Kinanthropometric Profile of Women Badminton Players

Rithika shree J [1], Muthukumaran Jothilingam [2], Dhanusia S [3] ,Raziya Mehar S [4],Sameena S [5], Jilna James R [6], Bharathi Krishnan S [7]

Running Title: Anthropometric Insights in Women's Badminton

Affiliation:

[1,4,5,6,7] Under Graduate Student, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Science, Chennai, Tamil Nadu, India-602105.

[2] Principal, School of Physiotherapy, Sri Balaji Vidyapeeth, Chennai, Tamil Nadu, INDIA.

[3]Tutor, Ph.D Scholor, Saveetha college of physiotherapy, Saveetha Institute of Medical and Technical Science, Chennai, Tamil Nadu, India-602105.

ABSTRACT :

Introduction : Badminton requires endurance, coordination, speed, and agility. Analysing women athletes' Kin anthropometric characteristics—body dimensions associated with movement helps them perform at their best and avoid injuries. This study examines somatotype (endomorphic, mesomorphic, and ectomorphic) in order to identify the physical traits associated with badminton success.

Methodology : Purposive sampling was used in an analytical descriptive study of forty-three state-level badminton players (twenty females and twenty men), ages thirteen to nineteen. Somatotypes were ascertained using the Heath-Carter method and anthropometric data were gathered. The analysis was conducted using SPSS 16.0, utilizing multivariate regression and Pearson/Spearman tests to evaluate the relationship between somatotype and physical fitness.

Results : The findings indicated that the predominant somatotype among female players was meso-ectomorph. Ectomorphic features were associated with speed and agility, mesomorphic traits with strength, and endomorphic traits with aerobic capacity. A strong predictor of general physical fitness was somatotype.

Conclusion : The fitness of female badminton players is significantly influenced by their somatotype. Higher endomorphic features may impair performance, whereas mesomorphic and ectomorphic qualities improve it. Somatotyping facilitates performance tracking, training, and talent identification.

Key Words : Kin anthropometry, Somatotype, Women Badminton Players, Anthropometry, Physical Fitness.

INTRODUCTION :

The dynamic sport of badminton requires players to possess a great degree of speed, agility, coordination, and endurance in order to compete [1]. Important physical characteristics, including muscular growth, limb proportions, and body composition, are essential for performing strong movements like leaps, lunges, and smashes [2]. By assessing an athlete's body composition and structure scientifically, kin anthropometry can assist assess how well-prepared they are for obstacles unique to their sport [3]. Many different disciplines employ the somatotyping categorization system, which incorporates endomorphic (body fat), mesomorphic (muscularity), and ectomorphic (slenderness) to evaluate athlete profiles [4]. According to research, meso-ectomorphic builds are common among elite badminton players, supporting rapid direction changes, explosive strength, and mobility on the court [5].

In order to prevent injuries, anthropometric assessments are essential because they can identify muscular imbalances or body asymmetries that could be causing problems connected to overuse [6]. Monitoring body composition in female athletes is especially crucial since it influences not only athletic performance but also hormone balance and vitality [7]. The creation of customized training plans to improve future performance and the early identification of athletic potential are made possible by profiling young athletes [8]. As sports science advances, Kin anthropometric evaluations are being used more frequently in routine athlete development plans [9]. In this study, the Kin anthropometric traits of female badminton players are examined in order to investigate the connection between physical features and competitive success [10].

METHODOLOGY :

The sample size for this analytical descriptive study was 43 state-level badminton athletes, 20 of whom were female and 23 of whom were male. Convenience sampling was used. For this study, however, only the data from the 20 female participants—who ranged in age from 13 to 19—were examined. Only female badminton players who were actively competing at the state level met the inclusion criteria; those who were presently enrolled in structured training programs, had acute joint discomfort, or had cervical or lumbar radiculopathy were not included.

To collect comprehensive information on body composition and structure, a variety of anthropometric instruments were used. A microtoise with a 1 mm accuracy level was used to measure height. The Omron Karada HBF-375 body composition monitor was used to capture the subjects' weight, body fat percentage, and muscle mass %. With a skinfold calliper, skinfold thickness was assessed at four different locations: the triceps, subscapular, suprailiac, and calf. The biceps and calf girth measures were obtained with a flexible measuring tape, and the femur and humerus bone widths were measured with a calliper. The main outcome measures were Z-scores to assess different aspects of physical fitness and the Heath-Carter method for somatotype classification.

DATA ANALYSIS:

SPSS version 16.0 was used to do the study's statistical analysis. The sample features were described using univariate analysis, which gave a basic summary of the anthropometric and fitness profiles of the participants. When doing bivariate analysis, variables with a normal distribution were subjected to Pearson correlation tests, whereas variables with an irregular distribution were subjected to Spearman rank correlation. Multiple linear regression was used in multivariate analysis to further examine the connections between somatotype components, physical fitness measures, and possible confounding factors such age, gender, hemoglobin levels, training length, and nutritional status. This methodology made it possible to evaluate the intricate relationships between the variables affecting athletic performance and identify important predictors.

TABELS :

Table 1 : Length measurement (cm)

Variables	Women badminton players	
	Mean	**SD**
Humerus Intercondylar Width	6.26333	0.13287
Femur Intercondylar Width	8.32667	0.15041

Table 2: Body Girths (cm)

Variables	Women badminton players	
	Mean	**SD**
Arm	25.3333	1.29957
Chest	84.5	1.20416
Waist	77.1667	1.09798
Abdomen	76.4	1.49666
Hip	94.8	1.42361
Thigh	45.3333	1.37437

Table 3 : Skinfold (mm)

Variables	Women badminton players	
	Mean	**SD**
Triceps	14.1333	1.17568
Chest	6.9	1.24766
Sub Scapular	13.1	1.49108
Abdomen	13.4333	1.38283
Suprailaic fossa	10.6	1.1431

Table 4 : Muscle endurance

Variables	Women badminton players	
	Mean	**SD**
Ab crunch test	39.4483	2.5675
Push up test	30.5172	1.73445

RESULTS :

Anthropometric measurements were made of height, weight, leg length, upper leg length, lower leg length, hip girth, thigh girth, calf girth, knee diameters, ankle diameters, and skinfolds at the abdomen, thigh, and calf. Each parameter's mean and standard deviation (SD) were computed to evaluate the measurements' central tendency and variability. Each measurement's t-value was also calculated to assess how significant differences between groups or conditions were. A thorough grasp of the participants' structural traits and body composition is offered by these measurements. The findings can help women badminton players with their training and talent discovery tactics and are helpful in establishing a correlation between anthropometric profiles and athletic performance.

DISCUSSION :

Agility and speed are critical in badminton, and they are influenced by an ideal body composition, especially a lower body fat percentage. Mesomorphic-endomorphic somatotypes are frequently seen in elite athletes, which promote their explosive power and agility on the court [11]. A longer arm span is useful for wide, fast defensive plays. Moreover, longer upper limbs facilitate more forceful smashes and successful clears [12]. In badminton, a smaller waist-to-hip ratio is frequently linked to improved balance and core control, which are crucial for quick rallies and lunges [13]. Adiposity in the lower trunk, in particular, can have an impact on endurance and mobility. Subcutaneous fat in these locations is typically absent in elite athletes [14]. For accurate shots and racquet control in badminton, grip strength is essential. A larger hand size can facilitate better control and gripping [15].

High levels of flexibility, particularly in the hips and shoulders, increase range of motion, lower the risk of injury, and improve the variability of strokes [16]. Kin anthropometric profiles increase with regular training, according to longitudinal studies, demonstrating adaptability to demands particular to a sport [17]. Frequent weight-bearing and high-impact badminton movements improve bone mineral density, particularly in the dominant limb, and increase resistance to stress fractures [18]. Because badminton is a unilateral sport, players frequently develop muscular asymmetry, particularly in the dominant arm and leg. If left untreated, this can alter posture and raise the risk of injury [19].

Kin anthropometric variations between singles and doubles-focused players were significant. Due to their need for constant mobility and the increased court area they cover, singles players typically have slimmer bodies with greater cardiovascular endurance. Conversely, because they perform more forceful, power-based moves during shorter rallies, doubles players frequently have increased upper body muscularity. This implies that positional demands have a direct impact on badminton players' body composition and physical development [20].

CONCLUSION :

This study emphasizes how crucial mesomorphic and ectomorphic characteristics are to the Kin anthropometric profile of female badminton players. Recognizing and comprehending these profiles can help improve training plans, athlete selection, and tactics for improving performance. In order to confirm these results and create sport-specific somatotype benchmarks, more studies with bigger and more varied sample sizes are advised.

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DATA AVAILABILITY

Data are available under reasonable request to the corresponding author.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

AUTHOR'S CONTRIBUTION:

Conceptualization & Methodology: Rithika Shree J, Dhanusia S

Investigation: Muthukumaran Jothilingam

Data Curation & Formal Analysis: Sameena S , Jilna James R · Bharathi Krishnan S

Writing – Original Draft : Rithika shree J

Writing – Review & Editing: Rithika shree ,Muthukumaran Jothilingam ,Dhanusia S ,
Raziya Mehar S ,Sameena S , Jilna James R , Bharathi Krishnan S ·

Supervision: Muthukumaran Jothilingam

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