NORMS CONSTRUCTION FOR MUSCULAR STRENGTH, MUSCULAR POWER AND MUSCULAR ENDURANCE OF BASKETBALL PLAYERS OF GURU NANAK DEV UNIVERSITY, AMRITSAR, PUNJAB, INDIA

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Abstract:
The aim of this study was to construct norms for Muscular Strength, Muscular Power and Muscular Endurance of male Basketball Players. Seventy Two, male Basketball Players of Guru Nanak Dev University, Amritsar between the age group of 19-25 years (Mean ± SD: Age 22.263 ± 1.332 years, Body Height 180.75 ± 6.008 centimeters and Body Mass 77.526 ± 5.960 kilograms) volunteered to participate in the study. Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e., very good, good, average, poor and very poor. In Muscular Strength, the scores below 43.296 are considered very poor, from about 45.995-43.296 is considered poor, 45.995-51.393 is considered average, 51.393-54.092 is considered good and the scores above 54.092 are considered very good. In Muscular Power, the scores below 41.913 are considered very poor, from about 43.991-41.913 is considered poor, 43.991-48.147 is considered average, 48.147-50.225 is considered good and the scores above 50.225 are considered very good. In Muscular Endurance, the scores below 4.39 are considered very poor, from about 5.438-4.39 is considered poor, 5.438-7.534 is considered average, 7.534-8.582 is considered good and the scores above 8.582 are considered very good.

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Key words: norms, basketball players, muscular strength, muscular power and muscular endurance

1. Introduction

Basketball has been described as an intermittent sport, being physically very demanding, requiring players to frequently repeat bouts of intense actions (sprinting, shuffling, jumping) with jogging, walking or short periods of recovery (Ben Abdelkrim, El Fazaa, & El Ati, 2006; McInnes, Carlson, Jones, & McKenna, 1995).

Consequently, in order to play successfully, basketball players must be physically well prepared by having optimally developed levels of explosive power, agility, anaerobic power and anaerobic capacities (Apostolidis, Nassis, Bolatoglou, & Geladas, 2004; Ben Abdelkrim, Chaouachi, Chamari, Chtara, & Castagna, 2010; Delextrat & Cohen, 2008; Hoffman, Tenenbaum, Maresh, & Kraemer, 1996).


2. Material and Methods

2.1 Selection of Subjects

Seventy Two, male Basketball Players of Guru Nanak Dev University, Amritsar between the age group of 19-25 years (Mean ± SD: Age 22.263 ± 1.332 years, Body Height 180.75 ± 6.008 centimeters and Body Mass 77.526 ± 5.960 kilograms) volunteered to participate in the study. The subject details are presented in Table 1 and exhibited in Figure 1.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>College</th>
<th>Sample (N=72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>D.A.V., College, Amritsar</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Khalsa, College, Amritsar</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>G.N.D. University, Campus, Amritsar</td>
<td>12</td>
</tr>
<tr>
<td>4.</td>
<td>D.A.V., College, Jalandhar</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>Lyallpur Khalsa College, Jalandhar</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>SSM College Dinanagar, Gurdaspur</td>
<td>12</td>
</tr>
</tbody>
</table>
Table 2: Subject’s demographics of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sample Size (N=72)</th>
<th>D.A.V., College, Amritsar (N=12)</th>
<th>Khalsa, College, Amritsar (N=12)</th>
<th>G.N.D. University, Campus, Amritsar (N=12)</th>
<th>D.A.V., College, Jalandhar (N=12)</th>
<th>Lyallpur Khalsa College, Jalandhar (N=12)</th>
<th>SSM College, Dinanagar, Gurdaspur (N=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>22.263 ± 1.332</td>
<td>22.583 ± 1.240</td>
<td>22.416 ± 1.378</td>
<td>22.166 ± 1.378</td>
<td>21.666 ± 1.466</td>
<td>22.25 ± 1.669</td>
<td>22.5 ± 1.087</td>
</tr>
<tr>
<td>Body Height (centimeters)</td>
<td>180.75 ± 6.008</td>
<td>180 ± 6.564</td>
<td>181.33 ± 5.959</td>
<td>179.83 ± 5.623</td>
<td>181.166 ± 6.548</td>
<td>181.25 ± 5.863</td>
<td>180.91 ± 5.991</td>
</tr>
<tr>
<td>Body Mass (kilograms)</td>
<td>77.526 ± 5.960</td>
<td>77.066 ± 6.463</td>
<td>77.35 ± 5.843</td>
<td>76.125 ± 5.526</td>
<td>78.741 ± 6.626</td>
<td>77.991 ± 6.159</td>
<td>77.883 ± 6.050</td>
</tr>
</tbody>
</table>
2.2 Selection of Variables
The following Physical Fitness Test Items were selected for the present study:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Variables</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Muscular Strength</td>
<td>Handgrip Strength Test</td>
</tr>
<tr>
<td>2.</td>
<td>Muscular Power</td>
<td>Vertical Jump Test</td>
</tr>
<tr>
<td>3.</td>
<td>Muscular Endurance</td>
<td>Pull-Up Test</td>
</tr>
</tbody>
</table>

3. Statistical Analysis
Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e., very good, good, average, poor and very poor.

4. Results
For each of the chosen variable, the result pertaining to Descriptive Statistics (Mean and SD) and Percentile Plot (Hi and Low) of Physical Fitness Test Items of Basketball Players of Guru Nanak Dev University, Amritsar are presented in the following tables:
Table 3: Descriptive Statistics (Mean and SD) and Percentile Plot (Hi and Low) of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Test Items</th>
<th>Mean ± SD</th>
<th>Hi</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Muscular Strength</td>
<td>Mean 48.694 ± 2.699</td>
<td>55.00</td>
<td>42.00</td>
</tr>
<tr>
<td>2.</td>
<td>Muscular Power</td>
<td>Mean 46.069 ± 2.078</td>
<td>40.00</td>
<td>49.00</td>
</tr>
<tr>
<td>3.</td>
<td>Muscular Endurance</td>
<td>Mean 6.486 ± 1.048</td>
<td>8.000</td>
<td>4.000</td>
</tr>
</tbody>
</table>

In Muscular Strength, the mean score was 48.694 and standard deviation score was 2.699. In Muscular Power the mean score was 46.069 and standard deviation score was 2.078. Whereas in Muscular Endurance, the mean score was 6.486 and standard deviation score was 1.048.

Figure 3: Descriptive Statistics (Mean and SD) of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power and c. Muscular Endurance of male basketball players of Guru Nanak Dev University, Amritsar (N=72)

4.1 Grades under Normal Distribution
Five types of classification/grades i.e., Very Poor, Poor, Average, Good and Very Good have also been prepared under Normal Distribution. Grades have been presented in Table 4.
Table 4: Grading of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power and c. Muscular Endurance of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscular Strength</td>
<td>Less than (&lt;) 43.296</td>
<td>45.995-43.296</td>
<td>45.995-51.393</td>
<td>51.393-54.092</td>
<td>Greater than (&gt;54.092</td>
</tr>
<tr>
<td>Muscular Power</td>
<td>Less than (&lt;) 41.913</td>
<td>43.991-41.913</td>
<td>43.991-48.147</td>
<td>48.147-50.225</td>
<td>Greater than (&gt;50.225</td>
</tr>
</tbody>
</table>
| Muscular Endurance| Less than (<) 4.39 | 5.438-4.39 | 5.438-7.534 | 7.534-8.582 | Greater than (>8.582 |}

4.2 Muscular Strength
- In Muscular Strength, the scores below 43.296 are considered very poor, from about 45.995-43.296 is considered poor, 45.995-51.393 is considered average, 51.393-54.092 is considered good and the scores above 54.092 are considered very good.

4.3 Muscular Power
- In Muscular Power, the scores below 41.913 are considered very poor, from about 43.991-41.913 is considered poor, 43.991-48.147 is considered average, 48.147-50.225 is considered good and the scores above 50.225 are considered very good.

4.4 Muscular Endurance
- In Muscular Endurance, the scores below 4.39 are considered very poor, from about 5.438-4.39 is considered poor, 5.438-7.534 is considered average, 7.534-8.582 is considered good and the scores above 8.582 are considered very good.
5. Conclusions

According to the results, we can conclude that the in Muscular Strength, the scores below 43.296 are considered very poor, and the scores above 54.092 are considered very good. In Muscular Power, the scores below 41.913 are considered very poor, and the scores above 50.225 are considered very good. In Muscular Endurance, the scores below 4.39 are considered very poor, and the scores above 8.582 are considered very good.

In practice, the results can be very useful for the physical education teachers, trainers and coaches of Basketball players to estimate the performance of their players/trainees and to improve the instructional programmes and training module accordingly.

Furthermore, this study may provide appropriate percentile norms of specific physical fitness items of male Basketball players and may offer distribution of grades under normal distribution.
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References


