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Degree of Master in Sports Science

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DECLARATION

,

I, hereby, declare that to the best of my knowledge this thesis is my original and no part of it was earlier submitted for the candidature of research degree to any university, college, or educational institutions. Whatever subject matter, I have presented in this thesis report belongs to my work and has not been copied from the past thesis.

Date: June 2021

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CHANDAN KOJU

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This is to certify that..... conducted this thesis entitled “**topic**” under my guidance and supervision. This thesis report is the result of his work and he has not copied any aspect from another past thesis. Therefore, I recommend this thesis for final evaluation.

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ABSTRACT

This comparative study was conducted to determine the anthropometric measurements and body composition, body mass index, and somatotype of Selected A division football Player of Nepal. It said that, scientific studies of Footballer have tended to focus on tactics and techniques, thereby neglecting the physical and physiological profile of the players. Therefore, the purpose of this study was to examine physical and anthropometric characteristics of total of 71 footballers from three teams were studied. The teams were Tribhuvan Army Football Club (TAC), Nepal Police Football Club (NPC) and Armed Police Force Football Club (APF). All the anthropometric variables (i.e. body height, body mass, body mass index and body adiposity) were measured following the standard procedures of the International Society for the Advancement of Kinanthropometry (ISAK) as outlined by Marfell-Jones et al (2006). A stadiometer and a calibrated scale were used to measure body height and mass of each player to the nearest 0.1 cm and 0.1 kg, respectively. The body mass index (BMI) was calculated from body height and mass (kg/m^2). The percentage of body fat (%BF) was calculated from the sum of seven skinfolds (biceps, triceps, suprailiac, abdominal, subscapular, front thigh and medial calf) using a Harpenden skinfold calliper (Ross and Marfell- Jones, 1991).

Each athlete was tested for various anthropometric measurements necessary for the exact decimal ratings of endomorphy mesomorphy and ectomorphy equations developed by Carter (1980).

The study depicts that the average age of the players is 26.5 (± 4.2) years, height is 169.2 (± 6.1) cm, and body mass is 65.2 (± 6.59) kg. Average of 10.89 (± 3.9) percent of body fat is contained with players and BMI is recorded 22.74 (± 1.8) kg/m^2 . In the way Mesomorphy is recorded highest 4.52 (± 1), ectomorphy is 2.3 (± 0.97) and endomorphy is 2. (± 0.57).

The tallest players are from TAC with average height of 171.42 (± 4.1) cm. The shortest players as recorded are from APF who measures 166.29 cm (± 5.7) in average. The players from TAC are heaviest as their average mass is 67.36 Kg (± 5.9) in compared to NPC's (65.24 ± 7 Kg) and APF's (63 ± 5.89 Kg). The youngest players among the three teams are of NPC with average age of 25.57 years (± 4) followed by APF with average age of 26 years (± 3.59). There seems no significance difference in the BMI of the players of the teams. The highest value of endomorphy recorded is of NPC (2.46 ± 0.7) followed by TAC (2.16 ± 0.35) in compare to APF (2.25 ± 0.52). The players of APF are the most muscular players as their average Mesomorphy is 5 (± 0.75) where as that of NPC is 4.47 (± 1.12). The value of Ectomorphy of TAC and NPC are the highest (2.34).

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ABBREVIATIONS

CHAPTER I

INTRODUCTION

1.1 General Background

Kinanthropometry comprises of three Greek words kinein (to move), anthropos (man) and metrein (to measure) referring to the dynamic relationship and quantitative interface between human structure and function. It is defined as the study of human size, shape, proportion, composition, maturation, gross function and cardiorespiratory function, which enables to understand growth, exercise, performance, and nutrition. The early 1970s witnessed emergence of a new scientific discipline called Kinanthropometry. (Ross et al 1980). (Citation rakhekomilena)
Citation rakhda references ma insert citation ma gayerarakhnaparne)

Ever since that time kinanthropometry has grown to be an all-encompassing scientific interest; with the application in research related to auxology, physical anthropology, human biology, physical education, sports science and medical science. Kinanthropometry is a medium for individuals to contribute to basic research and applications and is closely associated to physical education, sports science and medicine, human biology, science of growth. It is a scientific specialisation dealing with body measurements in a variety of morphological perspectives, its application to movement and those factors which influence movement, including: components of body build, composition, proportions, shape and maturation; cardio - respiratory capacities and motor abilities; physical activities including recreational activity as well as highly specialised sports performance.

Along with Kinanthropometry, Somatotyping is one of the most useful methods of evaluating human physique. It is a physique classification system of quantified expression description and describes the physical characteristics of the body and allows a definition of body type through the analysis of its components. Somatotype is the description of body type based on three components of endomorphy, mesomorphy and ectomorphy. Endomorphy is the relative fatness; mesomorphy is the relative musculo-skeletal robustness, while ectomorphy is the relative linearity or slenderness of a physique. (The Heath-Carter method.)

The commonly used measures for anthropometric profile for athletes giving high performance are stature, sitting height to stature ratio, upper limb length to stature ratio, brachial index (ratio of length of the forearm to length of upper arm) and level of body fatness assessed using the sum of skinfold, waist hip ratio, waist height ratio and body mass.

It has been observed that the performance of sportsmen in football is dependent on various characteristics of physiology, morphology and body composition. For the requirement of high-level performance in Football, the development of high degree of conditional, technical and co-ordinative abilities are utmost importance. The anthropometrical characteristics are also known to be of rather paramount importance in footballers. In this regard, the use the word Kinanthropometry has been gaining more popularity in the recent years.

Football is probably the world's most popular sport, in Nepal too, played in practically every nation at varying levels of competence and the FIFA World Cup usually attracting millions of spectators. Football may be played competitively or for fun, as a career, a means of keeping fit or for recreational too. (Clark,2007; Reilly et al.,2000)

To be successful, Football players need the finest combination of tactical, technical, mental and physical characteristics(Bangsbo,1994). Consequently, it is important to understand the determinants of success in Football, such as the physical performance and anthropometric characteristics required of players in specific positions.

Football players are categorised into four groups: goalkeepers, defenders, midfielders and forwards. Therefore, players in the various positions have different position-specific anthropometric characteristics required for success (Bangsbo et al.,1991). It is found that midfielders were lightest and shortest and had the least percentage of body fat compared to those in the other playing positions (goalkeepers, defenders and forwards) (Adiniran et al 2009).

Nepal is striving for achieving better and excellence in performance in Football. At the same time, it has been observed the performance of Nepalese footballer is not just unsatisfactory but very poor at the international level. However, the efforts were made to improve the performance standard, but very little success has so far been achieved in this regard. Low economic standard of people, lack of scientific consciousness in the society, inadequate socio-political awareness of

its importance and little developed infrastructure facilities seems to be the main drawbacks for its development.

Kinanthropometry utilizes external anthropometry and it is assumed that these measurements reflect information about the structure and composition of internal tissue. Measurement made on body describes the present status or phenotype, but it is important to recognize the genetic endowment as well as the result of adaptation and environmental effects (Carter,1984).

It is well established now that the examination of one's body weight does not provide complete information of the fitness. The main reason for this is the lesser requirement of extra fat in the body in most of events in athletics, which help in providing relatively a greater mass of muscle and bone. It has been noticed that the athletes who were very lean but heavy because of well-developed musculature were superior in performance in certain competitive sports such as football, weightlifters and shot put (cf. Sodhi, 1986).

The results of this study could therefore provide Football coaches and trainers with valuable information on how to efficiently and effectively plan and implement strategies for A-Division players. Such information may also be useful in understanding the physical fitness profiles of Football players in different positions so that coaches and sports scientists can direct position-specific conditioning programmes appropriately to maximise successful performance.

Importance of Kinanthropometric Analysis are: .

- Development of improved performance.
- Helps in understanding body Composition.
- Create confidence in Player.
- Prevents sports injuries.
- Helps in research work.
- Improves in training techniques.
- Increases the popularity.
- Development of specific training.
- Improves performance in Football

This Kinanthropometry study may be the first scientific exploration in the footballer as well as in all the sports in Nepalese sports history. This study will help to know the kinanthropometric status of Nepalese football players. It is the opinion of the investigator that the outcome of this study will serve as a guideline for the coaches and trainer in future.

1.2 Statement of the Problem (what is your statement of problem)

The scientific studies of Footballer have tended to focus on tactics and techniques, thereby neglecting the physical and physiological profile of the players. Therefore, the purpose of this study was to examine physical and anthropometric characteristics of total of 71 footballers from three teams were studied. This study has been helpful to know the kinanthropometric status of Nepalese football players.

1.3 Objectives of the study

The general objective of this study is to explore the Anthropometric Analysis of A-Division Player of Nepal. Whereas the specific objectives are as follows:

- To identify the current status & classification of players.
- classification of sports person and know the current status
- selection of sports person and Motivation
- to study the development of sportspersons
- to predict performance potentials to compare and evaluate training method
- to diagnosis of postural defects and for clinical purpose

1.4 Significance of the study

The Significance of the study are as follows:(write something Paragraph)

Sports science is based on practical and real experiences of many activities and events. Sports science activities are good for the health and development of the body too. It means school

children that are involving in many types of sports activities and games will be physically fit and healthy. Therefore, we can say that every person must emphasize teaching sports activities.

- I. The study would be useful for further research in the related field.
- II. It would help policymakers, Programmer conductor, coaches, & players.
- III. It would help to motivate the concerning sports agency in a particular area.
 1. This study may help in assessing the status of Nepalese Football player size, shape, proportion, body composition, somatic status.
 2. The study may be the probably first of its kind in Nepal.
 3. The study may point out the degree of lack of pre-requisite of physical structure of Nepalese Footballer, and help all those interested in Nepalese sports, to upgrade the standard of their Players.
 4. The study will help to compare Nepalese players with International Players.
 5. The Study will introduce the concept of kinanthropometry in Nepal, creating awareness about even for others sports in the country.
 6. This study will serve as a guideline for the coaches and trainer in future.

1.5 Delimitation of the Study (write something Paragraph)

- The study was delimited National football players only.
 1. The study has been confined to male footballer only.
 2. The study has been conducted on the Selected "A Division" Football Players of Nepal.
 3. The data for this study were collected from A Division Football Clubs (TAC, NPC and APF) of Nepal.
 4. The study was limited to various specific skin folds, bone, height, weight and few other anthropometrical measurements.

1.6 Organization of the study (Ifnes)

The research report has been organized in systematic and managed form. The all chapters of the research are presented in order accordingly.

The chapter one described the introduction with general background of the Kinanthropometry, statements of the problems related to topic, objectives behind the study and rational and significance of the study and this chapter also described the limitations of mentioned topic's study.

The chapter two of this study has deal and discourse with the review of literature of the topic in b theoretical aspects, variables, conceptual framework of the study and research questions.

All the anthropometric variables (i.e. body height, body mass, body mass index and body adiposity) were measured following the standard procedures of the International Society for the Advancement of Kinanthropometry (ISAK) as outlined by Marfell-Jones et al. (2006). A stadiometer and a calibrated scale were used to measure body height and mass of each player to the nearest 0.1 cm and 0.1 kg, respectively. The body mass index (BMI) was calculated from body height and mass (kg/m^2). The percentage of body fat (%BF) was calculated from the sum of seven skinfolds (biceps, triceps, suprailiac, abdominal, subscapular, front thigh and medial calf) using a Harpenden skinfold calliper (Ross and Marfell- Jones, 1991). All the anthropometric measurements were performed by a researcher and other three personnel and it took 15 days to datas for four persons .

HYPOTHESIS

"The Fat percentage is more in the goalkeepers."

statistical analysis

All the anthropometric variables (i.e. body height, body mass, body mass index and Somatotype) were analysed descriptively (i.e. mean and standard deviation) and quantitatively. All Data were analysed using the Microsoft Office Excel 2007.

CHAPTER – II

REVIEW OF THE LITERATURE

2.1 Review of Literature

A literature review is an evaluative report of information found in the literature related to the selected area of study. It should give a theoretical base for the research and help to determine the nature of the research.

Literature review helps to gather knowledge from different sources. Different topic related articles, reports, and other research paper is needed to explore the topic and to study more about the topic. Literature review is an account of what has been published by scholars and researchers on a specified topic. It helps to indentify the gaps in literature as well as it avoids time wastage and mistakes as others. Soccer is the most popular sport in the world, with the FIFA World Cup usually attracting millions of spectators (Clark, 2007; Reilly et al, 2000). Despite its global acclaim, studies have often focused on tactics and techniques at the expense of physical factors (Helgerud et al, 2001). Williams and Frankas (1998) are of the view that psychological, perceptual, technical, anthropometric and physiological factors must all be highly developed to reach an elite performance level. Therefore, in order to be successful, soccer players need the finest combination of tactical, technical, mental and physical characteristics (Bangsbo, 1994). Consequently, it is important to understand the determinants of success in soccer, such as the physical performance and anthropometric characteristics required of players in specific positions.

Football players are categorised into four groups: goalkeepers, defenders, midfielders and forwards. Therefore, players in the various positions have different position-specific physical performance and anthropometric characteristics required for success. For example, the midfielders run the longest distances compared to forwards or defenders (Bangsbo et al.,1991) In their study of Nigerian university soccer players, Adeniran et al. (2009) found that midfielders were lightest and shortest and had the least percentage of body fat compared to those in the other playing positions (i.e. goalkeepers, defenders and forwards). The forwards were significantly lighter than defenders and goalkeepers. The goalkeepers were the tallest, heaviest and had the highest fat content (Adeniran et al. (2009).

Although soccer is the most popular sport in South Africa) (Kubayi et al., 2015) very few studies, if any, have assessed the physical performance and anthropometric characteristics of university soccer players in the country. Whilst many previous studies (e.g.:Casajus,2001; Clark, 2010; Kashani et al.,2013; Reilli et al.,2010) have focussed on national soccer teams and those in professional leagues, there is limited information on university soccer players who also have the potential for selection into national teams for future development. In fact, according to Gil et al (2010), most of the studies on soccer have been based on elite players, and there is very little research concerning amateur soccer players who have great prospects for professional development. Therefore, this study attempts to fill the gap in the literature by examining the physical fitness levels among university soccer players according to their playing positions.

The results of this study could therefore provide soccer coaches and trainers with valuable information on how to efficiently and effectively plan and implement strategies for university soccer players. Such information may also be useful in understanding the physical fitness profiles of soccer players in different positions so that coaches and sports scientists can direct position-specific conditioning programmes appropriately to maximise successful performance.

Likewise, literature review helps to carry on where others have already reached. It helps researcher to identify opposing views and enable the researcher to learn from previous theory on the subject. In order to justify my research topic, I will study various books, search on different sources and other related documents. It would be so hard to find out complete report related to this topic but by analyzing some related topic I will gather some information. I will check on internet on several sites to find out.....

The literature concerning the research work dealing with kinanthropometric aspects of footballer, discussed under the following sub-headings;

1. BMI
2. Somatotype
3. Body Composition

BMI

BMI stands for Body Mass Index

This is a numerical value of weight in relation to the height. A BMI between 18.5 and 25 kg/m² indicates a normal weight. A BMI of less than 18.5 kg/m² is considered underweight. A BMI between 25 kg/m² and 29.9 kg/m² is considered overweight.

Body Mass Index is a simple calculation using a person's height and weight. The formula is BMI = kg/m² where kg is a person's weight in kilograms and m² is their height in metres squared. A BMI of 25.0 or more is overweight, while the healthy range is 18.5 to 24.9.

Somatotype

Sportsmen engaged in different kind of sports and games differ in many ways in their external body form. The variation in physical out look or built of sportsmen is an interesting aspect, which has attracted the scientist to analyze and classify them.

Human beings differ in many ways in their external body form. The variations and the process of modification in physical out look of humans and the athletes engaged in different sports is an interesting aspect which has tempted the scientists to analyses and classify them. Athletic populations are characterized by tremendous variability in their morphological and genetically make- up.

A somatotype is a description of present morphological confirmation. It is expressed in ratings, consisting of three sequential numbers, always recorded in the same order. Each number represents evaluation of one of the three primary components of physique, which describe individual variation in human morphology and composition. Endomorphy, or the first component, refers to relative fatness and leanness of the physique; mesomorphy, or the second component, refers to musculo-skeletal development relative to height; and ectomorphy, or the third component, refers to the relative linearity of individual physique (Carter, 1980).

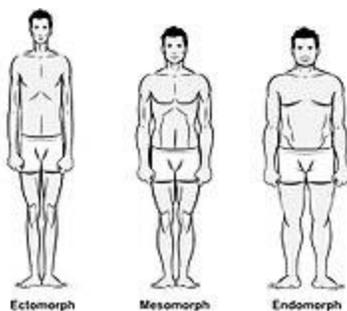
Somatotype is a physique classification based on the concept of shape, disregarding size. It is an appealing technique because it is a classification of the total body shape that can be expressed as a single rating. There are several systems of somatotyping, most of which are based

on the three component ratings of Sheldon and others, 1940. The rating represents the evaluation of following three components of the physique (Craig, N.P. 1991)

- **Endomorphy:** refers to the relative fatness of the body.
- **Mesomorphy:** refers to the relative muscular development per unit height of the body.
- **Ectomorphy:** refers to the relative linearity of the body

Sheldon categorized all possible body types according to a scale ranging from 1 to 7 for each of the three 'somatotypes', where the pure 'endomorph' is 7-1-1, the pure 'mesomorph' 1-7-1 and the pure 'ectomorph' scores 1-1-7. From type number, an individual's mental characteristics could supposedly be predicted.

Sheldon's "somatotypes" and their associated physical and psychological traits were characterized as follows:



Comparison of body types

- **Ectomorphic:** characterized as skinny, thin, slender, slim, lithe, lanky, neotenous, flat-chested, lightly muscled, weak, fragile, delicate, and usually tall; described as intelligent, contemplative, melancholic, industrious, effeminate, submissive, inferior, perfectionist, quirky, idiosyncratic, sensitive to pain, soft, gentle, loving, helpful, placatory, calm, peaceful, vulnerable, humble, self-deprecatory, socially awkward, solitary, secretive, concealing, self-conscious, introverted, shy, reserved, defensive, uncomfortable, tense, and anxious.

- **Mesomorphic:** characterized as hard, rugged, triangular, muscular, thick-skinned, and with good posture; described as athletic, eager, adventurous, willing to take risks, competitive, extroverted, aggressive, masculine, macho, authoritative, strong, assertive, direct, forthright, blustering, dominant, tough, strict, fortunate, vigorous, energetic, determined, courageous, and ambitious.
- **Endomorphic:** characterized as fat, round, heavy, usually short, and having difficulty losing weight; described as open, outgoing, sociable, amiable, friendly, affectionate, accepting, happy, pleased, satisfied, laid-back, easily complacent, lazy, ungenerous, selfish, greedy, well-endowed, and slow to react.

(In his 1954 book, *Atlas of Men*.)

Body Composition

Body composition refers to the overall weight and size of an athlete and the proportion of that weight made up of muscle, fat or bone. It includes fat, protein, minerals and body water. It also describes weight more accurately than BMI. Body composition analysis can accurately show changes in fat mass, muscle mass, and body fat percentage. Excess fat in relation to lean body mass, known as altered body composition, can greatly increase your risks to cardiovascular disease, diabetes, and more.

The Physical composition of the body is also relevant in the preparation of players for competitive performance. It is an important component of fitness because excess adipose tissue acts as dead weight in common game activities such as running and jumping where body mass must be lifted repeatedly against gravity. It is also recognized that body fat level affect energy expenditure, players' power-to-weight ratio, and acceleration capacity. (Carling Christopher, Orhant Emmanuel, 2010)

The following Measurements will be taken on the non-preferred side of the body, according to literature techniques (Durnin and Womersley, 1974). Harpenden skinfold calipers will be used to take skinfold measurements: Skinfold triceps, biceps, mid-axillary, Body Mass: Circumferences: mid-upper arm, forearm, chest, midabdomen Thicknesses: subscapular, supra-iliac, abdomen and anterior thigh.

Calculations are made of body mass index (weight divided by height squared) and of mid-arm muscle circumference (mid-upper arm circumference - 7T x triceps skinfold). Calculation of 'Body Composition An estimate of body density will be obtained using empirically derived equations from literature studies. The Two prediction equations chosen in the first study will be used.

The first (Durnin and Womersley, 1974) was derived from a study of a general male population, while the second (Wickkiser and Kelly, 1975) was derived from a study of American football players.

Durnin and Body density (B.D.) = $1.1631 - 0.0632 \log$ Womersley: (triceps skinfold + biceps skinfold + supra-iliac skinfold + subscapular skinfold).

The equation of Siri (1956) was used to convert body density to percentage body fat:

Percentage fat = $(B - 4.50) \times 100$ Body density

CHAPTER-III

MATERIAL AND METHODS

The study has been conducted on selected male football players of Nepal. Data for this study has been collected from "A Division Team", That are Tribhuvan Army Football Club(TAC), Nepal Police Football Club (NPC) and Armed Police Force Football Club(APF). Altogether 71 footballers have been examined from three "A Division Club of Nepal.

All the anthropometric variables (i.e. body height, body mass, body mass index and body adiposity) were measured following the standard procedures of the International Society for the Advancement of Kinanthropometry (ISAK) as outlined by Marfell-Jones et al (2006). A stadiometer and a calibrated scale were used to measure body height and mass of each player to the nearest 0.1 cm and 0.1 kg, respectively. The body mass index (BMI) was calculated from body height and mass (kg/m^2). The percentage of body fat (%BF) was calculated from the sum of seven skinfolds (biceps, triceps, suprailiac, abdominal, subscapular, front thigh and medial calf) using a Harpenden skinfold calliper (Ross and Marfell- Jones, 1991).

The following are the anthropometric measurements which will be taken on each subject.

1. Age (years)
2. Body weight (Kg)
3. Stature (cm)

Breadth Measurements (cm)

1. Humerus diameter
2. Wrist diameter
3. Femur diameter
4. Ankle Diameter

Circumference Measurement (cm)

1. Upper arm
2. Fore arm
3. Thigh

4. Calf

Skinfold Measurements (mm)

1. Biceps
2. Triceps
3. Forearm
4. Subscapular
5. Suprailiac
6. Thigh
7. Calf.

Equipment for Data collection

1. Stadiometer
2. Weighing scales
3. Anthropometric tape
4. Skinfold caliper
5. Anthropometer
6. Large sliding caliper
7. Segmometer
8. Wide-spreading caliper
9. Small sliding caliper
10. Anthropometric box

RESULT AND DISCUSSION

This comparative study was conducted to determine the anthropometric measurements and body composition, body mass index, and somatotype of Selected A division football Player of Nepal. It is found that, scientific studies of Footballer have tended to focus on tactics and techniques, thereby neglecting the physical and physiological profile of the players. Therefore, the purpose of this study was to examine physical and anthropometric characteristics of total of 71 footballers

from three teams were studied. The teams were Tribhuvan Army Football Club (TAC), Nepal Police Football Club (NPC) and Armed Police Force Football Club (APF).

All the anthropometric variables (i.e. body height, body mass, body mass index and Somatotype) were analysed descriptively (i.e. mean and standard deviation) and quantitatively. All data were analysed using the Microsoft Office Excel 2007. Mean, Standard Deviation formulae are –

$$=SQRT(SUMPRODUCT(I2:I72,I2:I72)/COUNT(I2:I72))-$$

$$PRODUCT(SUM(I2:I72),SUM(I2:I72))/PRODUCT(COUNT(I2:I72),COUNT(I2:I72))) \text{ and}$$

$$=SQRT(SUMPRODUCT(H2:H72,H2:H72)/COUNT(H2:H72))-$$

$$PRODUCT(SUM(H2:H72),SUM(H2:H72))/PRODUCT(COUNT(H2:H72),COUNT(H2:H72)))$$

Table 1 depicts that the average age of the players of three teams is 26.5 (± 4.2) years, height is 169.2 (± 6.1) cm, and body mass is 65.2 (± 6.59) kg. Average of 10.89 (± 3.9) percent of body fat is contained with players and BMI is recorded 22.74 (± 1.8) kg/m². In the way Mesomorphy is recorded highest 4.52 (± 1), ectomorphy is 2.3 (± 0.97) and endomorphy is 2. (± 0.57).

The youngest players among the three teams are of NPC with average age of 25.57 years (± 4) followed by APF with average age of 26 years (± 3.59). The tallest players are from TAC with average height of 171.42 (± 4.1) cm. The shortest players as recorded are from APF who measures 166.29 cm (± 5.7) in average. The players from TAC are heaviest as their average mass is 67.36 Kg (± 5.9) in compared to NPC's (65.24 ± 7 Kg) and APF's (63 ± 5.89 Kg). There seems no significance difference in the BMI of the players of the teams. The highest value of endomorphy recorded is of NPC (2.46 ± 0.7) followed by TAC (2.16 ± 0.35) in compare to APF (2.25 ± 0.52). The players of APF are the most muscular players as their average Mesomorphy is 5 (± 0.75) where as that of NPC is 4.47 (± 1.12). The value of Ectomorphy of TAC and NPC are the highest (2.34).

Table 2 illustrates the differences in the anthropometric characteristics of Tribhuvan Army Club Nepal Police Club and Armed police Force's footballers in accordance with their playing positions: goalkeepers, defenders, midfielders, and forwards.

Table depicts that forwards are the most Aged 28.8 \pm 3.59 followed by defenders 27.55 \pm 4, goalkeeper 26.78 \pm 3, and midfielder 27.55 \pm 4.43. Goalkeepers are the tallest 173.8 \pm 2.46cm followed by defenders 169.91 \pm 5.87, forwards 168. \pm 4.9cm and midfielder 167.39 \pm 5.cm.

Goalkeeper are the heaviest 69.35 ± 5 follow by defenders 68 ± 2.5 , forwards 62.125 ± 4.68 and midfielders 61.8 ± 5.17 . BMI is recorded 23.6 ± 2.7 defenders follow by forwards 22.94 ± 2.15 , goalkeeper 22.93 ± 1.24 and midfielder $22. \pm 1.66$. Goalkeepers have most fat percentage 14.84 ± 2.6 followed by defenders 10.61 ± 3.37 midfielders 10.42 ± 4 and forwards 9.39 ± 3.55 . Regarding somatotype, endomorphy is recorded 3.9 ± 1.44 by goalkeeper follow by defender 2.27 ± 0.68 , midfielder 2.23 ± 0.4 and forward 2.08 ± 0.5 . mesomorphy is recorded 4.7 ± 0.98 by defender follow by goal keeper 4.69 ± 1.04 , forwards 4.5 ± 1.14 and midfielders 4.39 ± 0.98 . Ectomorphy is recorded 2.48 ± 0.87 by midfielders followed by goalkeeper 2.45 ± 0.48 , forward 2.3 ± 1.51 and defender 1.96 ± 0.73 .

Among the four position players, midfielders are the youngest players whereas forwards are the most aged. Goalkeepers are the tallest and heaviest whereas midfielders are the shortest and lightest. Defenders BMI is the highest and midfielders is the lowest. Goalkeepers fat percentage is the highest and the lowest is of forwards. Goalkeepers are the most endomorphic and mesomorphir whereas forwards are the least endomorphic and midfielders are the least mesomorphic. Defenders the least ectomorphic whereas midfielders are the most ectomorphic.

Table 3 illustrates the differences in the anthropometric characteristics of Tribhuvan Army Club footballers in accordance with their playing positions: goalkeepers, defenders, midfielders, and forwards.

Table depicts that forwards are the most Aged 29.8 ± 3.18 followed by midfield 28.33 ± 4.6 , defenders 28.12 ± 5.13 and Goalkeepers 24.66 ± 2.8 . Goalkeepers are the tallest $173. \pm 53$ cm followed by defenders 173.3 ± 3.15 cm, forwards 171.78 ± 4 cm and midfielder 167.56 ± 3.3 cm. Goalkeepers are the heaviest having mass of 40.33 ± 6.1 kg followed by defender 69.87 ± 4 kg, forwards 68.6 ± 4.96 kg and midfielders 61.5 kg. BMI is recorded $23. \pm 1.63$ by goalkeepers followed by defenders 23.27 ± 1.31 , forwards 23.24 ± 1.45 and midfielders 21.85 ± 1.11 . Goalkeepers have most fat percentage 13.9 ± 3.19 followed by midfielders 9.99 ± 3.26 , defenders 9.24 ± 3.36 and forwards 8.24 ± 2 . Regarding somatotype, endomorphy is recorded 2.69 ± 0.24 by goalkeeper follows by midfielder defender and forward, mesomorphy is recorded 4.8 ± 1.11 by goalkeeper follow by forward defender and midfielder and ectomorphy is recorded 2.56 by midfielder followed by defender, goalkeeper, and forward.

Of the four positions, the highest height, weight, BMI, and amount of body fat are recorded in the goalkeepers, while the lowest height, weight and BMI are recorded in the midfielders. The forwards are the oldest players and had the lowest percentage of body fat, while the goalkeepers were the youngest and forward were most aged.

Table 4 illustrates the differences in the anthropometric characteristics of Nepal Police Club footballers in accordance with their playing positions: goalkeepers, defenders, midfielders, and forwards.

The forwards are the most Aged 28.33 ± 1.5 followed by defender 28.2 ± 2.4 , Goalkeepers 27 ± 1 , and midfielder 24.6 ± 4.28 . Goalkeepers are the tallest $172.7 \pm 0.8\text{cm}$ followed by defenders 170.88 ± 6.79 , forwards $169.33 \pm 4.03\text{cm}$ and midfielder $168.56 \pm 4.56\text{cm}$. Defenders are the heaviest 71.2 ± 11.42 follow by goalkeepers 67.2 ± 3.2 , forwards 66.66 ± 3.09 and midfielders 62.87 ± 4.54 . BMI is recorded 24.26 ± 2.7 defenders follow by forwards 23.4 ± 1.98 , goalkeeper 22.52 ± 0.86 and midfielder 22.15 ± 1.75 . Goalkeepers have most fat percentage 16.34 ± 3.8 followed by defenders 13.2 ± 3.6 forward 11.47 ± 5.15 and 11.2 ± 4.7 . Regarding somatotype, endomorphy is recorded 3.31 ± 0.1 by goalkeeper follow by defender 2.7 ± 1 , midfielder 2.25 ± 0.47 and forward 2.4 ± 0.71 . mesomorphy is recorded 5.05 by forward follow by defender 4.4 ± 1.14 , midfielder 4.39 ± 1.15 and Goalkeeper 4.2 ± 0.55 . Ectomorphy is recorded 2.57 by goalkeeper follow by midfielders 2.52 ± 0.98 , forward 2.06 ± 0.99 and defender 1.83 ± 1 .

The youngest players of the team are midfielders (24.06 ± 4.28 years) followed by goalkeepers (27 ± 1 years), eldest being the forwards (28.33 ± 1.25). As expected, goalkeepers are the tallest (172.7 ± 0.8 cm) and the shortest players are the midfielders (168.56 ± 4.56 cm). Defenders are the heaviest (71.2 ± 11.42 Kg) and their BMI as well were recorded the highest (24.26 ± 2.7). The body mass (62.87 ± 4.54 Kg) and BMI (22.15 ± 1.75) of midfielders is the least. The body fat percent is recorded highest in goalkeepers (16.34 ± 3.8) followed by defenders (13.2 ± 3.6), forward (11.47 ± 5.15). The value of Mesophormy is highest in forwards (5.05 ± 0.98) and least in goalkeepers (4.2 ± 0.55)

Table 5 depicts Physical condition of the Football players of Armed Police Force.

Table depicts that goalkeepers are the most Aged 29 ± 2.9 years followed by defenders 26.4 ± 3 years, forwards 25.75 ± 3.9 years, and midfielder 24.688 ± 3.44 years. Goalkeepers are the tallest $174.8 \pm 3\text{cm}$ followed by defenders 165.34 ± 4.41 , midfielder $165.2 \pm 5.93\text{cm}$ and forwards $164.33 \pm 2.75\text{cm}$. Goalkeeper are the heaviest $69.8 \pm 4.5\text{kg}$ follow by defenders $64 \pm 4.5\text{kg}$, forwards $62.625 \pm 2.8\text{kg}$ and midfielders 60.14 ± 6.12 . BMI is recorded 24.26 ± 2.7 defenders follow by forwards 23.25 ± 0.55 , goalkeeper 22.81 ± 0.81 and midfielder $22. \pm 0.55$. Goalkeepers have most fat percentage 14.68 ± 2.3 followed by forwards 10.98 ± 1.69 defenders 10.32 ± 3.2 and midfielders 9.2 ± 2.66 . Regarding somatotype, endomorphy is recorded 2.97 ± 0.47 by goalkeeper follow by defender 2.2 ± 0.52 , midfielder 2.16 ± 0.32 and forward 2.01 ± 0.44 . mesomorphy is recorded 5.4 by defender follow by goal keeper 4.9 ± 1.1 , midfielder 4.9 ± 0.82 and forwards 4.86 ± 0.26 . Ectomorphy is recorded 2.55 ± 0.28 by goalkeeper follow by midfielders 2.36 ± 0.84 , forward 1.7 ± 0.99 and defender 1.68 ± 0.39 .

The goalkeepers are the eldest players in the group with the average age of 29 ± 2.9 years. Also they are the tallest (174.8 ± 3 cm), heaviest (69.8 ± 4.5 Kg) and highest body fat holders ($14.68 \pm 2.3\%$). Defenders are the most muscular players in the team as their Mesomorphy measures 5.4 ± 0.51 and their ectomorphy measures the least at 1.68 ± 0.39 . Mid fielders are the youngest players in the squad as their average age is 24.88 ± 3.446 years. Also, they are the lightest with mass 60.14 ± 6.12 Kg.

Table 6 is the comparison of goalkeepers of the three teams.

Table depicts that APFs are the most Aged $29. \pm 2.9$ followed by NPC 27.55 ± 1 and TAC 24.66 ± 2.8 . APFs are the tallest 174.8 ± 3 cm followed by TAC 173.53 ± 2.1 and NPC 172.7 ± 0.8 .cm. TACs are the heaviest 70.33 ± 6.1 followed by APFs 69.8 ± 4.5 and NPCs 67.2 ± 3.2 . BMI is recorded 23.3 ± 1.63 TACs follow by APFs 22.81 ± 0.81 and NPCs 22.52 ± 0.86 . NPCs have most fat percentage 16.34 ± 3.8 followed by APFs 14.68 ± 2.3 and TACs 13.9 ± 3.19 . Regarding somatotype, endomorphy is recorded $3.31. \pm 0.1$ by NPCs followed by APFs 2.97 ± 0.47 and TACs 2.69 ± 0.24 . Mesomorphy is recorded 4.9 ± 1.1 by APFs follow by TACs 4.8 ± 1.1 and NPCs 4.2 ± 0.55 . Ectomorphy is recorded 2.57 ± 0.35 by NPCs followed by APFs 2.55 ± 0.28 and TACs 2.28 ± 0.63 .

Among the three teams, The goalkeepers of APF were tallest, eldest and most muscular as their average value of mesomorphy is. The goalkeepers of TAC are Youngest and Heaviest, highest BMI (23.3 ± 1.63) and least body fat percent ($13.9 \pm 3.19\%$). The keepers of NPC are the lightest, highest body fat ($16.34 \pm 3.8\%$) and higher value of Ectomorphy where as TACs is the lowest.

Table 7 illustrates the differences in the anthropometric characteristics of Defenders of the three teams.

Table depicts that NPCs are the most Aged $28.2. \pm 2.4$ followed by TACs 28.12 ± 5.13 and APFs 26.42 ± 3 . TACs are the tallest 173.3 ± 5.13 cm followed by NPCs 170.88 ± 6.79 and APFs $165.34.7 \pm 4.41$.cm. NPCs are the heaviest $71.2 \pm 11.42.1$ followed by TACs $69.87 \pm 4.$ and APFs 64.28 ± 4.5 . BMI is recorded 24.26 ± 2.7 by NPCs follow by APFs 23.48 ± 0.8 and TACs 23.27 ± 1.3 . NPCs have most fat percentage 13.2 ± 3.6 followed by APFs 10.32 ± 3.2 and TACs 9.24 ± 3.36 . Regarding somatotype, endomorphy is recorded $2.7. \pm 1$ by NPCs followed by APFs 2.2 ± 0.52 and TACs 2 ± 0.26 . mesomorphy is recorded 5.4 ± 0.51 by APFs follow by NPCs 4.4 ± 0.85 and TACs 4.25 ± 0.85 . Ectomorphy is recorded 2.29 ± 0.61 by TACs followed by NPCs 1.83 ± 1 and APFs 1.68 ± 0.39 .

The defenders of NPCs are the most aged and APFs are the least aged. TACs defenders are tallest where as APFs are the least hight. The NPCs are the heaviest in mass and BMI where as APFs have least body mass TACs BMI is the least. In case of fat percentage NPCs have the most and TACs have the least. TACs are the least endomorphic and NPCs are the most. APFs are the Most mesomorphic where as TACs are the least. And TACs are the most ectomorphic and APFs are the Least ectomorphic.

Table 8 illustrates the differences in the anthropometric characteristics of Midfielders of the three teams.

Table depicts that TACs are the most Aged 28.33 ± 2.4 followed by APFs 24.88 ± 3.44 and NPCs 24.06 ± 4.6 . TACs are the tallest 173.3 ± 5.13 cm followed by NPCs 170.88 ± 6.79 and APFs $165.34.7 \pm 4.41$ cm. NPCs are the heaviest 62.87 ± 4.54 followed by TACs 61.5 ± 4.46 . and APFs 60.14 ± 6.12 . BMI is recorded 22.15 ± 1.75 by NPCs follow by APFs 22 ± 1.6 and TACs 21.85 ± 1.1 . NPCs have most fat percentage 11.2 ± 4.7 followed by TAC 9.99 ± 3.26 and APFs 9.32 ± 2.66 . Regarding somatotype, endomorphy is recorded 2.28 ± 0.3 by NPCs followed by NPCs 2.25 ± 0.47 and APFs 2.16 ± 0.32 . mesomorphy is recorded 4.9 ± 0.82 by APFs follow by NPCs 4.39 ± 1.15 and TACs 3.35 ± 0.86 . Ectomorphy is recorded 2.56 ± 0.52 by TACs followed by NPCs 2.52 ± 0.98 and APFs 2.36 ± 0.84 .

Comparing in midfielders of Three Teams. TACs are the most aged least is NPCs but between the NPCs and APFs there is no significant difference. NPCs midfielders are tallest and heaviest and APFs are the lowest in height and weight. Regarding fat percentage and BMI NPCs have the highest whereas body fat is the lowest in APFs and BMI in TACs. Endomorphy is the highest in TACs and the lowest in APFs but there is no significant difference in three teams. APFs are the most mesomorphic TACs are The least. TACs are the most ectomorphic and the APFs are the least Ectomorphic.

Table 9 illustrates the differences in the anthropometric characteristics of forwards of the three teams.

Table depicts that TACs are the most Aged 29.8 ± 3.18 followed by NPCs 28.33 ± 1.25 and APFs 25.75 ± 3.9 . TACs are the tallest 171.3 ± 7.8 cm followed by NPCs 169.33 ± 4.03 and APFs $164.05.7 \pm 2.75$ cm. TACs are the heaviest 68.6 ± 4.96 kg followed by NPCs 66.66 ± 3.09 . and APFs 62.62 ± 2.8 . BMI is recorded 23.4 ± 1.98 by NPCs follow by APFs 23.25 ± 0.55 and TACs 23.24 ± 1.45 . NPCs have most fat percentage 11.47 ± 5.15 followed by APFs 10.98 ± 1.69 and TACs 8.24 ± 2.6 . Regarding somatotype, endomorphy is recorded 2.24 ± 0.71 by NPCs followed by APFs 2.01 ± 0.44 and TACs 1.93 ± 0.19 . mesomorphy is recorded 5.05 ± 0.98 by NPCs followed by APFs 4.86 ± 0.26 and TACs 4.4 ± 0.75 . Ectomorphy is recorded 2.2 ± 0.69 by TACs followed by NPCs 2.06 ± 0.99 and APFs 1.7 ± 0.23 .

In case of forward, TACS are the highest in Age, height and body and the least are APFs. NPCs are highest in BMI and body fat percentage whereas TACs are lowest BMI and body fat percentage, but there is no significance different in BMI in between them. NPCs are the most endomorphic and mesomorphic and TACs are the least endomorphic and mesomorphic. Forwards of TACs are the most ectomorphic and APFs are the least ectomorphic.

Conclusion

The purpose of this study was to examine physical and anthropometric characteristics of total of 71 footballers from three teams were studied. The teams were Tribhuvan Army Football Club (TAC), Nepal Police Football Club (NPC) and Armed Police Force Football Club (APF).

The tables 1 depicts that the average age of the players of three teams is $26.5 (\pm 4.2)$ years, height is $169.2 (\pm 6.1)$ cm, and body mass is $65.2 (\pm 6.59)$ kg. Average of $10.89 (\pm 3.9)$ percent of body fat is contained with players and BMI is recorded $22.74 (\pm 1.8)$ kg/m.² In the way Mesomorphy is recorded highest $4.52 (\pm 1)$, ectomorphy is $2.3 (\pm 0.97)$ and endomorphy is $2. (\pm 0.57)$.

Among the four position players, midfielders are the youngest players whereas forwards are the most aged. Goalkeepers are the tallest and heaviest whereas midfielders are the shortest and lightest. Defenders BMI is the highest and midfielders is the lowest. Goalkeepers fat percentage is the highest and the lowest is of forwards. Goalkeepers are the most endomorphic and mesomorphir whereas forwards are the least endomorphic and midfielders are the least mesomorphic. Defenders the least ectomorphic whereas midfielders are the most ectomorphic.

Of the four positions, the highest height, weight, BMI, and amount of body fat are recorded in the goalkeepers, while the lowest height, weight and BMI are recorded in the midfielders. The forwards are the oldest players and had the lowest percentage of body fat, while the goalkeepers were the youngest and forward were most aged.

The youngest players of the team are midfielders followed by goalkeepers, eldest being the forwards. As expected, goalkeepers are the tallest and the shortest players are the midfielders Defenders are the heaviest and their BMI as well were recorded the highest. The body mass and BMI of midfielders is the least. The body fat percent is recorded highest in goalkeepers followed by defenders, forward. The value of Mesophormy is highest in forwards) and least in goalkeepers.

The goalkeepers are the eldest players in the group with the average age of 29 ± 2.9 years. Also they are the tallest (174.8 ± 3 cm), heaviest (69.8 ± 4.5 Kg) and highest body fat holders ($14.68 \pm 2.3\%$). Defenders are the most muscular players in the team as their Mesomorphy measures 5.4 ± 0.51 and their ectomorphy measures the least at 1.68 ± 0.39 . Mid fielders are the youngest players in the squad as their average age is 24.88 ± 3.446 years. Also, they are the lightest with mass 60.14 ± 6.12 Kg.

Among the three teams, the goalkeepers of APF were tallest, eldest and most muscular as their average value of mesomorphy is. The goalkeepers of TAC are Youngest and Heaviest, highest BMI (23.3 ± 1.63) and least body fat percent ($13.9 \pm 3.19\%$). The keepers of NPC are the lightest, highest body fat ($16.34 \pm 3.8\%$) and higher value of Ectomorphy where as TACs is the lowest.

The defenders of NPCs are the most aged and APFs are the least aged. TACs defenders are tallest where as APFs are the least high. The NPCs are the heaviest in mass and BMI where as

APFs have least body mass TACs BMI is the least. In case of fat percentage NPCs have the most and TACs have the least. TACs are the least endomorphic and NPCs are the most. APFs are the Most mesomorphic where as TACs are the least. And TACs are the most ectomorphic and APFs are the Least ectomorphic.

Comparing in midfielders of Three Teams. TACs are the most aged least is NPCs but between the NPCs and APFs there is no significant difference. NPCs midfielders are tallest and heaviest and APFs are the lowest in height and weight. Regarding fat percentage and BMI NPCs have the highest whereas body fat is the lowest in APFs and BMI in TACs. Endomorphy is the highest in TACs and the lowest in APFs but there is no significant difference in three teams. APFs are the most mesomorphic TACs are The least. TACs are the most ectomorphic and the APFs are the least Ectomorphic.

In case of forward, TACS are the highest in Age, height and body and the least are APFs. NPCs are highest in BMI and body fat percentage whereas TACs are lowest BMI ans body fat percentage, but there is no significance different in BMI in between them. NPCs are the most endomorphic and mesomorphic and TACs are the least endomorphic and mesomorphic. Forwards of TACs are the most ectomorphic and APFs are the least ectomorphic.

Table 1

	All Teams	TAC	NPC	APF
	+ ₋ 4.2	± 4.6	± 4	± 3.59
AGE	26.5	28	25.57	26
	+ ₋ 6.1	±4.1	± 5	± 5.7
HEIGHT	169.2	171.42	169.38	166.29
	+ ₋ 6.59	± 5.9	± 7	± 5.89
BODY MASS (KG)	65.2	67.36	65.24	63
	+ ₋ 1.8	± 1.4	± 2.13	±1.32
BMI	22.74	22.89	22.73	22.78
	+ ₋ 3.9	± 3.6	± 4.6	± 3.16
BODY FAT%	10.89	9.86	12	10.6
	+ ₋ 0.57	± 0.35	± 0.7	± 0.52
ENDOMORPHY	2.3	2.16	2.46	2.25
	+ ₋ 1	± 0.97	± 1.12	± 0.75
MESOMORPHY	4.52	4.16	4.47	5
	+ ₋ 0.97	± 0.62	± 1	± 69
ECTOMORPHY	2.3	2.34	2.34	2

Table 2

	GOALKEEPER	DEFENDER	MIDFIELDER	FORWARD
	+ - 3	+ - 4	+ - 4.43	+ - 3.59
AGE	26.78	27.55	25.12	28.8
	+ - 2.467	+ - 5.87	+ - 5	+ - 4.9
HEIGHT	173.8	169.91	167.39	168.51
	+ - 5.08	+ - 7.4	+ - 5.17	+ - 4.688
BODY MASS (KG)	69.35	68.25	61.8	66.125
	+ - 1.24	+ - 1.71	+ - 1.66	+ - 2.15
BMI	22.93	23.597	22.06	22.94
	+ - 2.6	+ - 3.7	+ - 4.04	+ - 3.55
BODY FAT%	14.84	10.61	10.42	9.4
	+ 1.44	+ 0.68	+ 0.4	+ 0.5
ENDOMORPHY	3.9	2.27	2.23	2.08
	+ 1.04	+ 0.98	+ 1.11	+ 1.14
MESOMORPHY	4.69	4.7	4.37	4.5
	+ - 0.48	+ - 0.73	+ - 0.87	1.51
ECTOMORPHY	2.45	1.96	2.48	2.3

Table 3

	GOALKEEPER	DEFENDER	MIDFIELDER	FORWARD
	±2.8	±5.13	±4.6	±3.18
AGE	24.66	28.12	28.33	29.8
	± 2.1	±3.15	±3.31	±4.01
HEIGHT	173.533	173.3	167.56	171.78
	±6.1	±4.01	±4.46	±4.96
BODY MASS (KG)	70.33	69.87	61.5	68.6
	±1.63	±1.31	±1.11	±1.45
BMI	23.3	23.27	21.85	23.24
	±3.19	±3.36	±3.26	±2.6
BODY FAT%	13.9	9.24	9.99	8.24
	± 0.24	±0.26	± 0.3	± 0.19
ENDOMORPHY	2.69	2	2.28	1.93
	± 1.11	± 0.85	± 0.86	± 0.75
MESOMORPHY	4.8	4.25	3.53	4.4
	±0.63	±0.61	±52	±0.69
ECTOMORPHY	2.28	2.29	2.56	2.2

Table 4

	GOALKEEPER	DEFENDER	MIDFIELDER	FORWARD
	±1	±2.4	±4.28	±1.25
AGE	27	28.2	24.06	28.33
	±0.8	±6.79	±4.56	±4.03
HEIGHT	172.7	170.88	168.56	169..33
	±3.2	±11.42	±4.54	±3.09
BODY MASS (KG)	67.2	71.2	62.87	66.66
	±0.86	±2.7	±1.75	±1.98
BMI	22.52	24.26	22.15	23.4
	±3.8	±3.6	±4.7	±5.15
BODY FAT%	16.34	13.2	11.2	11.47
	±0.1	± 1	± 0.47	± 0.71
ENDOMORPHY	3.31	2.7	2.25	2.24
	± 0.55	±1.14	± 1.15	± 0.98
MESOMORPHY	4.2	4.4	4.39	5.05
	±0.35	±1	±0.98	±0.99
ECTOMORPHY	2.57	1.83	2.52	2.06

Table 5

	GOALKEEPER	DEFENDER	MIDFIELDER	FORWARD
	±2.9	±3	±3.446	±3.9
AGE	29	26.428	24.88	25.75
	±3	±4.41	±5.93	±2.75
HEIGHT	174.8	165.34	165.2	164.05
	±4.5	±4.558	±6.12	±2.8
BODY MASS (KG)	69.8	64.28	60.14	62.625
	±0.81	±0.8	±1.6	±0.55
BMI	22.81	23.487	22	23.258
	±2.3	±3.2	±2.66	±1.69
BODY FAT%	14.68	10.32	9.32	10.98
	±0.47	±0.52	±0.32	±0.44
ENDOMORPHY	2.97	2.20	2.16	2.01
	±1.1	±0.51	±0.82	±0.26
MESOMORPHY	4.9	5.4	4.9	4.86
	±0.28	±0.39	±0.84	±0.23
ECTOMORPHY	2.55	1.68	2.36	1.7

Table 6

	TAC	NPC	APF
	±2.8	±1	±2.9
AGE	24.66	27	29
	±2.1	±0.8	±3
HEIGHT	173.533	172.7	174.8
	±6.1	±3.2	±4.5
BODY MASS (KG)	70.33	67.2	69.8
	±1.63	±0.86	±0.81
BMI	23.3	22.52	22.81
	±3.19	±3.8	±2.3
BODY FAT%	13.9	16.34	14.68
	±0.24	±0.1	±0.47
ENDOMORPHY	2.69	3.31	2.97
	±1.11	±0.55	±1.1
MESOMORPHY	4.8	4.2	4.9
	±0.63	±0.35	±0.28
ECTOMORPHY	2.28	2.57	2.55

Table 7

	TAC	NPC	APF
	±5.13	±2.4	±3
AGE	28.12	28.2	26.428

	±3.15	±6.79	±4.41
HEIGHT	173.3	170.88	165.34
	±4.01	±11.42	±4.558
BODY MASS (KG)	69.87	71.2	64.28
	±1.31	±2.7	±0.8
BMI	23.27	24.26	23.487
	±3.36	±3.6	±3.2
BODY FAT%	9.24	13.2	10.32
	±0.26	± 1	±0.52
ENDOMORPHY	2	2.7	2.20
	± 0.85	±1.14	±0.51
MESOMORPHY	4.25	4.4	5.4
	±0.61	±1	±0.39
ECTOMORPHY	2.29	1.83	1.68

Table 8

	TAC	NPC	APF
	±4.6	±4.28	±3.446
AGE	28.33	24.06	24.88
	±3.31	±4.56	±5.93
HEIGHT	167.56	168.56	165.2
	±4.46	±4.54	±6.12
BODY MASS (KG)	61.5	62.87	60.14
	±1.11	±1.75	±1.6
BMI	21.85	22.15	22
	±3.26	±4.7	±2.66
BODY FAT%	9.99	11.2	9.32
	± 0.3	± 0.47	± 0.32
ENDOMORPHY	2.28	2.25	2.16
	± 0.86	± 1.15	± 0.82
MESOMORPHY	3.53	4.39	4.9
	±52	±0.98	±0.84
ECTOMORPHY	2.56	2.52	2.36

Table 9

	TAC	NPC	APF
	±3.18	±1.25	±3.9
AGE	29.8	28.33	25.75
	±4.01	±4.03	±2.75
HEIGHT	171.78	169..33	164.05
	±4.96	±3.09	±2.8
BODY MASS (KG)	68.6	66.66	62.625

	±1.45	±1.98	±0.55
BMI	23.24	23.4	23.258
	±2.6	±5.15	±1.69
BODY FAT%	8.24	11.47	10.98
	± 0.19	± 0.71	± 0.44
ENDOMORPHY	1.93	2.24	2.01
	± 0.75	± 0.98	± 0.26
MESOMORPHY	4.4	5.05	4.86
	±0.69	±0.99	±0.23
ECTOMORPHY	2.2	2.06	1.7

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