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A Comparative Study on Anthropometric Variables and Physical Fitness variables between rural and university level male medium fast bowlers in Cricket

DEBABRATA SARKAR

Research Scholar,
Department of Physical Education,
Guru Ghasidas Vishwavidyalaya,
Bilaspur (Chhattisgarh, India)
E-mail: debabratasarkarh@gmail.com

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Abstract:

The popular team game in most Commonwealth countries is Cricket. Anthropometric dimensions and physical fitness characteristics play's an important role in determining the success of a cricketer. That's why researcher planned to Compare Anthropometric Variables and Physical Fitness variables between rural and university level male medium fast bowlers in Cricket. A total of 20 rural and university level medium fast bowlers were selected from Bongaon block and Guru Ghasidas Vishwavidyalaya using purposive sampling. Age of the subjects were ranged from 15-25 years. Criterion measure was four anthropometric variables, such as, standing height, Arm length, Leg length, Body weight and five physical fitness tests i.e., Flexibility, dominant handgrip strength, Leg strength and Back strength test were measured on each subject using standard technique. Collected data were calculated by SPSS (v-26.0), where independent t test was used to compare both groups mean and Pearson product moment correlation was used to check the correlation. Result reviles that ruralmediumfast bowler had significantly greater Flexibility (mean-31.25<29.60, t-2.400, sig 2 tail-.027) and Leg Strength (mean-139.75<125.40, t value-2.664, sig 2 tail-.016) than the university medium fast bowlers. In that rural and university medium fast bowlers Height with Leg Length, Dominant Hand grip strength with Leg Strength and Back Strength had significantly positive correlations with majority of anthropometric variables studied.

Keywords: Anthropometric variables. Physical fitness, mediumfast bowler

INTRODUCTION:

Cricket is a popular open field team game played in most of the Commonwealth countries. In the past it was only played during a specific season (winter in Asian countries and summer in Western countries). But the game has grown in popularity over the past few decades to the point where it's now played year-around. As a result, cricketers are subjected to more rigorous schedules with longer training and practice periods. Increased workload may be one of the contributing factors

to increased injury rates. Given the multitude of human physiques it has been widely considered that certain sporting events are more suited to individuals with specific physiques than others. It has been well established that specific fitness variations or anthropometric profiles indicate whether a player is fit enough to compete at the highest level in a particular sport. These anthropometric and morphometric parameters are sensitive indicators of athlete's physical development and nutritional status for maximum performance.

study results available regarding anthropometric variables and performance tests in cricketers.

MATERIALS AND METHODS:

Subjects:

The present cross-sectional study is based on purposively selected 10 rural and 10 university level players from North twenty-four parganas district rural and Guru Ghasidas Vishwavidyalaya of age group 15-25 years. A written consent was obtained from the subjects. Data were collected under natural environmental conditions in evening (3PM. to 6 PM).

Anthropometric Measurements:

Four anthropometric variables, such as, standing height, Arm length, Leg length, Bodyweight were measured on each subject using standard technique. The Standing height was recorded using a stadiometer to the nearest 0.1 cm. Arm length, Leg length is measured through steal scale. Weight was measured by digital standing scales to the nearest 0.1 kg.

Physical Fitness Tests:

Four physical fitness tests i.e., Flexibility, dominant handgrip strength, Leg strength and Back strength test were measured on each subject using standard technique.

Flexibility:

The standard test to measure Flexibility of the lower back and hamstring muscles is Sit and Reach test. This test is measuring the strength of lumbar, lordosis, forward pelvic tilt etc. Procedure of the test is sitting on the floor without shoes legs should be stretched out straight ahead and soles of the feet are placed flat against the box. Palms facing downwards, and top of the hands should be attached with each other. After getting signal subject can reaches forward along the measuring line as far as possible without jerking movement and subject should hold the position minimum three seconds. The score is recorded to the nearest centimetre as the distance reached by the subject's hand.

Handgrip Strength Measurement:

The dominant handgrip strength measurement was done using a standard adjustable digital handgrip dynamometer at standing position with shoulder adducted and elbow in full extension. The dynamometer was held freely without support, and the subjects were asked to pull the grip with maximum force on the dynamometer. Best out of three chances will be final score (kilograms).

Leg strength and Back strength:

Leg and Back strength test were done through strength dynamometer. Stand upright feet apart on the base of the dynamometer, arms hang straight down to hold the centre of the bar with both hands, palms facing toward the body, knees are bent at approximately 110 degrees. Without bending your back, pull the bar as hard as possible on the chain and try to straighten your legs, with arms straight. Pull against the weight steadily without jerky movements, feet flat position should be on the base of the dynamometer. Best out of three chances will be final score (kilograms).

Statistical Analysis:

Standard descriptive statistics (mean & standard deviation) were determined for directly measured and derived variables. Student’s t-test was used for the comparison of various anthropometric variables between Rural and University cricket players. Pearson’s correlation coefficients were applied to establish the relationships among the variables measured. Data were analysed using SPSS version 26.0. Level of significance was set at 0.05.

RESULTS:

Table 1 Descriptive statistics of selected anthropometric variables and physical fitness tests in rural and university level medium fast bowlers

| Variables | Group | N | Mean | Std. Deviation | F | Sig. | t | df | Sig. (2-tailed) |
|----------------------------|------------|----|--------|----------------|-------|------|-------|--------|-----------------|
| Height | Rural | 10 | 169.79 | 2.26 | .243 | .628 | .057 | 18 | .955 |
| | University | 10 | 169.85 | 2.46 | | | | 17.868 | .955 |
| ArmLength | Rural | 10 | 63.05 | 1.26 | .024 | .878 | .595 | 18 | .559 |
| | University | 10 | 62.75 | .98 | | | | 16.980 | .559 |
| LegLength | Rural | 10 | 74.00 | 1.13 | 1.037 | .322 | 1.191 | 18 | .249 |
| | University | 10 | 73.30 | 1.48 | | | | 16.857 | .250 |
| BodyWeight | Rural | 10 | 62.65 | 3.00 | 3.112 | .095 | 1.614 | 18 | .124 |
| | University | 10 | 60.81 | 2.00 | | | | 15.665 | .126 |
| Flexibility | Rural | 10 | 31.25 | 1.44 | .015 | .904 | 2.400 | 18 | .027 |
| | University | 10 | 29.60 | 1.63 | | | | 17.727 | .028 |
| Dominant Handgrip Strength | Rural | 10 | 46.18 | 1.81 | .217 | .647 | .804 | 18 | .432 |
| | University | 10 | 45.57 | 1.57 | | | | 17.651 | .432 |
| LegStrength | Rural | 10 | 139.75 | 11.79 | .343 | .565 | 2.664 | 18 | .016 |

| | | | | | | | | | |
|--------------|------------|----|--------|-------|-------|------|------|--------|------|
| | University | 10 | 125.40 | 12.30 | | | | 17.968 | .016 |
| BackStrength | Rural | 10 | 138.70 | 12.87 | 5.077 | .037 | .895 | 18 | .382 |
| | University | 10 | 131.75 | 20.90 | | | | 14.969 | .385 |

Table 1 showed the descriptive statistics of four anthropometric variables, such as, standing height, Arm length, Leg length, Body weight and five physical fitness tests i.e., Flexibility, dominant handgrip strength, Leg strength and Back strength test rural and university level medium fast bowlers were selected from Bongaon block and Guru Ghasidas Vishwavidyalaya. Ruralmedium fast bowlers had higher mean values in Arm Length (63.05 C.M), Leg Length (74.00cm), Weight (62.65 kg.) Flexibility (31.25 cm), Dominant Handgrip Strength (46.18 kg.), Leg Strength (139.75), Back Strength (138.70 kg.) as compared to university medium fast bowlers (169.79 cm.). Whereas university medium fast bowlers Height (169.85 cm.) than rural medium fast bowlers (169.79cm).However, statistically significant differences were found in Flexibility (t-2.400 and Sig. 2-tailed- 0.027) and Leg strength (t - 2.664 and Sig. 2-tailed- 0.016) between the medium fast bowlers of Bongaon block and Guru Ghasidas Vishwavidyalaya.

Table 2 Correlation coefficients of selected anthropometric variables with physical fitness variables of Rural area medium fast bowlers

| Correlations | | | | | | | | | |
|--------------|---------------------|--------|----------------|---------------|----------------|-------------|------|-----------------|------------------|
| | | Height | ArmLength h | LegLen gth | BodyW eight | Flexibility | DHS | LegStrengt h | BackStren gth |
| Height | Pearson Correlation | 1 | .723* | .963** | .512 | .339 | .237 | .232 | .272 |
| | Sig. (2-tailed) | | .018 | .000 | .130 | .338 | .510 | .518 | .446 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| ArmLength | Pearson Correlation | .723* | 1 | .606 | .580 | .177 | .174 | .308 | .456 |
| | Sig. (2-tailed) | .018 | | .063 | .079 | .625 | .631 | .386 | .185 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| LegLength | Pearson Correlation | .963** | .606 | 1 | .459 | .410 | .375 | .321 | .319 |
| | Sig. (2-tailed) | .000 | .063 | | .182 | .239 | .286 | .366 | .369 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

| | | | | | | | | | |
|--|---------------------|------|------|------|-------|-------|--------|--------|--------|
| BodyWeight | Pearson Correlation | .512 | .580 | .459 | 1 | -.151 | -.195 | .074 | .046 |
| | Sig. (2-tailed) | .130 | .079 | .182 | | .677 | .590 | .839 | .900 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Flexibility | Pearson Correlation | .339 | .177 | .410 | -.151 | 1 | .446 | .309 | .369 |
| | Sig. (2-tailed) | .338 | .625 | .239 | .677 | | .197 | .385 | .294 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| DHS | Pearson Correlation | .237 | .174 | .375 | -.195 | .446 | 1 | .871** | .864** |
| | Sig. (2-tailed) | .510 | .631 | .286 | .590 | .197 | | .001 | .001 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| LegStrength | Pearson Correlation | .232 | .308 | .321 | .074 | .309 | .871** | 1 | .936** |
| | Sig. (2-tailed) | .518 | .386 | .366 | .839 | .385 | .001 | | .000 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Back Strength | Pearson Correlation | .272 | .456 | .319 | .046 | .369 | .864** | .936** | 1 |
| | Sig. (2-tailed) | .446 | .185 | .369 | .900 | .294 | .001 | .000 | |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | | |

Table 2 shows the correlation coefficients of selected anthropometric variables and physical fitness variables of rural area medium fast bowlers. In rural area medium fast bowlers, statistically significant strong positive correlations found in Height with Arm Length and Leg Length, dominant handgrip with Leg Strength and Back Strength, Leg strength with Height and moderate positive correlation was found in Leg strength with Arm Length were found rest of the cases no significance relations were found. Beside negative linear correlation was found in Flexibility with Body Weight (-.151) and Dominant Handgrip Strength with Body Weight (-.195).

Table 3 Correlation coefficients of selected anthropometric variables with physical fitness variables of university level medium fast bowlers

| | | Correlations | | | | | | | |
|-------------|---------------------|--------------|----------------|---------------|----------------|-------------|-------|-----------------|------------------|
| | | Height | ArmLength h | LegLengt h | BodyWei ght | Flexibility | DHS | LegStrengt h | BackStreng th |
| Height | Pearson Correlation | 1 | .547 | .961** | .066 | .277 | .477 | .527 | .790** |
| | Sig. (2-tailed) | | .102 | .000 | .857 | .439 | .164 | .118 | .007 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| ArmLength | Pearson Correlation | .547 | 1 | .461 | -.149 | -.331 | .572 | .374 | .288 |
| | Sig. (2-tailed) | .102 | | .179 | .681 | .350 | .084 | .287 | .419 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| LegLength | Pearson Correlation | .961** | .461 | 1 | .178 | .379 | .392 | .447 | .728* |
| | Sig. (2-tailed) | .000 | .179 | | .623 | .280 | .262 | .195 | .017 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| BodyWeight | Pearson Correlation | .066 | -.149 | .178 | 1 | .529 | -.553 | -.249 | -.223 |
| | Sig. (2-tailed) | .857 | .681 | .623 | | .116 | .097 | .487 | .536 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Flexibility | Pearson Correlation | .277 | -.331 | .379 | .529 | 1 | -.226 | -.256 | .148 |
| | Sig. (2-tailed) | .439 | .350 | .280 | .116 | | .529 | .476 | .684 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| DHS | Pearson Correlation | .477 | .572 | .392 | -.553 | -.226 | 1 | .698* | .576 |
| | Sig. (2-tailed) | .164 | .084 | .262 | .097 | .529 | | .025 | .081 |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| LegStrength | Pearson Correlation | .527 | .374 | .447 | -.249 | -.256 | .698* | 1 | .716* |
| | Sig. (2-tailed) | .118 | .287 | .195 | .487 | .476 | .025 | | .020 |

| | | | | | | | | | |
|--|---------------------|--------|------|-------|-------|------|------|-------|----|
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| BackStrength | Pearson Correlation | .790** | .288 | .728* | -.223 | .148 | .576 | .716* | 1 |
| | Sig. (2-tailed) | .007 | .419 | .017 | .536 | .684 | .081 | .020 | |
| | N | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | | |

Table 3 shows the correlation coefficients of selected anthropometric variables and physical fitness variables of university level medium fast bowlers. In university level medium fast bowlers, statistically strong significant positive correlation found in Height with Leg Length and Back Strength, Dominated Handgrip Strength with Leg Strength, Leg strength with Dominated Handgrip strength and Back Strength and Back Strength with Height, Leg Length and Leg strength. Beside rest of cases there were no significance difference was found but, in some cases, Negative correlation was found that is Arm Length with Body Weight and Flexibility, Flexibility with Dominated Handgrip strength and Leg Strength.

DISCUSSION:

Cricket is an endurance game also played year around. Therefore, the physical requirements of the players are paramount. It is clear that anthropometric analysis of different sports has shown that optimal performance seems to have certain physical demands. In this study in addition to the usual anthropometric variables a grip strength estimate of was performed to assess the overall body strength of medium fast bowlers. The results of this study indicate that the grip strength is slightly higher among average rural medium fast bowlers than in university medium fast bowlers. These differences probably be due to genetic and environmental factors. Physical and physiological maturation factors may also be responsible for these differences.

CONCLUSION:

It might be concluded from the present study that rural medium fast bowlers had significantly greater Flexibility and Leg Strength than the university medium fast bowlers. In that rural and university medium fast bowlers Height with Leg Length, Dominant Hand grip strength with Leg Strength and Back Strength had significantly positive correlations with majority of anthropometric variables studied. The findings of the present study have immense practical application in talent search with reference to their particular anthropometric parameters in medium fast bowling. It would be helpful to reshape training programs specific to avoid injury and develop good medium fast bowlers in cricket.

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