Correlation between Body Mass Index (BMI), Skinfold Thickness and Speed and Power of Adolescent Cricket bowlers: A Cross Sectional Study Protocol

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Abstract

Background: The most exciting aspect in the game of Cricket is bowling. Adolescents shows increased involvement in sports due to which there is a risk and severity of sport injury. Few studies are there which correlate anthropometric characteristics and performance tests having age, BMI, skinfold thickness with power, speed tests in adolescent Cricket bowlers. *Objective*: To relate the BMI, Skinfold Thickness and speed and power of adolescent Cricket bowlers. *Methods:* A sample of 400 Bowlers will be recruited based on predetermined set of inclusion criteria from recognised school by multistage sampling method for cross-sectional study. Power and speed will be estimated by 6m timed hop test and 50-yard dash test respectively. *Stiatistical Analysis*: Results will be expressed as the mean ± standard deviation (SD). Data will be screened for normality using the Kolmogorv-Smirnov test and summarized using descriptive statistics. Pearson's correlation coefficient will be applied to establish the relationships among the variables measured. *Conclusion*: This study will help in determining the relationship between BMI, Skinfold thickness and speed and power in adolescents Cricket bowlers.

Keywords: Adolescent Cricket Bowlers; BMI; Skinfold Thickness; 6m Timed Hop Test; 50-Yard Dash Test.

Introduction

For most Indians, Cricket has been more than a game which serves as a fulcrum around which national identity is shaped. The game of the Cricket unites India more assuredly than any other thing [1]. The most exciting aspect in the game of Cricket is bowling [2]. During bowling there is a constant twisting, extension and rotation in a brief duration of time while body tissue and footwear absorb much ground reaction force [3]. Most of injuries in Cricket occurs while bowling. The bowlers of younger age are at big risk of injury, because of their incomplete growth process [4].

Adolescence is an age of human growth and maturation during which unique changes occur as well as many adult patterns are entrenched [5]. At an early age there is an increased involvement of adolescents in organized sports due to which there is a risk and severity of sport injury. Increased participation and training leads to more sports injuries. The leading causes of injury are sports and recreational injuries [6].

Gradual plan that respond and accommodates with injury or pathological issues and conditions is a feature of successful rehabilitation. To prevent further soft tissue injury, it involves adequate management of injury followed by progressive treatment protocol which is to be implemented effectively and key to successful implementation of progressive rehabilitation programme is goal planning [7].

For competitive athletes of all age groups pre-participation physical evaluation should take place. In case of adolescents, pre-participation physical evaluation determines general health, provide quality and cost effective health care [8]. For the evaluation of physical structure anthropometry is helpful and performance which is skill related is measured with specific tests [9,10].

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Anthropometry is defined as human body measurement in terms of dimensions of bone, muscle and adipose tissue. Presently selection of sportsman for higher performance is taking place on the grounds of physical structure and body size [11]. The bowlers are known to be lean and tall having little fat in their lower extrimites [12]. There was a strong positive relationship between high BMI and increased risk of injury as well as higher injury-related expenditure in adolescent age groups [13]. Measurements such as height, body weight, mid arm circumference and triceps skin fold thickness are commonly used for assessment [11]. In addition to technique of movement and experience, an important factor to athlete's performance may be the favourable anthropometric profile [14]. Performance testing allows menders to identify an athlete's strength as well as weakness. According to athlete's need, performance test enable them to accommodate and adjust training and rehabilitation [15].

Aim of the Study

To find out the relationship between BMI, Skinfold Thickness and speed and power of adolescents Cricket bowlers.

Objective of the Study

To relate the BMI, Skinfold Thickness and speed and power of adolescent Cricket bowlers

Review of Literature

Nuhmani and Akthar [16] characterize correlation between anthropometric traits and functional achievement of professional inferior tennis athletes of India. Hundred elite junior tennis players were assessed for anthropometric measurements including BMI, fat mass, calf circumference, thigh circumference, Waist- hip ratio, and muscle mass. Sergeant Chalk jump test, 40 yard sprint test and T test were used to assess performance. The findings revealed a positive interrelation between muscle group, circumference evaluation and functional achievement, and negative correlation between anthropometric characteristics like BMI, Waist Hip ratio and functional performance.

Lopes et al [17] studied association between BMI and motor abilities in children. Seven thousand one hundred seventy five students under the age of six to fourteen years were assessed. For evaluating motor abilities balance beam test, jumping laterally, hopping on one leg, shifting platforms were used. They found that motor abilities are inversely associated with BMI.

Nuhmani et al [18] evaluated Limb circumference and performance in junior tennis players. Hundred junior tennis players were assessed. Among Skinfold thickness calf and thigh circumference and for performance Sergeant Chalk jump test, 40 yard sprint test, T test were taken. They found a interrelation between both thigh and calf circumference and the entire three functional performance test.

Methodology

- Study Design: Cross-sectional study
- Study Setting: sports complex of respective school
- Sample Population: Adolescents
- Sampling Technique: Criteria based multistage sampling technique
- Sample Size: n=400
- Estimated by the Formula:

$$n= \frac{Z^2_{a/2}*P*(1-p)*D}{E^2}$$

Inclusion Criteria
- Adolescents (10-19year)
- Male and female gender
- Cricket bowlers

Exclusion Criteria
- Cricket batsman
- Musculoskeletal disorder
- Any cardiac or respiratory or neurological disorder
- Fracture and recent surgeries
- Who play sports other than Cricket

Variable
- Independent variable
  - Skin fold thickness
  - Weight
  - Height
- Dependent variable.
  - Conceptual dependent variables
    - Speed

  ❍ Power
❖ perational dependent variables
  ❍ 50 yard Dash test
  ❍ 6-m timed hop test
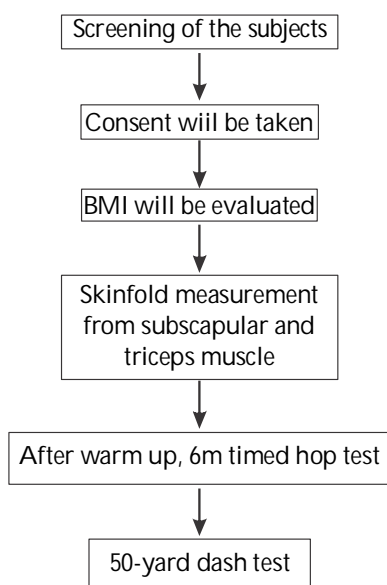
Instrumentation for Data Collection
- ◆ Standard Measuring tape
- ◆ Skin fold calliper
- ◆ Weighing machine
- ◆ Stop watch

Outcome Measure
- ◆ Primary:
  - ❖ Skinfold thickness
  - ❖ Speed
- ◆ Secondary:
  - ❖ Height
  - ❖ Weight
  - ❖ Power

Protocol and Procedure

By taking written permission from principal of school, tester contact with the respective teacher for students who used to play Cricket. Screening will be done on the basis of selection criteria 400 adolescents who participate in Cricket as bowlers of age group 10-19 years will be recruited from schools of Mullana, Ambala district.

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│ Screening of the subjects │
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┌─────────────────────────┐
│ Consent will be taken    │
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│ BMI will be evaluated    │
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┌─────────────────────────┐
│ Skinfold measurement     │
│ from subscapular and     │
│ triceps muscle           │
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            │
            ▼
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│ After warm up, 6m timed hop test │
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┌─────────────────────────┐
│ 50-yard dash test        │
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Procedure

Data Analysis

Results will be expressed as the mean ± standard deviation (SD). Data will be screened for normality using the Kolmogorv-Smirnov test and summarized using descriptive statistics. Pearson's correlation coefficient will be applied to establish the relationships among the variables measured. Data will be analyzed by using SPSS (Statistical Package for Social Science) version 16. A 5% error will be used to indicate statistical significance.

Discussion and Implication

This study will help in determining the relationship between BMI, Skinfold thickness and speed and power in adolescents Cricket bowlers. It will be helpful for the bowlers in their training program and rehabilitation. This study will be concluded in March 2016.

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