ed degree of the Lovely Professional University, under my guidance. He has carried out the work at the Department of Physical Education, Lovely Professional University.

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Aarti sen

Date **Investigator**

ABSTRACT

The objective of the present study was to establishing the Analysis of Softball Performance in Relation to Anthropometric Profile. The sample was compared by 25 softball women's players; age was 18 to 26 years from Lovely Professional University, who was participated in National level and All India Inter University level competition. The Anthropometric variables inclusive sitting height, standing height, body weight, shoulder breadth, total arm length, shoulder elbow length, elbow hand length, upper arm circumference, forearm circumference, forearm breadth, hand length, hand breadth, wrist circumference, waist breadth, waist circumference, waist height, buttock knee length, knee height, thigh circumference, calf circumference, foot length, biceps skin fold triceps skin fold, thigh skin fold, calf skin fold, and BMI were collected with the purpose of establishing the softball anthropometric profile. The data were analyzed by descriptive statistics. This was accomplished by analysis of mean and standard deviations of 26 anthropometric variables. Explain in brief about measurement Mean and Standard deviation of sitting height is 81.79cm and 11.39, standing height is 158.61cm and 4.36, body weight is 54.31cm and 6.7, shoulder breadth is 44.2cm and 2.77, total arm length is 72.83cm and 3.61, shoulder elbow length is 35.32cm and 1.72, elbow hand length 43.56cm and 4.45, upper arm circumference is 24.92cm and 2.71, forearm circumference is 22.28cm and 1.43, forearm breadth is 11.2cm and 0.95, hand length is 18.61cm and 1.03, hand breadth is 9.36cm and 1.24, wrist circumference is 15.08cm and 1.54, waist breadth is 32.66cm and 3.41, waist circumference is 75.04cm and 6.62, waist height is 91.6cm and 22.67, buttock knee length is 15.6cm and 3.15, knee height is 49.8cm and 2.37, thigh circumference is 50.22cm and 3.82, calf circumference is 33.73cm and 2.85, foot length 24.56cm and 1.16, biceps skin fold is 9.12mm and 4.68, triceps skin fold is 13.73mm and 3.18, thigh skin fold is 9.17mm and 6.2, calf skin fold is 11.05mm and 4.44, and BMI is 21.6 and 2.52. The important variables in this game involve catching, hitting, throwing, running, sliding, it also required good strength, agility and speed. Thus the possession of desirable anthropometric parameter will have great advantage in executing a better performance in competition and helpful aspect for talent identification in softball game.

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CHAPTER-I

INTRODUCTION OF THE PROBLEM

Softball is a technical game in which performance is based on skills and techniques in which different complicated elements are involved such as high level of physical and psychological abilities. Though psychological, physical and physiological variables play important role in enhancing Softball performance. The essential physical skills for softball are strength, speed, agility, power and flexibility.

"Softball is an exceptionally energizing diversion that is played by more than 20 million ladies and men, young ladies and young men everywhere throughout the world. There are two fundamental renditions of softball: one is with pace of the ball increase and other is with pace of the ball decrease. In both adaptations the ball is pitching (balling) underhand by the player known as "the pitcher". In quick pitch, the ball is contributed a straight or level line to the catcher as quick as could be allowed. In some cases that is not quick if the players are beginner or simply taking in the position, while at the top levels of softball, similar to in the Olympic Games, pitched balls will go more than 112 km (70 mph) every hour. With pace of the ball decrease the ball is contributed toward the player a curve that ventures gradually – consequently the name moderate pitch" (ISF, 2015).

Softball game is played between two team. One team plays and the other team fields. The object of the game is to secure runs. The batsman attempt to hit the ball into the fair field or the play. Having done so, he circles the three bases to return to home base. A run is scored provided the batsman-runner is not tagged with the ball while circling the bases. The outfield area has three players stationed in each of the areas of outfield. (i) left field, (ii) Centre field, (iii) Right field.

If the batter without begin out, comes back to the home base running after touching the second and third base he is awarded one run. After this, the other members of his team do the same turn by turn. After the three players are out the batters play the game.

A team shall consist of 9 players whose positions shall be as follows

(1) Pitcher, (2) Catcher,(3) 1^{st} base men, (4) 2^{nd} base man, (5) 3^{rd} base man, (6) Short stop, (7) Left fielder, (8) Centre fielder, (9) Right Fielder

Basic skills of softball are pitching, catching, throwing, batting and base running.

Technical Skills

"Everybody included in guiding softball knows the significance of specialized abilities. The way a player fields a ground ball, sets out a hit, tosses a fastball or executes a bowed leg slide has a huge impact on the result of an amusement. Specialized aptitudes are "the particular systems to move one's body to execute the assignment that requirements to be fulfilled" (Martens, Successful Coaching).

The execution of specialized abilities, the ability to show competitors how to perform them, the energy to distinguish lapses and right them and the capacity to perceive when those aptitudes become possibly the most important factor in an amusement are all things that you will grow over the long run with the gathering of experience"(K. Walker, 2009).

Tactical Skills

"Albeit mastering the specialized aptitudes of softball is critical, it is insufficient. Softball players need to know how to play the amusement in fact as well as how to pick the strategies important to make progress. Numerous softball writings neglect the strategic parts of the amusement. Mentors even overlook strategic contemplations from practice in light of the fact that they concentrate so eagerly on showing specialized aptitudes. Showing strategies is much harder and requires substantially more exertion than showing methods, yet the subsequent profits are significant.

Strategic aptitudes can best be characterized as "the choices and activities of players in the challenge to pick up favourable element over the contradicting group or players" (Martens, Successful Coaching, p. 170).

Restricted that mentors can approach showing strategic aptitudes is by concentrating on three basic angles, the "strategic triangle"- 1 Reading the play or circumstance, 2 Acquiring the learning expected to settle on a fitting strategic choice, 3 Applying choice making abilities to the problem"(K. Walker, 2009).

“The human body is composed of cells, which combine to form tissues, which in turn unite in different ways to form specific organs. Similar organs or different ones, which unite either in location or in function to perform specific roles for the body as a whole. Thus, the human body may be studied in its entirety by learning about one system at a time. Although parts of a particular system may come into relation with another, the main focus is upon the

system being studied. On viewing the human body externally, the systems are not seen, as the body appears to be made up of characteristic parts, such as the head, neck, trunk and extremities. All these regions have a specific relationship with each other and may be studied as a whole.

Of the various methods of studying anatomy of the human body, the developmental anatomy of the human body, the developmental anatomy has its maximum relevance with the anthropometric studies. Developmental anatomy is the study of the human organism from its conception until its adult or full form is attained. All the specific structures and organs of the body may be grouped according to similarities in structure and function into organ systems. The grouping of organs into system is in recognition of the fact that a number of organ may be involved in the performance of a general function. This grouping also helps in the systematic study of the structure and function of the person's body" (S.Nath 2005)

"Anthropometry is a critical device in the study and comprehension of human natural variability, including, obviously, morphological variety as all around pertinent, non-obtrusive and reasonable strategies" (WHO, 1995).

"Human motor performance is a compound of lots of variables one of that is structure of body. The particular measurement of limb length, circumference, breadths and build indices can open up the relationship between anthropometric of the sportsman and his motor fitness. Measurement of the body size include such descriptive information as height, weight and surface area, while measures of body proportion describe the relationship between height, weight and among length, width and circumference of various body segments. It has been found that top athlete in some sports tend to have those proportion that biomechanically aid the particular performance required" (Zeigler, 1982).

The scientific selection of sportsmen at their young age may increase the number of participation in various sports events (Hirata 1979). Therefore, the sports scientists have been made efforts from time to time for the search of the most talented children from a large number of school boys and girls in the various sports disciplines on the basis of their anatomical structure, their capabilities, motor abilities and other parameters of fitness. The scientific methods of selection and training of sports probable's in advanced countries not only helped to achieve their better performance at the various levels of international competitions, but also helped their citizen to achieve their better health condition (Jagdev Singh Sidhu 2012).

The present study is also conducted on the same guidelines. It will assist the physical education teachers and coaches to select the best talented children from the raw material on the basis of their anthropometric measurements. Which decides the winning and losing of the team.

Physical education is the essential part of the common education which promotes harmonious growth and development. Through proper muscular activity a person modifies his behaviour, becomes physically, mentally, socially and emotionally adjusted within the society. It is also essential for a fruitful life. It promotes efficient functioning of the body.

We can tack arrangements with estimations of size, weight and extents of human body through anthropometry. It gives logical systems and perceptions on the alive people. Anthropometric strategies (skinfold fat, circuit and breadth estimations) are prevalent for anticipating body structure on the grounds that they are very little costly, oblige little space and can be performed effortlessly. Anthropometry is regularly utilized as a part of physical training, games science, physical movement and biomedical sciences. Anthropometric estimations be able to partitioned into tallness, weight and lengths, broadness or width, perimeters or sizes, profundities and skinfolds. All estimations of person's are outer measurements of the body.

"Study of the investigation of the estimation of person's body in term of the measurements of bone, muscles, and (fat) tissue is known as anthropometric. Measures of subcutaneous fat tissue are essential because people with extensive qualities are accounted for to be at expanded dangers hypertension, adult onset diabetes mellitus, cardiovascular ailment, gallstones, joint pain, different types of disease, and different maladies. Joined with the nutritional and related poll information, and the biochemical determinations, anthropometry is essential and crucial data expected to aid in portraying the information accumulation from persons in the specimen.

Anthropometric measurements, body composition, body size and proportions are playing an important role in physical performance and fitness of the sportsman. Height and weight both are the indicators of overall body size and have been used for the grouping of children and youth in various kinds of activity according to their age and sex.

Anthropometry is the systematized measurements that express the dimensions of human body. The research on anthropometric measurements may be useful in selecting the

suitable game or sport for any individual. The idea behind the choice of a game or event by an individual of his interest is to give out the best possible abilities. For this purpose, the role of anthropometric measurements in any game or event is most important.

Real stature, weight, and body estimations (counting skinfolds and boundaries) will be gathered for purposes of surveying development, muscle to fat ratio ratios dispersion, and for the procurement of reference information. Anthropometric estimations, for example, skinfolds and outlines, consolidated with bioelectrical impedance (a technique used to gauge the measure of learn tissue), will permit cross-sectional examination of the relationship in the middle of weight and danger of sickness. One measure has been included to give additional data body casing size, while others have been dropped on the grounds that new information have confirmed that different measures are more informative"(Vijaya Laksmi, 2005).

Anthropometry is used to assess and predict performance, health and survival of individual and reflect the sports, and social well being of populations. Anthropometric characteristics include sitting height, standing height, body weight, total arm length, shoulder elbow length, elbow hand length, upper arm circumference, forearm circumference, forearm breadth, hand length, hand breadth, wrist circumference, waist circumference, waist breadth, waist circumference, waist height, buttock knee length, knee height, shoulder breadth, thigh circumference, calf circumference, foot length, biceps skinfold triceps skinfold, thigh skinfold, calf skinfold and BMI play important role in softball game. On the basis of these characteristics we will found talented player for softball game.

“The science of morphology is to be one of the most important sciences to understand structural basis of sports performance in the different games and sports. The coach and teacher of physical education have long realized that the performance of boys and girls is influenced by such factors as age, height, and weight and body structure. It is also acknowledged that those persons of the same weight will differ greatly in body weight, that person may weigh the same out of the relative proportion of muscle, fat and bone. It is obvious that no single measure by itself is satisfactory for the purpose of classifying student into homogenous group. Now sports have become a worldwide phenomenon.

Talent Identification and selection in sports

Future performance of youngsters can be predicted by talent identification methodology which will achieve success at national or international levels.

His / her child experience success in sport will be appreciated by each parent. Some of the parents always refer to his or her child may excel at more elite levels, and also recognize in national and international level. The progression is very complex in more elite levels in the initial youth sports experiences.

On the other hand, the procedure might likewise include more formal ID and choice of people who apparently have the ability, physical, and behavioral requirements for achievement in a given game.

Recognizing and selecting the possibly capable youthful competitor is the initial phase in moderately long haul procedure, prompting the execution of ability. The adolescent must adjust to the physical, social and enthusiastic requests of the mentors, preparing projects, and rivalries. The methodology additionally includes a few manifestations of social control, e.g., extend periods of time of practice, altered school plans, particular treatment, differential access to assets, and division of a youngster from family and companions, and broad travel.

Early Identification of "ability" is no surety of accomplishment in game amid youth, let alone amid puberty and adulthood. There are basically an excess of interceding variables connected with typical development, development and advancement, and with the games framework. Sometimes, singular qualities and the games framework collaborate. In age gathering swimming, for instance, it is not unprecedented for a youngster to be effective in one age bunch just to be consigned to a low position in the rankings when he/she moves to the following age bunch. Correspondingly, changes connected with adolescence in young ladies frequently prompt changes in self idea which may impact execution. It is at such moves that numerous youngsters understand that there are different things in life notwithstanding game. Such moves are additionally noted by game authorities, and it has even been recommended that a few vaulting mentors dread adolescence more than the youthful female gymnasts.

Guardian of kids named as capable may add to a misguided feeling of the potential for their kid's accomplishment in game either as school grant or an expert profession. A few guardians even put significant wholes of cash in ahead of schedule games preparing for their youngsters. It must be underlined, then again, that the numbers are numerous and the likelihood of achievement in miniscule.

There are numerous conditions fundamental for accomplishment in advanced game. One of these is an inalienable ability or inborn ability or inclination. Early recognizable proof of ability is a standout amongst the most imperative concerns in contemporary games. The fundamental reason hidden Talent opportunity projects is that the improvement of the young competitor can be best served if the competitor prepares in a game of control for which he/she is ideally equipped. Two end products to this reason are:

(a) If the competitor begins at a more elevated amount of capacity or execution then he/she at last winds up at a more elevated amount of execution, and

(b) If you begin with a more noteworthy bent for a specific action, then the competitor will advance quicker than a competitor with a lower starting inclination.

Regrettably, their premises have not been definitively demonstrated, and may succumb to wide individual variability. On the other hand, one can even-minded expect that on account of the prerequisite of five or more years of preparing to achieve a level of capability in games, and a fairly a somewhat contract window of age that competitor can expect crest execution, it is essential that athletic ability is found early, and checked persistently to help the competitor achieve large amounts of execution.

Talent Opportunity Criteria

General health- First and premier the competitor must be solid. The competitor ought to be free of physical or natural glitches. The level of wellbeing of the competitor must be controlled by qualified work force including, yet not constrained to, the competitor's close to home doctor, a games pharmaceutical orthopaedist, a games drug physical advisor, an athletic coach, and/or a games therapist. A pre participation physical must be performed to figure out whether there are numerous restorative issues that would be possibly restricting to preparing and execution.

Physiological characteristics- The physiological variables are less unsurprising or stable than the build variables. Studies have been finished with cutting edge competitors, however regularly not as much as world class competitors. The prescient capacity of such studies is faulty when looking for the ultra-skilled competitor. This is liable to be because of the gigantic effect that preparation can have on the physiological variables and generally little impact that preparation can have on constitution variables. Bajin verified that dynamic adaptability had the most astounding relationship with execution brings about the long haul

testing project embraced in Canada. Tests of youngsters to foresee grown-up execution is most likely most noteworthy in those games where there is a solitary overwhelming execution trademark, for example, perseverance running or shot putting. There is an issue in acrobatic with ability distinguishing proof utilizing physiological variables as a result of the colossal effect of preparing on a large portion of them, the expansive number of distinctive physiological attributes that a gymnastic specialist needs at abnormal states, and the relative flimsiness of these variables to anticipate youthful grown-up execution.

Psychological characteristics- There is minimal mental data in regards to kids and game execution and the heritability and/or consistency of mental variables on future execution. It is farfetched that any mentor would deny that mental qualities may set the razor's edge of focused adequacy in later years, yet it is basically difficult to foresee future execution in view of youth mental appraisals at the present time. Significant writing has been given to how kids can best get sport brain research administrations, yet minimal psychic work has been finished.

Sports brain research as mental preparing has been pushed and utilized with good results and examinations concerning profiling the flow tip top athlete have been performed. The after effects of the examinations lead to some practical judgment skills uses of mental qualities to tip top entertainers. The capacity to certainly distinguish and support ability in the mental region is a long way from cement. The potential advantages from expanding endeavours here ought not be disparaged. Tests of visualization as proposed by beier could open numerous ways to expanding the adequacy and productivity of vaulting preparing. Ability recognizable proof from mental variables is still in its earliest stages.

Around there, the first approach is to keep on inquiring about mental variables with respect to future execution by rehashed testing and advancement of a far reaching database of mental and other execution data. The second approach is to depend on the experience and instinct of fulfilled mentors in identifying the unobtrusive subtleties of conduct that are demonstrative to them great mental potential in the competitor.

’The human beings successfully inhabit the globe from equator to the poles and from deserts to the high altitude zones. These regions have drastically different climatic conditions and physical properties have undergone special changes in their bodies which provide them selective advantage for survival and procreating. for example, to be successful in a desert climate, the body must evolve a strategy to dissipate body heat which can be done by

increasing the surface area. This seems to be the reason for thin and elongated bodies of the inhabitants of the deserts. On the other hand, people of the arctic have thick bodies which prevent heat loss. Similarly, the residents of the high altitude have greater chest diameters in order to increase the pulmonary ventilation which provides them with an opportunity to increase the availability of the oxygen which otherwise is less in the rarefied atmosphere of the altitude.

The populations of the world have lots of variation in body size and structure. There are very tall populations measuring as much as 180 cms in comparison to the pygmies of central Africa who are barely 130 cms in height. This range of averages of body height of the two extremes amply point towards the need of having specific reference data for different populations.

Height and weight are the two most important measurements on the basis of which assessment about the growth status of either the individual or that of the population can be assessed. In the case of the individual Childs, his present status with respect to his percentile position is the given reference standards can be assessed. If his position is significantly below third centile, his growth performance is doubtful and needs monitoring. On the other hand, the status of groups in the standards can provided and thus the performance of the group as a whole become clear.

The body measurement are useful is studying different groups. The absolute and proportional differences between groups can reveal a lot of information and throw light on the factors responsible for effective such a change. The same group migrated to an affluent setting can be compared to negative group in order to gauge the effect of migration which might be responsible for a drastic change in the life style as a result of acculturation. a comparison of the body measurement between normal and abnormality on human body"(Singh,2009).

Anthropometry is used to measure nutritional status in patients. Include: body weight, body height, skinfold thickness, mid-arm circumference, hand-grip dynamometry.

Anthropometric information is utilized as a part of numerous ranges of assembling to give data to the outline of items, for example, apparel, footwear, protection equipment, furniture, vehicles and any articles with which individuals collaborate. In the equipped administrations this information is of specific significance as survival of the serviceman may

rely on it. Case in point, fit as a fiddle of snug security gear, for example, body shield or battle caps, or in the or in the ideal ergonomic outline of battle vehicles.

SIGNIFICANCE OF THE STUDY

The study will systematically analyse the anthropometric characteristics. Through quantitative analysis of LPU Girls softball players, unique physique characteristics to softball players may be identified that will provide evidence for validation of indices that will be useful in selection of talented athletes and talent identification.

STATEMENT OF THE PROBLEM

The problem is stated as "Analysis of softball performance in relation to anthropometric profile."

OPERATIONAL DEFINITIONS OF THE TERMS

Anthropometry:-

Anthropometry is the systematic collection and correlation measurement of human body. Anthropometry has been used to assess gross structure and function, including body size, shape, and proportion and body composition.

Anthropometric measurement:-

An arrangement of quantitative procedures for deciding a singular's muscle to fat quotients structure by measuring, recording, and investigating particular measurements of the body, for example, tallness and weight; skin-fold thickness; and real periphery at the waist, hip, and midsection.

OBJECTIVE OF THE STUDY

1. Analysis of softball performance of the players in relation to their anthropometric profile.
2. Preparing a Anthropometric profile of softball female players.

LIMITATIONS OF THE STUDY

Lack of equipment availability might act as the limitation of the study.

DELIMITATION OF THE STUDY

1. The study was delimited to 25 softball girl's player.
2. The age group of subjects was 18 to 26 years.
3. The study was delimited to All India Inter University and national level Softball girls of Lovely Professional University.

CHAPTER-II

REVIEW OF RELATED LITERATURE

Beat Knechtle*1,2,MD (2014) relationship of Anthropometric and Training Characteristics with Race Performance in Endurance and Ultra-Endurance Athletes. A mixture of anthropometric and preparing qualities have been distinguished as indicator variables for race execution in perseverance and ultra-continuance competitors. Anthropometric qualities, for example, skin-fold thicknesses, muscle to fat ratio ratios, circuits and length of appendages, body mass, body stature, and body mass list were bi-variately identified with race execution in continuance competitors, for example, swimmers in pools and in vast water, in street and mountain bicycle cyclists, and in runners and long distance runners over distinctive separations. Furthermore, preparing variables, for example, volume and pace were additionally bi-variately connected with race execution. Multi-variate relapse examinations including anthropometric and preparing attributes diminished the indicator variables essentially to muscle to fat quotients and velocity amid preparing units. Further multi-variate relapse examinations including moreover the parts of past experience, for example, individual best times demonstrated that fundamentally past best time in shorter races were the most vital indicators for ultra-continuance race times. Ultra-continuance competitors appeared to get ready diversely for their races contrasted with perseverance competitors where ultra-perseverance competitors put additional time in preparing and finished additionally preparing kilometres at lower velocity contrasted with continuance competitors. Taking everything into account, the most critical indicator variables for ultra-perseverance competitors were a quick individual greatest time in shorter races, a low muscle to fat ratio ratios and a high velocity amid preparing units.

Sidhu and Singh Jagdev, (2013). forecast of execution of college hockey players in connection to their anthropometric and physical wellness variables. Anthropometry is the science that arrangements with estimations of size, weight and extents of human body. It gives experimental systems and perceptions on the living people. Anthropometric methods (skinfold fat, perimeter and width estimations) are mainstream for foreseeing body synthesis on the grounds that they are very little costly, oblige little space and can be performed effortlessly. Anthropometry is often utilized as a part of physical training, games science, physical action and biomedical sciences. Anthropometric estimations can be separated into stature, weight and lengths, expansiveness or width, boundaries or sizes, profundities and

skinfolds. All estimations of individual are outer measurements of the body. Reid (1978) researched the relationship of anthropometric estimations, quality and adaptability of lower appendages to the skating rate of 17 college hockey players. The tests led were leg quality, hold quality, lower appendage adaptability, skating rate test and anthropometry of legs. The outcomes uncovered that the adaptability was viewed as a fundamental element to every and a general skating body sort. Adaptability was discovered to be related with quality yet anthropometry and adaptability were not identified with skating rate. Kansal et al. (1980) researched the national football and hockey players as to their oxygen consuming power and body arrangement as indicated by their field positions. It was discovered that the players of diverse positions were truly comparative in body mass, body weight and high-impact power. Kansal et al. (1980) further recommended that the body extents of safeguards and guilty parties did not contrast much. In body size and other body measurements two gatherings demonstrated critical distinction. Selection of Subjects The subjects for the present study comprised of hockey players who took part at college level. 200 subjects from the different colleges who took an interest in the north zone between college level rivalries were chosen.

Delahunt E et al. (2013). anthropometric profile and body composition of Irish adolescent rugby union players aged 16-18. The writing recommends that one of the key determinants of accomplishment at rugby union worldwide rivalries is the anthropometric profile of players. The Irish Rugby Football Union (IRFU) long haul player improvement (LTPD) model is a system intended to lead the advancement of the strategic, physical, and mental spaces of wearing investment. In Ireland, the Train-to-Train phase of the IRFU model is a discriminating stage, whereby the following formative movement would incorporate the move of players into expert institutes. To date, no already distributed studies have analyzed the anthropometric profile of Irish Schools' rugby union players at the Train-to-Train phase of the IRFU model. The anthropometric profile of 136 male juvenile rugby union players at the Train-to-Train phase of the IRFU model was surveyed utilizing aggregate body double vitality x-beam absorptiometry. Huge contrasts in stature, body mass, muscle to fat quotient, fat mass, lean mass, and without fat mass were seen between players allotted to the forward and back units, and for particular position orders inside every unit. Direct logistic relapse uncovered that body mass was a measurably huge ($p < 0.01$) indicator of unit position order, with a chances proportion of 2.35, showing that the players with a advanced body mass were twice as prone to be delegated advances. The after effects of this study show that at the Train-to-Train phase of the IRFU model, forward and back units have particularly distinctive

anthropometric profiles. Besides, anthropometric separation additionally exists inside particular position classifications inside each of these playing units. In this manner, anthropometric profiling ought to be done on a deliberate and occasional premise, on the grounds that this will take into consideration the assessment of the viability of the execution techniques of the IRFU demonstrate on a national premise.

Mehdi Ben Brahim et.al, (2013). the point of this examination was to give anthropometric, physical and physiological execution cha- racteristics of Tunisian youthful soccer players and to look at the relationship among chose parameters as indicated by their playing standard position. One hundred under 13 years of age (U-13) male soccer players were tried. They were arranged by playing standard positions (goalkeeper: GK, shield: DF, midfield: MF, and forward: FW). Testing comprised of anthropometric estimations counting weight, tallness, and body mass file, and execution measures of pace (5, 15, and 20 m), nimbleness run (Agility-15 m and Ball-15 m), vertical hopping, ball shooting, and vigorous limit (Hoff Dribble Test and Yo-Yo discontinuous Endurance Run, YYIER). GK were heighted and weighty than different players. Significant contrasts of playing positions for most of the physical tests incorporate 20 m sprint, Agility-15 m and Ball-15 m times (all $p < .01$), and additionally squat hop and counter development bounce (all $p < .01$). Likewise, weight was fundamentally related with 20 m sprint ($r = .29$, $p < .01$), Agility-15 m ($r = .30$, $p < .01$) and Ball-15 m ($r = .31$, $p < .01$) times and ball shooting rate ($r = -.42$, $p < .01$). Different relapse examinations demonstrated that weight and tallness were the mainly critical indicators of 20 m sprint time and the YYIER separation, separately. Taking everything into account, execution capacities between positions in youthful soccer players have all the earmarks of being distinctive. Anthropometry can separate physical limits and soccer aptitudes giving a logical reasonable at the back the coaches action of selecting youthful soccer player.

Dr.M.P.Gaur (2013) relationship Between Selected Anthropometric Measurement and Performance of Women Badminton Players. The part of anthropometry as a games science is maybe a standout amongst the most critical in such manner. It is crucial on the grounds that the body, body organization, physical development and one's motor improvement are of central significance in adding to the criteria of ability connection and advancement in games. Thirty Five (35) female players age ranging from 17-25 years who have participated in inter college or zonal championships in Badminton were randomly selected to act as subjects for the study. Weight, Standing Height, Sitting Height, Leg Length,

Lower Leg Length, Upper Leg Length, Arm Length, Upper Arm Length, and Lower Arm Length were taken into consideration. Weighing Scale, Anthropometric Rod, Steel tape and Skin Fold Caliper were the tools used for the measurements whereas the performance of the selected Badminton players was gathered by the help of three experts out of 10. The collected data was analyzed by computing descriptive statistics followed by Pearson's Product Moment Correlation. The results revealed that mean and SD values of Weight, Standing Height, Sitting Height, Leg Length, Lower Leg Length, Upper Leg Length, Arm Length, Upper Arm Length, and Lower Arm Length were found to be 50.48±5.28, 154.91±3.85, 79.03±6.32, 86.82±7.38, 47.80±3.82, 43.80±1.99, 59.73±4.68, 29.15±3.20 and 31.0±4.21 respectively. Whereas a relevant relationship was found between Performance score and the selected variables, as the values were found to be 0.324, 0.828, 0.468, 0.481, 0.655, 0.533, 0.352 and 0.658 respectively against the tabulated value 0.296 which was significant related at 0.05 level but only upper leg length was not correlated to performance score as the value was found to be 0.178. So finally it was concluded that for better prediction of performance of women Badminton players, all the selected anthropometric variables may be considered in combination instead of studying the influence of each independent variables.

Sharma A. et al, (2012) correlations of anthropometric characteristics with physical fitness tests in Indian professional hockey players. Relationships of anthropometric qualities with physical wellness tests in Indian proficient hockey players. The reason for this study was to explore the relationships of anthropometric attributes with isotonic quality (handgrip quality), lower appendage power, vigorous quality, and expertise tests in intentionally chose 60 Indian proficient male hockey players of diverse levels players (35 national and 25 state level) matured 18-23 years gathered from Ranjit Singh Hockey Academy, Amritsar, Punjab, India. To fill this need, three anthropometric attributes (tallness, weight and percent muscle to fat quotients), right and left handgrip quality, vertical hop, multi stage wellness test, slalom sprint and spill tests were performed on every subject. Results showed factually huge ($p<0.05$) contrasts just in lower appendage power between Indian national and state level male hockey players. In Indian proficient male hockey players, stature has essentially positive relationships with weight, right and left handgrip quality, lower appendage power and negative connections with % muscle to fat quotients and spill test, and body weight has fundamentally positive connections with % muscle to fat ratio ratios, left and right handgrip quality, lower appendage power and negative connections with slalom sprint. Altogether positive connections were noted between the wellness segment variables as well.

Spieser L et. al. (2012). anthropometry of the Swiss junior and elite judo national team - a descriptive study. To secure the anthropometrical attributes and the hand grasp quality of the Swiss junior and world class judo national group. The deliberate qualities were contrasted and information from the literature.24 individuals, 19 guys (23.01 ± 4.91 years) and five females (19.95 ± 2.02 years), were measured. The accompanying anthropometric measurements were made: body size, body weight, six skinfolds (SFT), two breadths, two boundaries, muscle to fat ratio ratios (tanita scale, Durnin and Womersley strategy), BMI and determination of somatotypes. Also, the hand hold quality was measured. The mean somatotype of male judoka was 2,2 ± 0,8 for the endomorphy, 6,0 ± 0,9 for the mesomorphy and 2,0 ± 0,7 for the ectomorphy. The mean somatotype was adjusted mesomorph. The mean hand hold quality of male judoka was 47,4 ± 6,7 kg. The mean somatotype of female judoka was 3.7 ± 1.2 for the endomorphy, 4,9 ± 0,7 for the mesomorphy and 1,5 ± 0,3 for the ectomorphy. The mean somatotype was mesomorphic endomorph. The mean hand hold quality of the female judoka was 27,0 ± 3,1 kg. There were anthropometric contrasts between the Swiss youngsters and world class judoka and between the Swiss competitors and the competitors of the reference studies. The anthropometric information and the consequences of the hand grasp quality give data, which parts Swiss judoka ought to make strides. A judoka who does not coordinate the perfect profile can in any case be effective with the assistance of different variables (technical, tactical, mental strength).

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Sidhu, Jagdev Singh (2012). prediction of performance of university hockey players in relation to their anthropometric and physical fitness variables. Physical training office, Punjabi University. Anthropometry is the science that arrangements with estimations of size, weight and extents of human body. It gives investigative techniques and perceptions on the living people. Anthropometric methods (skinfold fat, periphery and measurement estimations) are prominent for anticipating body creation on the grounds that they are very little costly, oblige little space and can be performed effortlessly (Behenke and Willmore, 1974 and Pollock and Willmore, 1990). Anthropometry is often utilized as a part of physical instruction, sports science, physical movement and biomedical sciences. Anthropometric estimations can be separated into stature, weight and lengths, expansiveness or width, perimeters or circumferences, profundities and skinfolds. All estimations of individual are outer measurements of the body. Reid (1978) explored the relationship of anthropometric estimations, quality and adaptability of lower appendages to the skating pace of 17 college hockey players. The tests directed were leg quality, grasp quality, lower appendage adaptability, skating rate test and anthropometry of legs. The outcomes uncovered that the adaptability was viewed as a fundamental element to every and a general skating body sort. Adaptability was discovered to be corresponded with quality however anthropometry and adaptability were not identified with skating rate. Kansal et al. (1980) examined the national football and hockey players concerning their vigorous power and body structure as per their field positions. It was observed that the players of diverse positions were truly comparative in body mass, body weight and high-impact power. Kansal et al. (1980) further recommended that the body extents of shields and wrongdoers did not very much. The two gatherings demonstrated critical distinction in body size and other body measurements. Selection of Subjects The subjects for the present study comprised of hockey players who took part at college level. 200 subjects from the different colleges who took an interest in the north zone between college level rivalries were chosen.

Ali Fattahi et al. (2012). relationship between anthropometric parameters with vertical jump in male elite volleyball players due to game's position. Late study was

performed to focus relationship between anthropometric properties with vertical bounce on 40 male world class volleyball players (27.93±3.92 years of age and 8±1.53 years sport history) in Iran chief association. 42 anthropometric parameters were measured utilizing caliper and adaptable tape meter (JAMAR STAINLESS®). So as to decline parameters covering the same estimations among 42 anthropometric properties, different relationship were connected and parameters with coefficient higher than 0.8 were chosen for further examination, so number of parameters diminished to 17. Utilizing rule segment examination strategy on 17 parameters, three primary parts including 70% of information change were separated. In the principle segments, parameters with coefficient more than 0.7 including weight, situated stature in installation, shank length, foot length, middle outline at hip level, most extreme calf perimeter, guts fat, centre tight periphery and tight length were utilized for further examination. The distinction in separation between the standing achieve stature and the hop tallness was measured as the vertical hop records. To focus contrasts between vertical bounce records furthermore relationship between anthropometric properties with vertical bounced, one way fluctuation examination (F- Test) and relapse coefficients were utilized. There are huge contrasts between vertical bounce of spikers and liberos, additionally in the middle of setters and liberos, however there are no noteworthy contrasts between vertical hop of spikers and setters. There is huge relationship between vertical hops with shank length, greatest calf outline, foot length for spikers and setters, additionally tight perimeter and weight for liber.

Open access journal of sports medicine (2011), Dove press journal , the point of this study was to research indicator variables of anthropometry, preparing, and past involvement to foresee a half marathon race time for future fledgling recreational male half marathoners. Eighty-four male finishers in the 'Half Marathon Basel' finished the race separate inside (mean and standard deviation, SD) 103.9 (16.5) min, running at a pace of 12.7 (1.9) km/h. After multivariate investigation of the anthropometric qualities, body mass record ($r = 0.56$), suprailiacal ($r = 0.36$) and average calf skin fold ($r = 0.53$) were identified with race time. For the variables of preparing and past experience, speed in running of the instructional meetings ($r = -0.54$) were connected with race time. After multivariate examination of both the critical anthropometric and preparing variables, body mass list ($P = 0.0150$) and speed in running amid preparing ($P = 0.0045$) were identified with race time. Race time in a half marathon may be incompletely anticipated by the accompanying comparison ($r2 = 0.44$): Race time (min) = 72.91 + 3.045 * (body mass list, kg/m2) –3.884 *

(speed in running amid preparing, km/h) for recreational male runners. To finish up, variables of both anthropometry and preparing were identified with half marathon race time in recreational male half marathoners and can't be diminished to one single indicator vari.

Gorski T et al. (2011) an anthropometric and physical profile of young Swiss alpine skiers between 2004 and 2011. described the development of anthropometric and physical characteristics of young Swiss alpine skiers between 2004 and 2011, to compare them between age and performance-level groups, and to identify age- and sex-dependent reference values for the tests performed. The Swiss-Ski Power Test includes anthropometric measures and physical tests for coordination and speed, strength, anaerobic capacity, and endurance. The authors analyzed the results of 8176 tests performed by 1579 male and 1109 female alpine skiers between 2004 and 2011. Subjects ranged between regional and national level of performance and were grouped according to their competition age groups (U12, 11 y; U14, 12-13 y; U16, 14-15 y; U18, 16-17 y; U21, 18-20 y) and performance level. A progressive increase in anthropometric measures and improvements in tests results with increasing age were found. For all tests, male athletes had better results than female athletes. Minor differences were observed in anthropometric characteristics between 2004 and 2011 (mostly <5%), while results of physical and coordinative tests showed significant improvements (up to more than 50% enhancement) or stability over the years. Differences between higher- and lower-level athletes were more pronounced in tests for lower-limb strength and anaerobic capacity. The presented profile of young Swiss alpine skiers highlights the improvements in different physical aspects along the maturation process and chronologically over a period of 7 y. Furthermore, reference values are provided for comparisons with alpine skiers or athletes from other sports.

Viswanathan and Dr.Chandrasekaran (2010). optimizing Position-wise Anthropometric Models for Prediction of Playing Ability among Elite Indian Basketball Players. The motivation behind this study was to anticipate the part of various anthropometric qualities in execution of Indian youth first class Basketball players with unique reference to their playing positions. Two hundred and seventy six (age, 15.1 ± 1.3 years) youth tip top male Basketball players from 23 conditions of India took part in the 26th Lakadawala Youth National Basketball Championship at Mastan YMCA, Mumbai from 9th to 16th May 2009, were chosen as the subjects. The chose subjects were partitioned into three gatherings as indicated by their playing positions in particular Guard (GD = 72), Forward (FD = 126) and Centre (CR = 78). The chose anthropometric variables specifically Body weight, Skinfold

estimations (mm) - Biceps, Sub scapular, Triceps, Supraspinale, Abdominal, Illiac Crest, Front Thigh and Medial Calf; Girth estimations (cm) - Arm circumference loose, Arm bigness flexed and Calf size; Length estimations (cm) - Standing tallness, Arm compass, Arm length, Leg length and Breadth estimations (cm) - Humerus expansiveness and Femur broadness as the autonomous variables were taken for this study. The information were gathered by taking after standard testing protocal of International Society for the Advancement of Kinanthropometry (ISAK) amid the opposition by deductively sanction types of gear. The model variable, playing capacity of the chose Basketball players are surveyed by three qualified Basketball mentors. To focus the relationship between the chose anthropometric variables and the mentors rating on playing capacity, the coefficient of connection was utilized. Anthropometric variables that measurably corresponded with execution were utilized to shape individual direct prescient models (stepwise contention choice) with uncommon reference to their playing positions for prescient comparison advancement. The outcomes uncovered that there was a solid relationships ($r = 0.9$) exists between the playing capacity versus tallness, weight, a safe distance, arm compass, leg length and flexed arm circumference among all the playing positions.

Yuyi zhang (2010) southern cross university. An investigation on the anthropometry profile and its relationship with physical performance of elite Chinese women volleyball players. The reasons of this study were to focus the anthropometric qualities of tip top Chinese ladies volleyball players, recognize the distinctions in the anthropometric profile and physical execution between the players at distinctive volleyball positions, and analyze the connections between the anthropometric profile and the physical execution of the players. Thirty-one anthropometric files and four physical execution (prescription ball tossing, running vertical hop, T shuttle run nimbleness test and timed 20 sit ups) were measured for 100 volleyball players selected from the main eight groups of 2007-2008 national title. The normal age of the players was 22.3±3.6 (SD) years and the normal preparing age was 9.7±4.0 years. For the first class Chinese ladies volleyball players, the normal estimations of stature, body mass, sitting tallness, standing achieve tallness, and BMI were individually 183.6±5.8 cm, 70.5±7.6 kg, 95.7±3.5 cm, 236.7±7.8 cm, and 20.9±2.0. The general anthropometric qualities of these volleyball players can be depicted as high stature; generally more lower arm, palm, calf and Achilles' tendon lengths yet a shorter sitting tallness; more extensive femur, biiliocristal and biacromial breadths; bigger contrast in the middle of casual and tensed arm bigness, littler wrist and lower leg sizes, littler lower leg circumference/ Achilles'

tendon length record; and littler skinfolds. The outcomes additionally uncovered that a large portion of the anthropometric variables were inadequately connected with the chose physical execution estimations, aside from that the biepicondylar femur broadness, calf bigness and calf length files were fundamentally associated with the running hop stature. There were critical contrasts among the anthropometric profiles of the players at distinctive volleyball positions, particularly in the files of body mass, stature, standing achieve tallness, radiale-stylion length, acromiale-dactylion length, midstylion-dactylion length, iliospinale tallness, tibiale-laterale tallness length, biacromial broadness, biiliocristal expansiveness, transverse midsection broadness and gluteal size (all $P<0.001$). Notwithstanding, the physical execution of the players at diverse positions demonstrated no huge between-position distinction with the exception of the running bounce tallness. The normal somatoype estimations of world class Chinese ladies volleyball players were "3.7-2.9-4.0", fitting in with endomorph-ectomorph. Their somatoypes were discovered principally in four of the 13 classes, with 29% in endomorphic ectomorph, 14% in adjusted ectomorph, 11% in adjusted endomorph and 9% in ectomorph-endomorph. The somatotype of the spikers and liberos was of the focal sort, that of the second spikers and second setters was endomorphic ectomorph, and that of the setters was endomorph-ectomorph. Taking into account the discoveries of this study, it is prescribed that the accompanying anthropometric files be considered in enlistment for ladies volleyball players: body mass, stature, sitting tallness, biacromial broadness, subscapular skinfold, lower leg circumference, lower arm size and Achilles' tendon.

Carvajal W et al. (2009) body type and performance of elite cuban baseball players. Presentation Appropriate stature and satisfactory somatotype are by all account not the only properties deciding athletic execution, yet they are imperative requirements for games investment and achievement. Then again, there is meager writing on baseball players' kinanthropometric profiles and their relationship with execution. Given that Cuban baseball players have been among the world's top entertainers in late decades, portrayal of their morphological highlights connected to their execution may add to building up the proof base around there. Target Describe the kinanthropometric profile identified with games execution of tip top Cuban baseball players, characterized by playing position. Routines Body organization, somatotype, proportionality, and execution were measured in 100 tip top baseball players assembled by playing position and execution. Information from the 2002-2003 baseball season was assembled for players taking an interest in the 43rd Cuban National Baseball Series (November 2003-May 2004). Slugging rate (SLG) was utilized to gauge

execution of all players aside from pitchers, whose execution was measured as end-of-season win-misfortune record. Mean and standard deviation qualities were computed for anthropometric and execution results, introduced in tables for examination. ANOVA and MANOVA examinations were connected to focus sizes of contrast between the variables examined, and measurable hugeness of the distinctions created ($p \leq 0.05$ and $p \leq 0.01$). Results Performance and body sort shifted by playing position, and factually huge contrasts were found in execution, body organization and somatotype variables between a few positions. No noteworthy contrasts in proportionality were found. In the first place basemen and outfielders (focus, left, and right fielders) were the best hostile players with the most elevated mean SLG, body weight and bulk values. Infielders (second basemen, shortstops, and third basemen) had the most reduced mean body weight and fat tissue mass qualities, and the least mean SLG. Catchers had comparable mean weight, tallness, bulk, and fat tissue mass values as first basemen, outfielders and infielders, yet a low mean SLG like that of infielders. Pitchers were morphologically like players in all positions, however critical morphological contrasts were found among pitchers with diverse execution levels. Better-performing pitchers (≥.600 winning rate (Wpct)) were essentially heavier and more mesomorphic than lower-performing pitchers (<.600 Wpct). All players were transcendently mesoendomorphic, yet mean somatotype values shifted between players in distinctive positions, and between pitchers with diverse execution levels. Conclusions The kinanthropometric profile of elite baseball players portrayed in this study by and large concurs with the accessible writing. Further research on relative specimens is expected to accept the relationship between players' body sort and execution. All things considered, the aftereffects of this study may be connected to criteria for choice and preparing of superior baseball players in Cuba. Catchphrases: Body organization, somatotypes, anthropometry, sports, baseball, athletic execution, sports exec.

Wan Nudri WD1 (1996) anthropometric measurements and body composition of selected national athlete. this study was directed to focus the anthropometric estimations and body organization of chose national competitors. A sum of 84 male competitors from 10 unique sorts of games and 24 female competitors from 5 sorts of games were contemplated. The stature and body weight of subjects were measured utilizing the SEGA measuring offset with tallness connection. Skinfold thickness estimations were taken utilizing the Harpenden Calipers at 4 locales (biceps, triceps, subscapular and suprailiac). Rate of muscle to fat ratio ratios was computed from the entirety of 4 estimations of skinfold thickness. Taking into

account body mass file (BMI), the majority of the male (68 subjects or 81%) and female (19 subjects or 79%) competitors were delegated ordinary. The rate normal muscle to fat ratio ratios for both male and female competitors were 13.8 ± 4.5% and 24.7 ± 5.3%, individually. The male and female competitors likewise had lower rate of muscle to fat quotients when contrasted with non-competitors, however these competitors had marginally higher rate of muscle to fat quotients when contrasted with those in chose nation.

Claessens AL et al,(1994). the role of anthropometric characteristics in modern pentathlon performance in female athletes. Keeping in mind the end goal to focus the part of work out attributes in current pentathletes, 65 female members at the IXth World Modern Pentathlon Championships, 1989 (Wiener Neustadt, Austria) were researched. Of these, 54 take an interest in the opposition; the other 11 were stores. Their mean (+/ - S.D.) age was 22.34 +/ - 3.97 years (run 16.08-32.58 years). Anthropometric attributes (body mass, lengths, breadths, sizes and skinfolds), somatotype and body arrangement assessments were resolved. Contrasted and other female competitors (e.g. swimmers, runners, fencers), the world class present day pentathletes were somewhat tall (x = 168.1 cm) and, as demonstrated by the body mass list (x = 21.6), they had a high mass in respect to their stature. In light of skinfolds, muscle to fat quotients was assessed as 16%, and anthropometrically decided somatotype was all things considered 2.5-3.9-2.8. The relationship between the competitors' anthropometric attributes and present day pentathlon execution was researched by method for Pearson zero-request relationships between the physical characteristics and the aggressive execution scores. Noteworthy relationships were discovered essentially for the "fat" variables, for example, skinfolds, percent fat and the endomorphy segment, r changing from -0.34 to -0.58, which demonstrated a reverse relationship between the measure of bloatedness and advanced pentathlon execution. To explore this relationship further, Pearson zero-request connections were computed between the particular components scores, got from a turned variable example (Varimax) completed on chose physical variables, and the execution scores. The outcomes exhibited that, in connection to anthropometric qualities, advanced pentathlon execution in females is fundamentally connected with the 'fat advancement' element, and to a lesser degree with the 'bone-muscle improvement' variable. Variables speaking to linearity of body appear to be inconsequential to current pentathlon execution. Stepwise relapse investigation uncovered that 42.4% of the change in advanced pentathlon execution can be clarified by the accompanying anthropometric variables: whole of 10 skinfolds, biacromial broadness and humerus measurement. To acquire an abnormal state of advanced pentathlon

execution, no doubt a female competitor should most importantly have a low level of body heftiness and, to a lesser degree, a generally abnormal state of lean body mass.

CHAPTER-III

METHODS AND PROCEDURE

In this chapter, design of the study, selection of variables tools, collection of data and statistical technique employed for analysis has been described.

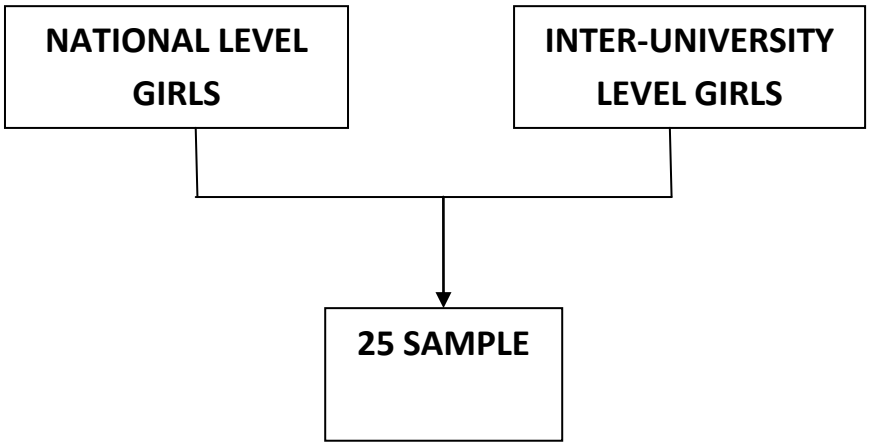
Design of the study

Single group design will be used. A total number of subjects will be 25 girls of softball game who had participated at National level and Inter University level competition.

Sampling Area

The total number of sample for the study consists of 25 softball girl's player of Lovely Professional University. Before undergoing the test all the player were informed about the testing procedure.

The "purposive sampling" technique commonly called, judgmental sample was used. Thus by the nature of the research the author choose purposive sampling technique.



TOOLS

Anthropometry test.

1. Weight by weighing machine.

2. Skin-fold thickness to compute percentage body fat by skin-fold calipers

3. Body composition analyser

4. Steel tape

5. Sliding calliper

6. Stadiometer

Selection of Variables

Keeping in the view significance of the investigation, the variables will selected.

1. Sitting height

2. Standing height

3. Body weight

4. Total arm length

5. Shoulder elbow length

6. Elbow hand length

7. Upper arm circumference

8. Forearm circumference

9. Forearm breadth

10. Hand length

11. Hand breadth

12. Wrist circumference

13. Waist breadth

14. Waist circumference

15. Waist height

16. Buttock knee length

17. Knee height

18. Shoulder breadth

19. Thigh circumference

20. Calf circumference

21. Foot length

22. Biceps skinfold

23. Triceps skinfold

24. Thigh skinfold

25. Calf skinfold

26. Body Mass Index

PROCEDURE OF DATA COLLECTION

The data collected from the Lovely Professional University All interuniversity and National level softball girls.

Anthropometric Tests

Variable: sitting height

Equipment: Measuring tape

Procedure Adapted: Subject sits erect in standard sitting position. Her head is oriented in ear-eye plane. Using the measuring tape measure the distance from the sitting surface to the vertex from behind.

Variable: Height

Equipment: Stadiometer

Procedure Adopted: The tallness rule is taped vertically to hard level surface with the base at floor level. The subject was asked to stand erect on a horizontal surface. Heels of the subject must be touching one another and the head must be on eye ear plane and measurement was done through stadiometer. Arms were hanging down on the sides and height was recorded in centimetre.

Variable: Body weight

Equipment: Weighing machine

Procedure Adapted: Weighing of a subject should be done perfectly in the nude or in the minimum of clothing.

Variable: Total Arm length

Equipment: Steel tape

Procedure Adapted: Subject stands erect in the standard standing position. Using the steel tape, measure the distance between acromion and stylion radiale.

Variable: Shoulder-Elbow length

Equipment: Steel tape

Procedure Adapted: Subject sits erect with his upper arm parallel to the body and forearm extended at right angles. The measurement is taken from acromion to the most inferior point on the olecranon process.

Variable: Elbow Hand length

Equipment: Steel tape

Procedure Adapted: It is obtained as a distance between olecranon tip and the tip out stretched middle finger when the upper arm is held vertically by the side of the body and the forearm extending forword at right angle,using the steel tape.

Variables: Upper arm circumference

Equipment: Steel tape

Procedure Adapted: Subject stands erect, arm hanging freely with forearm and hand extended loosly.the circumference is taken in a plan at right angles to the long axis of the humerus through a point midway between the axilla and the skin flexion line at the cubital fossa (the triangular hollow in front of the elbow joint).

Variables: Forearm circumference

Equipment: Steel tape

Procedure Adapted: The tap is wrapped horizontally around the hanging right arm at the greatest protrusion, a little below the elbow, when the hand is extended and not clenched.

Variable: Forearm breadth

Equipment: Sliding Caliper

Procedure Adapted: Subject stands erect and arms hanging in side way with palms in, With the paddle blades of sliding calliper and measure the maximum breadth of the right forearm at the point of the maximum circumference at a fixed pressure value.

Variable: Hand length

Equipment: Sliding Caliper

Procedure Adapted: Subject's right hand is extended and palm up. With the sliding caliper lying along her palm, measure the distance from the wrist crease base line to the tip of the middle finger.

Variable: Hand breadth

Equipment: Sliding Caliper

Procedure Adapted: The hand is extended and placed palm up, flat on a hard surface, with the forearm resting in the same plane. Distance between the widest point at the head of the first and fifth metacarpals, is taken using the sliding calliper.

Variables: Wrist circumference

Equipment: Steel tape

Procedure Adapted: Subject stands erect with his right arm held slightly away from the body. Using the tape, measure the minimum circumference of the wrist.

Variable: Waist breadth

Equipment: Steel tape

Procedure Adapted: Subject stands erect, using the steel tape and measure the breadth of the waist at the level of omphalion landmark.

Variable: Waist circumference

Equipment: Steel tape

Procedure Adapted: Subject stands erect, using the tape and measure the maximum horizontal circumference of the waist at the point of the navel (omphalion).

Variable: Waist height

Equipment: Steel tape

Procedure Adapted: Subject stands erect with feet together, weight equally distributed, With the steel tape, measure the vertical separation from the standing surface to the umbilicus (navel).

Variable: Buttock knee length

Equipment: Steel tap

Procedure Adapted: Subject sits erect with his feet laying on a surface balanced so that the knees are twisted in right angles. Using the measuring tape, measure the horizontal distance from the rear most surface of the right side of buttock to the front surface of the knee cap.

Variable: Knee height

Equipment: Steel tap

Procedure Adapted: Subject sits erect, with her feet laying on a surface so that the knees are bowed at right edge. Utilizing the steel tape, knee height is measured as the vertical separation from the foot rest surface to the highest point of the right knee.

Variable: Shoulder breadth

Equipment: Steel tape

Procedure Adapted: Subject stand erect, upper arms at sides, and elbow flexed. With the steel tape, measure the horizontal breadth across the shoulders.

Variable: Thigh circumference

Equipment: Steel tape

Procedure Adapted: Subject stands erect with his legs spread slightly to allow passage of the tape between them. The circumference of the thigh is taken in a plane at right angles of femur long axis through a point halfway between the lowest point in the crotch and tibiale.

Variable: Calf circumference

Equipment: Steel tape

Procedure Adapted: Subject stands erect with his feet slightly apart. Using the tape for measuring the horizontal right lower leg circumference at the point of the great bulge of the calf muscle.

Variable: Foot length

Equipment: Sliding caliper

Procedure Adapted: Subject stands with feet apart, weight evently distributed. With the sliding caliper, measure the separation from the heel to the longest toe of the right foot parallel to the long hub of the foot.

Variable: BMI **:-** BMI remains for Body Mass Index. It is utilized to issue you a thought of whether you're underweight, overweight or a perfect weight for your stature. It's valuable to know in light of the fact that if your weight expands or diminishes outside of the perfect range, your wellbeing dangers may increment.

BMI under 18.5 - Underweight

BMI 18.5 to 25 - Healthy weight

BMI 25 to 30 - Overweight

BMI 30 to 40 - Obese

BMI above 40 - Very obese

Equipment: Body composition Analyser

Procedure Adapted: Measurement taken by Body composition Analyser machine.

Skin-fold measurement

The Skinfold was measured in millimetres using the harpended skin-fold caliper. The skin-fold measurement consisted of a double fold of skin and subcutaneous adipose (fat) tissue. Percentage body fat was computed based on the measurement of fat fold thickness taken from three body sites namely triceps, biceps, and thigh and calf.

Variable: Triceps skinfold

Equipment: Skinfold caliper

Procedure Adopted: A vertical fold along the back midline of the upper arm was taken midpoint between acromion (shoulder) and olecranon methods (elbow). The arm was held uninhibitedly to the side of the body. Skin-fold was picked up about 1cm above marked level. The jaws of skinfold calliper was applied to the skinfold and reading noted after two seconds. Reading was recorded up to nearest 1/10 of centimetre.

Variable: Biceps Skinfold

Equipment: Skinfold Caliper

Procedure Adapted: The skinfold was measured by rising a vertical fold at the stamped mid acromial-radiale line on the foremost surface of the arm. The subject remained with the arm should be relaxed. Extraordinary consideration was taken not to handle the basic solid tissues. It is recorded to one-tenth of a millimeters.

Variable: Thigh skinfold

Equipment: Skinfold caliper

Procedure Adapted: A vertical fold along the anterior line of the midpoint of the thigh was taken. Skin-fold was picked up about 1 cm above marked level. The jaws of skinfold caliper was applied to the skinfold and reading noted after two seconds. Reading was recorded up to nearest 1/10 of a centimetre.

Variable: Calf skinfold

Equipment: Skinfold caliper

Procedure Adapted: A vertical fold along the posterior line of the mid calf, at the level of the largest circumference. The jaws of skinfold caliper was applied to the skinfold and reading noted after two seconds..

Statistical Procedure

Descriptive statistics were used.

CHAPTER-IV

DATA ANALYSIS, RESULTS AND DISCUSSIONS

DATA ANALYSIS

In this chapter, analysis of the data, findings and the discussion of findings have been described. The investigator found the data collected with the help of standard tools as to be reliable, accurate and valid.

The present study was conducted on twenty five softball girls' samples. The sample was selected from Lovely professional university, Phagwara Punjab. Sitting height, standing height, body weight, total arm length, shoulder elbow length, elbow hand length, forearm circumference, upper arm circumference, forearm breadth, hand breadth, hand length, wrist circumference, waist breadth, waist circumference, waist height, buttock knee length, knee height, shoulder breadth, calf circumference, thigh circumference, foot length, biceps skin-fold triceps skin-fold, thigh skin-fold, calf skin-fold, and body composition measurement taken for making profiling of Anthropometric characteristics of softball girls. In order to fine out result of this objective in present chapter, the statically technique Mean, Standard Deviation were applied. All result obtained have been presented in figures.

In order to find out the result of this objective in the present chapter, the statistical technique mean and standard Deviations.

Anthropometric Measurement of Softball Player

TABLE-4.1

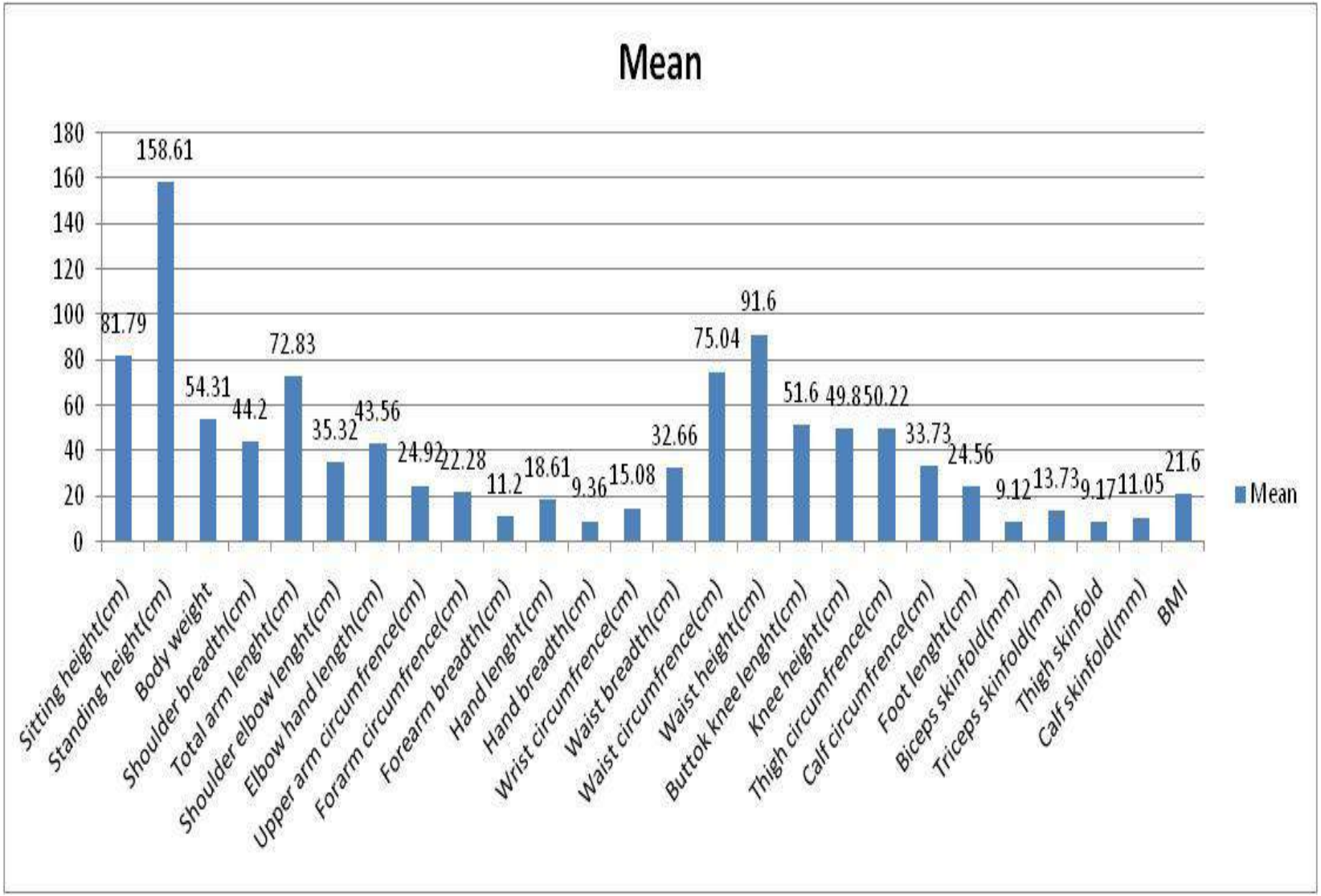
VARIABLES	SUBJECTS												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Sitting height(cm)	**84.3**	**83**	**82.3**	**84**	**85.5**	**80**	**83.5**	**78.7**	**85.5**	**85**	**85.5**	**81.5**	**88.5**
Standing height(cm)	**162**	**152**	**155.5**	**161.6**	**162**	**158.7**	**152.5**	**147.7**	**162.1**	**162.6**	**159.5**	**156**	**161.4**
Body weight	**48.1**	**58.5**	**51.3**	**45.3**	**67.3**	**57.7**	**54.7**	**37.1**	**56.3**	**51.9**	**61.8**	**49.1**	**57.7**
Shoulder breadth(cm)	**42**	**43**	**47**	**44**	**50**	**40**	**47**	**37**	**48**	**43**	**45**	**42**	**43**
Total arm length(cm)	**72**	**70**	**67.5**	**75**	**71**	**73**	**67.4**	**64.2**	**78**	**77**	**75.5**	**72**	**74.3**
Shoulder elbow length(cm)	**33**	**33.5**	**33**	**36.5**	**35**	**33**	**35.5**	**30.5**	**35**	**36**	**36**	**34.5**	**36**
Elbow hand length(cm)	**43**	**41**	**42**	**44.5**	**45.5**	**44.5**	**41.5**	**41.7**	**49**	**47**	**47.5**	**45**	**44.5**
Upper arm circumference(cm)	**23**	**27**	**24.5**	**21**	**31**	**26**	**28**	**20.5**	**25**	**24.7**	**28**	**23**	**27**
Forearm circumference(cm)	**21**	**23**	**22**	**21**	**25**	**23**	**24**	**20**	**22**	**21.5**	**24**	**21.5**	**23**
Forearm breadth(cm)	**10.5**	**12**	**11.5**	**10.5**	**12**	**12.5**	**12**	**10**	**11**	**11**	**12**	**11**	**11**
Hand length(cm)	**19.3**	**18**	**17**	**19.1**	**19**	**19**	**17.4**	**17.2**	**20.3**	**19**	**19.8**	**18.5**	**17.7**
Hand breadth(cm)	**8.9**	**9.5**	**8.5**	**9.2**	**8.7**	**8.7**	**9.4**	**14.5**	**10**	**8.2**	**9**	**8**	**9**
Wrist circumference(cm)	**15**	**15.5**	**15**	**15**	**15.5**	**16.5**	**15**	**8.3**	**16.2**	**15.3**	**16**	**15**	**15.2**

Waist breadth(cm)	**27.5**	**30.5**	**32**	**27.5**	**39**	**36**	**28**	**24**	**31**	**31**	**34.5**	**31.5**	**35.5**
Waist circumference(cm)	**66.8**	**81**	**72**	**63**	**79**	**83**	**73**	**58.5**	**73.2**	**77**	**85.5**	**73**	**78**
Waist height(cm)	**98.5**	**96**	**99.5**	**98.5**	**99**	**97**	**94**	**90**	**1.3m**	**1.1m**	**99**	**98**	**97**
Buttock knee length(cm)	**45**	**50**	**49**	**52**	**59**	**48**	**51**	**47**	**57.5**	**52**	**54**	**53.5**	**51**
Knee height(cm)	**49.5**	**45.5**	**49**	**50**	**50**	**51.5**	**48**	**43.5**	**51.5**	**50.5**	**53**	**49**	**51.5**
Thigh circumference(cm)	**44**	**52**	**51.5**	**46**	**54**	**50**	**54.5**	**44**	**50**	**49.5**	**55**	**46**	**56.5**
Calf circumference(cm)	**30.5**	**38**	**33**	**30.5**	**35**	**35.5**	**35.2**	**28**	**33.3**	**31**	**35**	**32**	**34.2**
Foot length(cm)	**23.5**	**24**	**23**	**25**	**26**	**24.8**	**23**	**22.7**	**26**	**24.5**	**25**	**25**	**24**
Biceps skin-fold(mm)	**6mm**	**11.2mm**	**18**	**5.2**	**13**	**16**	**11**	**5.1**	**5.1**	**6.2**	**8.5**	**8.3**	**11**
Triceps skin-fold(mm)	**12.5mm**	**9.2mm**	**19**	**6**	**17**	**17**	**15.1**	**11**	**9.2**	**12.2**	**18**	**13.2**	**11.2**
Thigh skin-fold	**16mm**	**16.3mm**	**17.3**	**6.3**	**14**	**16.3**	**19.1**	**4.5**	**15**	**6.1**	**18**	**3.2**	**5**
Calf skin-fold(mm)	**12.2mm**	**18**	**13**	**4.2**	**11.2**	**12**	**5.2**	**12.2**	**11.3**	**12.2**	**7**	**14**	**14**
BMI	**18.3**	**25.3**	**21.2**	**17.4**	**25.6**	**23**	**23.5**	**17.1**	**21.5**	**19.7**	**24.3**	**20.2**	**22.1**

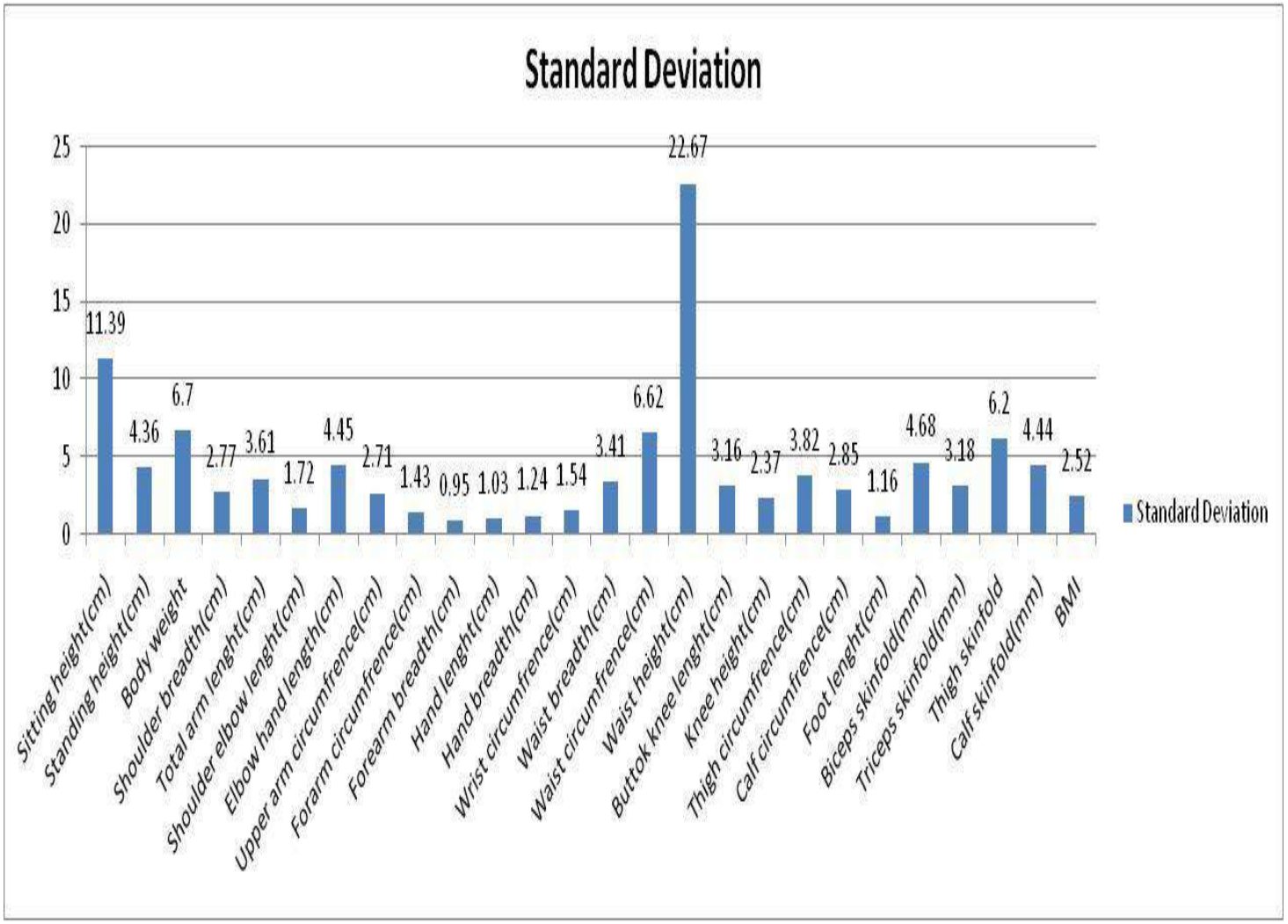
Table 4.2

VARIABLES	SUBJECTS											
	14	15	16	17	18	19	20	21	22	23	24	25
Sitting height(cm)	**85.5**	**85.5**	**87**	**86**	**79.8**	**28.5**	**81**	**86.8**	**80.8**	**85**	**85.5**	**86**
Standing height(cm)	**167**	**159.7**	**161.7**	**159.6**	**156**	**157**	**158**	**163.5**	**152.6**	**159.5**	**155.5**	**161.5**
Body weight	**62.3**	**43.4**	**54.9**	**64.2**	**54**	**49.3**	**58.3**	**53.2**	**54.8**	**59**	**55**	**52.5**
Shoulder breadth(cm)	**47**	**40**	**46.5**	**44**	**44.5**	**44**	**45**	**44**	**45**	**46**	**44**	**44**
Total arm length(cm)	**78**	**72**	**74**	**74**	**68.5**	**74.5**	**73**	**78**	**69.2**	**73.2**	**72.3**	**77**
Shoulder elbow length(cm)	**38**	**35.5**	**36.5**	**35.5**	**35.5**	**36**	**36.5**	**38**	**36**	**36**	**34.5**	**37.5**
Elbow hand length(cm)	**47**	**43**	**46.5**	**25**	**40**	**45.5**	**42**	**45.5**	**43.8**	**45.5**	**44**	**44.5**
Upper arm circumference(cm)	**24**	**19**	**24.2**	**28**	**24.5**	**22.5**	**25.5**	**23.5**	**25.5**	**26**	**28**	**23.5**
Forearm circumference(cm)	**22.5**	**19**	**23.5**	**24**	**21**	**21.5**	**22**	**21**	**23**	**23**	**24**	**21.5**
Forearm breadth(cm)	**11.5**	**10.5**	**11.5**	**12**	**10.5**	**11**	**12**	**11**	**12.5**	**8**	**11.5**	**11**
Hand length(cm)	**19.5**	**18.3**	**19.5**	**19**	**16**	**18**	**17.8**	**20**	**19.1**	**18.7**	**19.4**	**18.5**
Hand breadth(cm)	**10**	**8.8**	**10**	**9**	**8.5**	**9**	**9**	**10.2**	**10**	**8.7**	**10**	**9**
Wrist circumference(cm)	**16**	**14.5**	**16**	**15**	**14**	**15.5**	**14.8**	**15.5**	**15.6**	**15**	**16.5**	**15**
Waist breadth(cm)	**33.5**	**32**	**34**	**35.5**	**33**	**33**	**37**	**36.5**	**35.5**	**32**	**33**	**33.5**

Waist circumference(cm)	**74**	**71**	**68**	**86**	**80**	**73.5**	**82**	**74**	**79.5**	**77**	**71**	**77**
Waist height(cm)	**1.11m**	**1m**	**1.3**	**99**	**99**	**97**	**97**	**1.1m**	**95**	**1m**	**94**	**1.1m**
Buttock knee length(cm)	**54**	**50**	**52**	**55**	**50**	**48**	**53**	**54**	**49**	**53**	**52**	**51**
Knee height(cm)	**54**	**51.5**	**52.5**	**52**	**49**	**50.5**	**49.5**	**51**	**49**	**46.5**	**47.5**	**49.5**
Thigh circumference(cm)	**53**	**44**	**47.5**	**57**	**47**	**48**	**52**	**51.5**	**49.5**	**53**	**52**	**48**
Calf circumference(cm)	**35.5**	**29**	**37**	**36**	**32**	**31**	**38.5**	**32**	**35**	**35.5**	**32.5**	**38**
Foot length(cm)	**25.5**	**25.5**	**25.5**	**25.5**	**21.5**	**24.5**	**24**	**25.8**	**24.8**	**24.5**	**24.2**	**26**
Biceps skin-fold(mm)	**7**	**2**	**6.1**	**11.2**	**10**	**4.2**	**5.2**	**6.2**	**8.4**	**18.3**	**6.4**	**17.2**
Triceps skin-fold(mm)	**14**	**10**	**16**	**17.2**	**13**	**10.3**	**14**	**12**	**15**	**16.2**	**15**	**14**
Thigh skin-fold	**1**	**6**	**1.6**	**17**	**2**	**16**	**4**	**3**	**3.2**	**11**	**10**	**11.2**
Calf skin-fold(mm)	**17**	**7.2**	**13**	**10**	**14**	**14**	**2.2**	**11**	**18**	**6**	**4.2**	**14.2**
BMI	**22.3**	**17.1**	**21**	**25.2**	**22.2**	**20**	**23.4**	**19.9**	**23.8**	**23.2**	**22.7**	**20**



Graph of Mean- 4.1



Graph of Standard Deviation- 4.2

Table- 4.3

Mean and Standard Deviation Scores of Sitting Height Measurement in Girls of Inter University and National level Softball Players.

Mean	**81.79 cm**
S.D.	**11.39**

Table- 1 indicates the mean and standard deviation score of sitting height measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Sitting height measurement in girls of Inter University and national level softball player were recorded as 81.79 cm and 11.39 respectively.

Table- 4.4

Mean and Standard Deviation Scores of Standing Height Measurement in Girls of Inter University and National level Softball Players.

Mean	**158.61 cm**
S.D.	**4.36**

Table- 2 indicates the mean and standard deviation score of standing height measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Standing height measurement in girls of Inter University and national level softball player were recorded as 158.61cm and 4.36 respectively.

Figure- 4.1

Table- 4.5

Mean and Standard Deviation Scores of Body Weight Measurement in Girls of Inter University and National level Softball Players.

Mean	**54.31 kg**
S.D.	**6.7**

Table- 3 indicates the mean and standard deviation score of Body Weight measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Body Weight measurement in girls of Inter University and national level softball player were recorded as 54.31 kg and 6.7 respectively.

Figure- 4.2

Table- 4.6

Mean and Standard Deviation Scores of Shoulder breadth Measurement in Girls of Inter University and National level Softball Players.

Mean	**44.2 cm**
S.D.	**2.77**

Table- 4 indicates the mean and standard deviation score of Shoulder breadth measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Shoulder breadth measurement in girls of Inter University and national level softball player were recorded as 44.2 cm and 2.77 respectively.

Table- 4.7

Mean and Standard Deviation Scores of Total Arm Length Measurement in Girls of Inter-university and National level Softball Players.

Mean	**72.83 cm**
S.D.	**3.61**

Table- 5 indicates the mean and standard deviation score of Total Arm Length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Total arm length measurement in girls of Inter University and national level softball player were recorded as 72.83 cm and 3.61 respectively.

Table- 4.8

Mean and Standard Deviation Scores of Shoulder elbow length Measurement in Girls of Inter University and National level Softball Players.

Mean	**35.32 cm**
S.D.	**1.72**

Table- 6 indicates the mean and standard deviation score of Shoulder elbow length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Shoulder elbow length measurement in girls of Inter University and national level softball player were recorded as 35.32 cm and 1.72 respectively.

Table- 4.9

Mean and Standard Deviation Scores of Elbow hand Length Measurement in Girls of Inter University and National level Softball Players

Mean	**43.56 cm**
S.D.	**4.45**

Table- 7 indicates the mean and standard deviation score of Elbow hand length Length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Elbow hand length measurement in girls of Inter University and national level softball player were recorded as 43.56 cm and 4.45 respectively.

Table- 4.10

Mean and Standard Deviation Scores Upper Arm Circumference in Girls of Inter University and National level Softball Players.

Mean	**24.92 cm**
S.D.	**2.71**

Table- 8 indicates the mean and standard deviation score of Upper arm circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Upper arm circumference measurement in girls of Inter University and national level softball player were recorded as 24.92 cm and 2.71 respectively.

Table- 4.11

Mean and Standard Deviation Scores of Forearm Circumference Measurement in Girls of Inter University and National level Softball Players.

Mean	**22.28 cm**
S.D.	**1.43**

Table- 9 indicates the mean and standard deviation score of Forearm circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Forearm circumference measurement in girls of inter-university and national level softball player were recorded as 22.28 cm and 1.43 respectively.

Table- 4.12

Mean and Standard Deviation Scores of Forearm Breadth Measurement in Girls of Inter University and National level Softball Players.

Mean	**11.2 cm**
S.D.	**0.95**

Table- 10 indicates the mean and standard deviation score of Forearm breadth measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Forearm breadth measurement in girls of Inter University and national level softball player were recorded as 11.2 cm and 0.95 respectively.

Figure- 4.3

Table- 4.13

Mean and Standard Deviation Scores of Hand Length Measurement in Girls of Inter-university and National level Softball Players.

Mean	**18.61 cm**
S.D.	**1.03**

Table- 11 indicates the mean and standard deviation score of Hand length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Hand length measurement in girls of Inter University and national level softball player were recorded as 18.61 cm and 1.03 respectively.

Figure- 4.4

Table- 4.14

Mean and Standard Deviation Scores of Hand Breadth Measurement in Girls of Inter University and National level Softball Players.

Mean	**9.36 cm**
S.D.	**1.24**

Table- 12 indicates the mean and standard deviation score of Hand breadth measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Hand breadth measurement in girls of Inter University and national level softball player were recorded as 9.36 cm and 1.24 respectively.

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Figure- 4.5

Table- 4.15

Mean and Standard Deviation Scores of Wrist Circumference Measurement in Girls of Inter University and National level Softball Players.

Mean	**15.08 cm**
S.D.	**1.54**

Table- 13 indicates the mean and standard deviation score of wrist circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Wrist circumference measurement in girls of inter-university and national level softball player were recorded as 15.08 cm and 1.54 respectively.

Table- 4.16

Mean and Standard Deviation Scores of Waist Breadth Measurement in Girls of Inter University and National level Softball Players.

Mean	**32.66 cm**
S.D.	**3.41**

Table- 14 indicates the mean and standard deviation score of waist breadth measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Waist breadth measurement in girls of Inter University and national level softball player were recorded as 32.66 cm and 3.41 respectively.

Table- 4.17

Mean and Standard Deviation Scores of Waist Circumference Measurement in Girls of Inter University and National level Softball Players.

Mean	**75.04 cm**
S.D.	**6.62**

Table- 15 indicates the mean and standard deviation score of waist circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Waist circumference measurement in girls of Inter University and national level softball player were recorded as 75.04 cm and 6.62 respectively.

Table- 4.18

Mean and Standard Deviation Scores of Waist Height Measurement in Girls of Inter University and National level Softball Players.

Mean	**91.6 cm**
S.D.	**22.67**

Table- 16 indicates the mean and standard deviation score of waist height measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Waist height measurement in girls of Inter University and national level softball player were recorded as 91.6 cm and 22.67 respectively.

Table- 4.19

Mean and Standard Deviation Scores of Buttock Knee Length Measurement in Girls of Inter University and National level Softball Players.

Mean	**15.6 cm**
S.D.	**3.16**

Table- 17 indicates the mean and standard deviation score of Buttock knee length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Buttock knee length measurement in girls of Inter University and national level softball player were recorded as 15.6 cm and 3.16 respectively.

Table- 4.20

Mean and Standard Deviation Scores of Knee Height Measurement in Girls of Inter University and National level Softball Players.

Mean	**49.8 cm**
S.D.	**2.37**

Table- 18 indicates the mean and standard deviation score of knee height measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Knee height measurement in girls of Inter University and national level softball player were recorded as 49.8 cm and 2.37 respectively.

Table- 4.21

Mean and Standard Deviation Scores of Thigh Circumference Measurement in Girls of Inter University and National level Softball Players.

Mean	**50.22 cm**
S.D.	**3.82**

Table- 19 indicates the mean and standard deviation score of thigh circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of thigh circumference measurement in girls of Inter University and national level softball player were recorded as 50.22 cm and 3.82 respectively.

Table- 4.22

Mean and Standard Deviation Scores of Calf Circumference Measurement in Girls of Inter University and National level Softball Players.

Mean	**33.73 cm**
S.D.	**2.85**

Table- 20 indicates the mean and standard deviation score of calf circumference measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of calf circumference measurement in girls of Inter University and national level softball player were recorded as 33.73 cm and 2.85 respectively.

Table- 4.23

Mean and Standard Deviation Scores of Foot Length Measurement in Girls of Inter University and National level Softball Players.

Mean	**24.56 cm**
S.D.	**1.16**

Table- 21 indicates the mean and standard deviation score of Foot length measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Foot length measurement in girls of inter-university and national level softball player were recorded as 24.56 cm and 1.16 respectively.

Figure- 4.6

Table- 4.24

Mean and Standard Deviation Scores of Biceps skinfold Measurement in Girls of Inter-university and National level Softball Players.

Mean	**9.12 mm**
S.D.	**4.68**

Table- 22 indicates the mean and standard deviation score of Biceps skinfold measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Biceps skinfold measurement in girls of Inter University and national level softball player were recorded as 9.12 mm and 4.68 respectively.

Figure- 4.7

Table- 4.25

Mean and Standard Deviation Scores of Triceps skinfold Measurement in Girls of Inter University and National level Softball Players.

Mean	**13.73 mm**
S.D.	**3.18**

Table- 23 indicates the mean and standard deviation score of Triceps skinfold measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Triceps skinfold measurement in girls of inter-university and national level softball player were recorded as 13.73 mm and 3.18 respectively.

Figure- 4.8

Table- 4.26

Mean and Standard Deviation Scores of Thigh skinfold Measurement in Girls of Inter University and National level Softball Players.

Mean	**9.17 mm**
S.D.	**6.2**

Table- 24 indicates the mean and standard deviation score of Thigh skinfold measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Thigh skinfold measurement in girls of Inter University and national level softball player were recorded as 9.17 mm and 6.2 respectively.

Table- 4.27

Mean and Standard Deviation Scores of Calf Skinfold Measurement in Girls of Inter University and National level Softball Players.

Mean	**11.05 mm**
S.D.	**4.44**

Table- 25 indicates the mean and standard deviation score of Calf skinfold measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of Calf skinfold measurement in girls of Inter University and national level softball player were recorded as 11.05 mm and 4.44 respectively.

Figure- 4.9

Table- 4.28

Mean and Standard Deviation Scores of BMI Measurement in Girls of Inter University and National level Softball Players.

Mean	**21.6**
S.D.	**2.52**

Table- 26 indicates the mean and standard deviation score of BMI measurement in girls of Softball Inter University and National level players. The mean and standard deviation score of BMI measurement in girls of inter-university and national level softball player were recorded as 21.6 and 2.52 respectively.

Figure- 4.10

Discussion of findings

The present study was conducted on twenty five softball National and All India Inter University girls of Lovely Professional University. These girls was winners of Softball All India Inter University competition 2014 and 2nd Runner-up of Softball All India Inter University completion in 2015. In this study investigator made an effort to find out talent identification variables based on Anthropometric characteristics in softball girls of Lovely Professional University Profiling was done on that basis total 26 variable were selected for this study and make profile were was we found Mean and Standard deviation of sitting height is 81.79cm and 11.39, standing height is 158.61cm and 4.36, body weight is 54.31cm and 6.7, shoulder breadth is 44.2cm and 2.77, total arm length is 72.83cm and 3.61, shoulder elbow length is 35.32cm and 1.72, elbow hand length 43.56cm and 4.45, upper arm circumference is 24.92cm and 2.71, forearm circumference is 22.28cm and 1.43, forearm breadth is 11.2cm and 0.95, hand length is 18.61cm and 1.03, hand breadth is 9.36cm and 1.24, wrist circumference is 15.08cm and 1.54, waist breadth is 32.66cm and 3.41, waist circumference is 75.04cm and 6.62, waist height is 91.6cm and 22.67, buttock knee length is 15.6cm and 3.15, knee height is 49.8cm and 2.37, thigh circumference is 50.22cm and 3.82, calf circumference is 33.73cm and 2.85, foot length 24.56cm and 1.16, biceps skin fold is 9.12mm and 4.68, triceps skin fold is 13.73mm and 3.18, thigh skin fold is 9.17mm and 6.2, calf skin fold is 11.05mm and 4.44, and BMI is 21.6 and 2.52. The important variables in this game involve catching, hitting, throwing, running, sliding, it also required good strength, agility and speed. Thus the possession of desirable anthropometric parameter will have great advantage in executing a better performance in competition and helpful aspect for talent identification in softball game.

Despite being based on a small sample size, the current study's findings suggest that international counterparts consist of various parameters like anthropometric, motor and physiological for talent identification, training and sporting of positional allocation of players, where as Indian players have no specific norms or criteria in getting talented player roles in the game of softball. Reason behind this may be the lack of enough literature and understanding on regards to talent identifications, but still there is a scope for the study that can be carried in future to understand clearly the reasons for such a cause pertinent in Indian managers, coaches and players. There are many things that influence toward a bright career in professional as well in an Indian softball. Today, anthropometry has numerous reasonable

uses, a large portion of them kind hearted, Like it is utilized to assess dietary status, to screen the development of kids, and to help in creating office furniture

CHAPTER-V

SUMMARY, CONCLUSIONS AND RECOMMENDATION

Summary

This dissertation has investigated the Analysis of softball performance in relation to anthropometric profile. Twenty six variables were selected for the study and make profile were was we found Mean and Standard deviation of sitting height is 81.79cm and 11.39, standing height is 158.61cm and 4.36, body weight is 54.31cm and 6.7, shoulder breadth is 44.2cm and 2.77, total arm length is 72.83cm and 3.61, shoulder elbow length is 35.32cm and 1.72, elbow hand length 43.56cm and 4.45, upper arm circumference is 24.92cm and 2.71, forearm circumference is 22.28cm and 1.43, forearm breadth is 11.2cm and 0.95, hand length is 18.61cm and 1.03, hand breadth is 9.36cm and 1.24, wrist circumference is 15.08cm and 1.54, waist breadth is 32.66cm and 3.41, waist circumference is 75.04cm and 6.62, waist height is 91.6cm and 22.67, buttock knee length is 15.6cm and 3.15, knee height is 49.8cm and 2.37, thigh circumference is 50.22cm and 3.82, calf circumference is 33.73cm and 2.85, foot length 24.56cm and 1.16, biceps skin fold is 9.12mm and 4.68, triceps skin fold is 13.73mm and 3.18, thigh skin fold is 9.17mm and 6.2, calf skin fold is 11.05mm and 4.44, and BMI is 21.6 and 2.52. Weight taken by weighing machine, skin-fold thickness to compute percentage body fat taken by skin-fold callipers, BMI taken by body composition analyser. Forearm breadth, hand length, hand breadth measurement taken sliding calliper and other measurement taken by steel tape. The study assessed 25 softball girls player from Lovely Professional University. The important variables in this game involve catching, hitting, throwing, running, sliding, it also required good strength, agility and speed. Thus the possession of desirable anthropometric parameter will have great advantage in executing a better performance in competition and helpful aspect for talent identification in softball game.

Conclusion

In conclusion we found that anthropometric profile given an idea of selecting or preparing softball player and introduce talent identification in freshers. In this study we analyze softball performance of National and Inter University girls' player with anthropometric profile and we found that with these anthropometric characteristics this softball girl' players represent National and All India Inter University tournament and gave his best performance in these tournament and won many medals in National level

tournament. Behalf of this study we can say that anthropometric characteristics play significant role in softball performance.

The study Analysis of softball performance in relation to anthropometric profile plays significant role in success of All India Interuniversity and National softball team. Anthropometric knowledge helps coaches to analyse and understand the gross functioning of human body by measuring its shape, size, compositions and proportions and then selecting these to health, exercise and performance. After the application of anthropometric parameters to health and sports, it will increase its use in future, like a guide to the coaches and physical educationist to judge the anthropometric variables for the up liftment of standard of sports in India.

Recommendations

Based on the conclusion drown in the present study, following recommendation have been made.

1. The study can be conducted on male players.
2. The scope of the present study could be expended to other, physical, physiological and psychological parameters.
3. The same study could be conducted on different age groups.
4. The same study can be conducted international level sports man.
5. A Similar study could be conducted to assess the differences in the selected parameter in relation to the playing position.

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Appendix

Anthropometric Measurement of Softball Player

Table 1

VARIABLES	SUBJECTS												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Sitting height(cm)	**84.3**	**83**	**82.3**	**84**	**85.5**	**80**	**83.5**	**78.7**	**85.5**	**85**	**85.5**	**81.5**	**88.5**
Standing height(cm)	**162**	**152**	**155.5**	**161.6**	**162**	**158.7**	**152.5**	**147.7**	**162.1**	**162.6**	**159.5**	**156**	**161.4**
Body weight	**48.1**	**58.5**	**51.3**	**45.3**	**67.3**	**57.7**	**54.7**	**37.1**	**56.3**	**51.9**	**61.8**	**49.1**	**57.7**
Shoulder breadth(cm)	**42**	**43**	**47**	**44**	**50**	**40**	**47**	**37**	**48**	**43**	**45**	**42**	**43**
Total arm length(cm)	**72**	**70**	**67.5**	**75**	**71**	**73**	**67.4**	**64.2**	**78**	**77**	**75.5**	**72**	**74.3**
Shoulder elbow length(cm)	**33**	**33.5**	**33**	**36.5**	**35**	**33**	**35.5**	**30.5**	**35**	**36**	**36**	**34.5**	**36**
Elbow hand length(cm)	**43**	**41**	**42**	**44.5**	**45.5**	**44.5**	**41.5**	**41.7**	**49**	**47**	**47.5**	**45**	**44.5**
Upper arm circumference(cm)	**23**	**27**	**24.5**	**21**	**31**	**26**	**28**	**20.5**	**25**	**24.7**	**28**	**23**	**27**
Forearm circumference(cm)	**21**	**23**	**22**	**21**	**25**	**23**	**24**	**20**	**22**	**21.5**	**24**	**21.5**	**23**
Forearm breadth(cm)	**10.5**	**12**	**11.5**	**10.5**	**12**	**12.5**	**12**	**10**	**11**	**11**	**12**	**11**	**11**
Hand length(cm)	**19.3**	**18**	**17**	**19.1**	**19**	**19**	**17.4**	**17.2**	**20.3**	**19**	**19.8**	**18.5**	**17.7**
Hand breadth(cm)	**8.9**	**9.5**	**8.5**	**9.2**	**8.7**	**8.7**	**9.4**	**14.5**	**10**	**8.2**	**9**	**8**	**9**

Wrist circumference(cm)	**15**	**15.5**	**15**	**15**	**15.5**	**16.5**	**15**	**8.3**	**16.2**	**15.3**	**16**	**15**	**15.2**
Waist breadth(cm)	**27.5**	**30.5**	**32**	**27.5**	**39**	**36**	**28**	**24**	**31**	**31**	**34.5**	**31.5**	**35.5**
Waist circumference(cm)	**66.8**	**81**	**72**	**63**	**79**	**83**	**73**	**58.5**	**73.2**	**77**	**85.5**	**73**	**78**
Waist height(cm)	**98.5**	**96**	**99.5**	**98.5**	**99**	**97**	**94**	**90**	**1.3m**	**1.1m**	**99**	**98**	**97**
Buttock knee length(cm)	**45**	**50**	**49**	**52**	**59**	**48**	**51**	**47**	**57.5**	**52**	**54**	**53.5**	**51**
Knee height(cm)	**49.5**	**45.5**	**49**	**50**	**50**	**51.5**	**48**	**43.5**	**51.5**	**50.5**	**53**	**49**	**51.5**
Thigh circumference(cm)	**44**	**52**	**51.5**	**46**	**54**	**50**	**54.5**	**44**	**50**	**49.5**	**55**	**46**	**56.5**
Calf circumference(cm)	**30.5**	**38**	**33**	**30.5**	**35**	**35.5**	**35.2**	**28**	**33.3**	**31**	**35**	**32**	**34.2**
Foot length(cm)	**23.5**	**24**	**23**	**25**	**26**	**24.8**	**23**	**22.7**	**26**	**24.5**	**25**	**25**	**24**
Biceps skin-fold(mm)	**6mm**	**11.2mm**	**18**	**5.2**	**13**	**16**	**11**	**5.1**	**5.1**	**6.2**	**8.5**	**8.3**	**11**
Triceps skin-fold(mm)	**12.5mm**	**9.2mm**	**19**	**6**	**17**	**17**	**15.1**	**11**	**9.2**	**12.2**	**18**	**13.2**	**11.2**
Thigh skin-fold	**16mm**	**16.3mm**	**17.3**	**6.3**	**14**	**16.3**	**19.1**	**4.5**	**15**	**6.1**	**18**	**3.2**	**5**
Calf skin-fold(mm)	**12.2mm**	**18**	**13**	**4.2**	**11.2**	**12**	**5.2**	**12.2**	**11.3**	**12.2**	**7**	**14**	**14**
BMI	**18.3**	**25.3**	**21.2**	**17.4**	**25.6**	**23**	**23.5**	**17.1**	**21.5**	**19.7**	**24.3**	**20.2**	**22.1**

Table 2

VARIABLES	SUBJECTS											
	14	15	16	17	18	19	20	21	22	23	24	25
Sitting height(cm)	**85.5**	**85.5**	**87**	**86**	**79.8**	**28.5**	**81**	**86.8**	**80.8**	**85**	**85.5**	**86**
Standing height(cm)	**167**	**159.7**	**161.7**	**159.6**	**156**	**157**	**158**	**163.5**	**152.6**	**159.5**	**155.5**	**161.5**
Body weight	**62.3**	**43.4**	**54.9**	**64.2**	**54**	**49.3**	**58.3**	**53.2**	**54.8**	**59**	**55**	**52.5**
Shoulder breadth(cm)	**47**	**40**	**46.5**	**44**	**44.5**	**44**	**45**	**44**	**45**	**46**	**44**	**44**
Total arm length(cm)	**78**	**72**	**74**	**74**	**68.5**	**74.5**	**73**	**78**	**69.2**	**73.2**	**72.3**	**77**
Shoulder elbow length(cm)	**38**	**35.5**	**36.5**	**35.5**	**35.5**	**36**	**36.5**	**38**	**36**	**36**	**34.5**	**37.5**
Elbow hand length(cm)	**47**	**43**	**46.5**	**25**	**40**	**45.5**	**42**	**45.5**	**43.8**	**45.5**	**44**	**44.5**
Upper arm circumference(cm)	**24**	**19**	**24.2**	**28**	**24.5**	**22.5**	**25.5**	**23.5**	**25.5**	**26**	**28**	**23.5**
Forearm circumference(cm)	**22.5**	**19**	**23.5**	**24**	**21**	**21.5**	**22**	**21**	**23**	**23**	**24**	**21.5**
Forearm breadth(cm)	**11.5**	**10.5**	**11.5**	**12**	**10.5**	**11**	**12**	**11**	**12.5**	**8**	**11.5**	**11**
Hand length(cm)	**19.5**	**18.3**	**19.5**	**19**	**16**	**18**	**17.8**	**20**	**19.1**	**18.7**	**19.4**	**18.5**
Hand breadth(cm)	**10**	**8.8**	**10**	**9**	**8.5**	**9**	**9**	**10.2**	**10**	**8.7**	**10**	**9**
Wrist circumference(cm)	**16**	**14.5**	**16**	**15**	**14**	**15.5**	**14.8**	**15.5**	**15.6**	**15**	**16.5**	**15**
Waist breadth(cm)	**33.5**	**32**	**34**	**35.5**	**33**	**33**	**37**	**36.5**	**35.5**	**32**	**33**	**33.5**

Waist circumference(cm)	**74**	**71**	**68**	**86**	**80**	**73.5**	**82**	**74**	**79.5**	**77**	**71**	**77**
Waist height(cm)	**1.11m**	**1m**	**1.3**	**99**	**99**	**97**	**97**	**1.1m**	**95**	**1m**	**94**	**1.1m**
Buttock knee length(cm)	**54**	**50**	**52**	**55**	**50**	**48**	**53**	**54**	**49**	**53**	**52**	**51**
Knee height(cm)	**54**	**51.5**	**52.5**	**52**	**49**	**50.5**	**49.5**	**51**	**49**	**46.5**	**47.5**	**49.5**
Thigh circumference(cm)	**53**	**44**	**47.5**	**57**	**47**	**48**	**52**	**51.5**	**49.5**	**53**	**52**	**48**
Calf circumference(cm)	**35.5**	**29**	**37**	**36**	**32**	**31**	**38.5**	**32**	**35**	**35.5**	**32.5**	**38**
Foot length(cm)	**25.5**	**25.5**	**25.5**	**25.5**	**21.5**	**24.5**	**24**	**25.8**	**24.8**	**24.5**	**24.2**	**26**
Biceps skin-fold(mm)	**7**	**2**	**6.1**	**11.2**	**10**	**4.2**	**5.2**	**6.2**	**8.4**	**18.3**	**6.4**	**17.2**
Triceps skin-fold(mm)	**14**	**10**	**16**	**17.2**	**13**	**10.3**	**14**	**12**	**15**	**16.2**	**15**	**14**
Thigh skin-fold	**1**	**6**	**1.6**	**17**	**2**	**16**	**4**	**3**	**3.2**	**11**	**10**	**11.2**
Calf skin-fold(mm)	**17**	**7.2**	**13**	**10**	**14**	**14**	**2.2**	**11**	**18**	**6**	**4.2**	**14.2**
BMI	**22.3**	**17.1**	**21**	**25.2**	**22.2**	**20**	**23.4**	**19.9**	**23.8**	**23.2**	**22.7**	**20**