

Constructing Norms for Skill Test Items as a Barometer for Sports Potential Betwixt Basketball Players

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Abstract:

The Aim of this study was to examine the Dataset, Grade Distribution and Constructing Percentile Scores of Basketball Skill Test Items. For this investigation, sixty (N=60) state level girls basketball players from different sports centres of selected districts of Haryana were selected for the purpose of the present study. The participants were aged between 15 and 17 years. All the subjects were informed about the objective and protocol of the study. The primary data for the present study was gathered on the specified test items (viz., Field Goal Speed Test, Basketball Throws for Accuracy and Basketball Dribble Test). G*Power version 3.1.9.7 was used to analyse the power and to compute sample size with graphics options. The normality of the data was checked by using the Shapiro-Wilk Test of Normality. Under the data analysis, exploration of data was made with descriptive statistics and graphical analysis. Distribution of Grades under Normal Distribution was used, further it was sorted into five grades (viz., Excellent, Good, Average, Poor and Very Poor). The percentile calculator was utilized to generate a table that enumerates every 5th percentile, while also displaying the quartiles and deciles. The SPSS (Statistical Package for the Social Sciences) version 20.0 was used for all analyses. Field Goal Speed Test: In field goal speed test, score between 9.75-11.167 was considered as Excellent, 8.333-9.75 as Good, 5.499-8.333 as Average, 4.082-5.499 as Poor and score between 2.665-4.082 as Very Poor. Basketball Throws for Accuracy: In basketball throw for accuracy test, score between 21.955-24.294 was considered as Excellent, 19.416-21.955 as Good, 16.877-19.416 as Average, 14.338-16.877 as Poor and score between 11.799-14.338 as Very Poor. Basketball Dribble Test: In basketball dribble test, score between 21.5-23.934 was considered as Excellent, 19.066-21.5 as Good, 16.632-19.066 as Average, 14.198-16.632 as Poor and score between 11.764-14.198 as Very Poor. In Field Goal Speed Test: The above table indicates that the highest scores of field goal speed test are at 100th percentile is 10 and the lowest scores are at Zero percentile is 5 for Basketball players. In Basketball Throws for Accuracy: The above table indicates that the highest scores of basketballs throw for accuracy test are at 100th percentile is 25 and the lowest scores are at Zero percentile is 13 for Basketball players. In Basketball Dribble Test: The above table indicates that the highest scores of basketball dribble test are at 100th percentile is 23 and the lowest scores are at Zero percentile is 11 for Basketball players.

Keywords: Constructing, Dataset, Grade Distribution Percentile Scores, Basketball, Skill Test Items.

1. Introduction

Physical fitness is a good summative measure of the body's ability to perform physical activity and exercise, and it also provides an important summative indicator of health. (Tomkinson et al. 2018). Physical activity and physical fitness are significant skill and health-related factors for the youth population (Ren et al. 2021). A norm is a benchmark against which grades are measured. It is to some extent the basic components of a scientific test because all tests are regulated and controlled by standards (Bal & Sharma 2024). To counteract the negative effects of physical inactivity and promote health, the WHO recommends at least 150 min of at least moderate or 75 min of vigorous physical activity per week, complemented by strength training twice a week (Bal 2024). To achieve competitive success in any sport an adequate level physical fitness should be achieved (Bal & Singh 2018). Physical fitness measurement has emerged as an index of health status in children and youth (Ortega et al. 2008). Regular physical fitness evaluation allows monitoring it over time and identifying trends in different population groups (Lamoureux et al. 2019). Physical fitness is defined as the capacity to perform daily activity with vitality and sharpness, without undue fatigue while being able to appreciate recreation time interests and to meet the unpredicted emergencies (Singh & Singh 2017). A new fitness concept, health-related fitness, has been introduced on the basis of relationships between physical activities, fitness, and health (Blair et al. 1989). Fitness, in various forms, increases performance and improves safety (Sharkey 1990). Improvements in physical fitness through appropriate physical activities in an older adult should enable them to maintain and promote health and well-being into later years of life (Zajko et al. 2009). Individuals having an appropriate level of health-related fitness may work efficiently, reduce the risk of disease and injury, look their physical best, and participate and enjoy physical activity (Huang & Malina, 2002). Fitness, in various forms, increases performance and improves safety and leads to greater reserve capacity to resist physical stress (Astrand 1956). To develop health-related fitness norms according to age and gender of older adults, with the expectation that our research might provide useful information for targeting effective physical activity interventions towards people at risk for declining health and to improve the health status of the general population (Kim et al. 2020).

2. Selection of Subjects

For this investigation, sixty (N=60) state level girls basketball players from different sports centres of selected districts of Haryana were selected for the purpose of the present study. The participants were aged between 15 and 17 years. All the subjects were informed about the objective and protocol of the study. Subjects with history of any infective or respiratory ailment condition were excluded from the study. Purposive sampling was used keeping in view of administrative feasibility. The participants participated in the study voluntarily. The informed consent of participants was not conducted or granted in this study because all participants' privacy and personal identity information were maintained.

3. Selection of Test Items

The primary data for the present study was gathered from the state level girls' basketball players from different sports centres of selected districts of Haryana focusing on the specified test items.

i. Field Goal Speed Test

- ii. Basketball Throws for Accuracy
- iii. Basketball Dribble Test

4. Description of the Test Items

Field Goal Speed Test:

The tester asks the basketball player to stand at any position under the basket and the maximum number of baskets he needs to make in 30 seconds which provides a score for this test. This item measures the player's ability to consistently score field goals as quickly as possible under time pressure.

Scoring - The number of successful baskets thrown in 30 seconds provides the score for this test.

Basketball Throws for Accuracy:

This test measures the ability of a consistently accurate throw and the strength of the shoulder. In this test, a circular or rectangular target is placed on the wall which is installed 14 inches above the ground. The player is placed 40 feet away from the target and is asked to hit the ball in the center. The player can use the hook pass or overhand pass method to hit the target with the ball.

Scoring - Three points are awarded for each hit in the middle or line of the inner rectangle or circle; two points are awarded for each hit in the middle rectangle and its line. A total of ten trials, scores, are used to evaluate the Basketball Passing Test item of the Battery.

Basketball Dribble Test:

This basketball test item has been designed with the aim of measuring the ability to control the ball and the level of agility of a player. The player has to cover the maximum distance in 30 seconds while zigzag dribbling around the obstacle. 4 cones or obstacle are placed in a straight line at a distance of six feet. The first cone or obstacle is to be placed at a distance of 12 feet from the starting line which is 6 feet wide. The player must start dribbling from one end of the starting line and reach the opposite side of the starting point, dribbling around all the cones or obstacles.

Scoring - The score is equal to the number of zones covered in 30 seconds. In short, the player gets one point for each obstacle he crosses. However, the two sides of the final constraint and the starting line mark provide two distinct points because they each represent the boundaries of the two.

5. Research Design

Evocative or observational Research Design was utilized for the purpose of this study. The design is non-experimental as there was no manipulation for the independent variable, no experimental or control group, and no randomization. This is an exploratory study that has employed method of data collection and analysis quantitatively.

6. Inclusion and Exclusion Criteria

Participation in the study is subject to a number of inclusion and exclusion criteria:

Table-1 Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
For this investigation, sixty (N=60) state level girls basketball players from different sports centres of selected districts of Haryana were selected for the purpose of the present study.	Any acute or chronic physical disease that would limit the ability of the players to participate in the study.
Only female subjects were included for the present study.	Denial to give informed consent.

7. Ethical Considerations

Certain ethical concerns were applied to the current investigation. During the process of collecting and presenting research results, the investigator keeps the following ethical considerations in mind:

- i. Integrity
- ii. Dignity
- iii. Autonomy
- iv. Confidentiality
- v. Responsibility
- vi. Competence
- vii. Justice and Privacy

8. Statistical Techniques

G*Power version 3.1.9.7 was used to analyse the power and to compute sample size with graphics options.

The normality of the data was checked by using the Shapiro-Wilk Test of Normality.

Under the data analysis, exploration of data was made with descriptive statistics and graphical analysis.

Distribution of Grades under Normal Distribution was used, further it was sorted into five grades i.e.,

- i. Excellent
- ii. Good
- iii. Average
- iv. Poor
- v. Very Poor

The percentile calculator was utilized to generate a table that enumerates every 5th percentile, while also displaying the quartiles and deciles.

The SPSS (Statistical Package for the Social Sciences) version 20.0 was used for all analyses.

9. SWOT Analysis

Table 2 SWOT (strengths, weaknesses, opportunities and threats) analysis.

Sr. No.	SWOT	Inferences
1.	Strengths	The conclusions of this study can benefit players, coaches, trainers, instructors, physical education teachers, and sports psychologists, among others in relation to following test items: i. Field Goal Speed Test ii. Basketball Throws for Accuracy iii. Basketball Dribble Test
2.	Weaknesses	A limited diversity existed among the athletes; therefore, the results cannot be generalized into other sports settings.
3.	Opportunities	Study may help to design the basis of development of scientific training programs for different sports categories also.
4.	Threats	The researcher did not account for additional variables such as interest, attitude, cooperation, home environment, genetic composition, socioeconomic, cultural, religious, educational background, and nutrition, which might have posed risks to the study.

10. Results

Table 3 Descriptive statistics of test items (viz., field goal speed test, basketball throws for accuracy and basketball dribble test).

Descriptive Statistics:	Field Goal Speed Test	Basketball Throws for Accuracy	Basketball Dribble Test
Minimum	5	13	11
Maximum	10	25	23
Range	5	12	12
Size	60	60	60
Sum	415	1165	1144
Mean	6.916	19.416	19.066
Median	7	20	19
Mode	6	20,21	19
Standard Deviation	1.417	2.539	2.434
Variance	2.009	6.45	5.927
Mid-Range	7.5	19	17
Interquartile Range	2	3	3
Sum of Squares	118.583	380.583	349.733

Mean Absolute Deviation	1.161	2.061	1.837
Root Mean Square	7.058	19.579	19.218
Std Error of Mean	0.183	0.327	0.314
Skewness	0.336	-0.461	0.984
Kurtosis	2.342	3.015	4.731
Coefficient of Variation	0.204	0.130	0.127
Relative Standard Deviation	20.496%	13.08	12.769

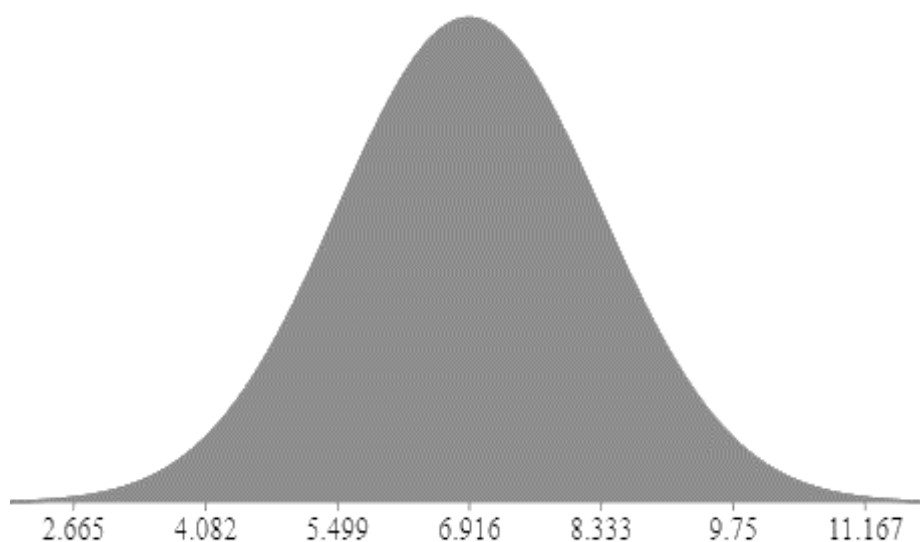


Figure-2: Graphical illustration of normal distribution concerning field goal speed test.

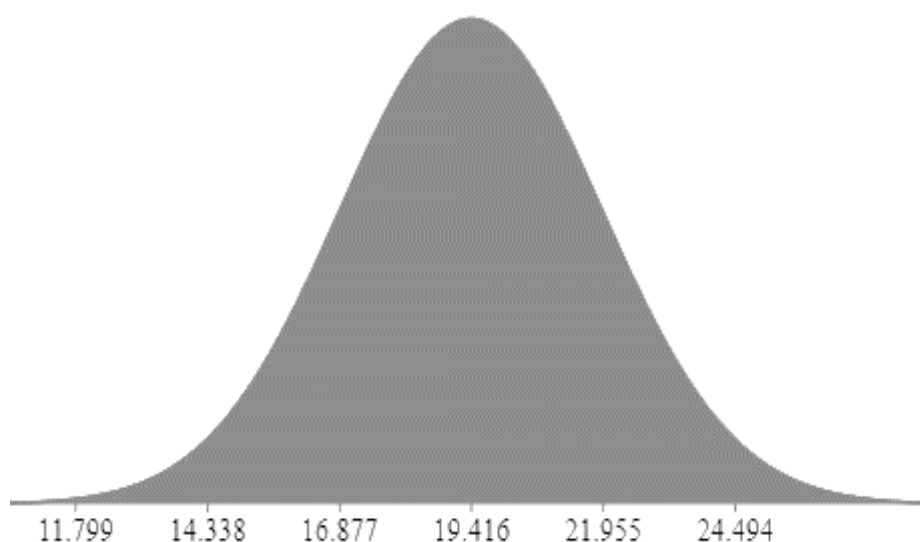


Figure-3: Graphical illustration of normal distribution concerning basketball throws for accuracy.

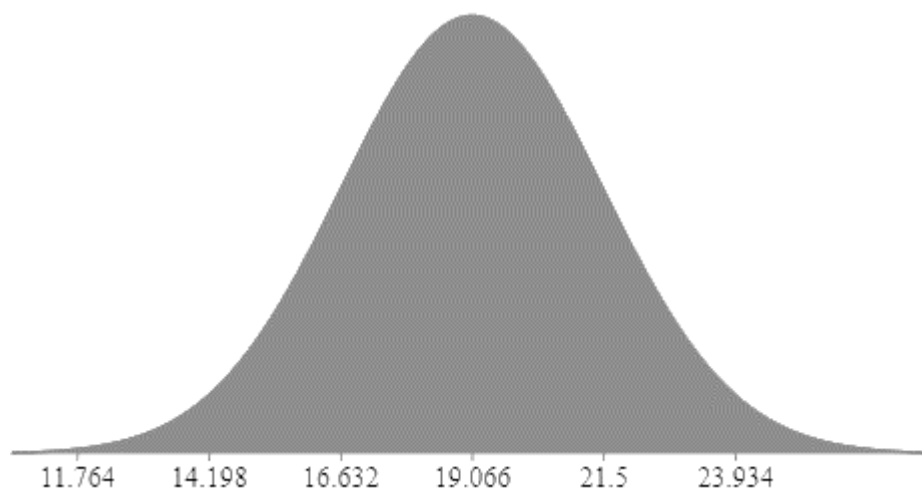


Figure-4: Graphical illustration of normal distribution concerning basketball dribble test.

Table 4 Distribution of grades of test items (viz., field goal speed test, basketball throws for accuracy and basketball dribble test).

Sr. No.	Test Items	Very Poor	Poor	Average	Good	Excellent
1.	Field Goal Speed Test	2.665-4.082	4.082-5.499	5.499-8.333	8.333-9.75	9.75-11.167
2.	Basketball Throws for Accuracy	11.799-14.338	14.338-16.877	16.877-19.416	19.416-21.955	21.955-24.294
3.	Basketball Dribble Test	11.764-14.198	14.198-16.632	16.632-19.066	19.066-21.5	21.5-23.934

Field Goal Speed Test:

In field goal speed test, score between 9.75-11.167 was considered as Excellent, 8.333-9.75 as Good, 5.499-8.333 as Average, 4.082-5.499 as Poor and score between 2.665-4.082 as Very Poor.

Basketball Throws for Accuracy

In basketball throw for accuracy test, score between 21.955-24.294 was considered as Excellent, 19.416-21.955 as Good, 16.877-19.416 as Average, 14.338-16.877 as Poor and score between 11.799-14.338 as Very Poor.

Basketball Dribble Test:

In basketball dribble test, score between 21.5-23.934 was considered as Excellent, 19.066-21.5 as Good, 16.632-19.066 as Average, 14.198-16.632 as Poor and score between 11.764-14.198 as Very Poor.

Table 5 Percentile norms of subjects for test items (viz., field goal speed test, basketball throws for accuracy and basketball dribble test).

Percentiles:	Field Goal Speed Test	Basketball Throws for Accuracy	Basketball Dribble Test
0th	5	13	11
5th	5	14.95	15
10th	5	16	16
15th	5	16.85	17
20th	6	17	17
25th	6	18	18
30th	6	18	18
35th	6	19	18.65
40th	6	19	19
45th	7	20	19
50th	7	20	19
55th	7	20	20
60th	7	20	20
65th	7	21	20
70th	8	21	20.3
75th	8	21	21
80th	8	21.2	21
85th	9	22	21.15
90th	9	22	22
95th	9	23	22
100th	10	25	23

Field Goal Speed Test:

The above table indicates that the highest scores of field goal speed test are at 100th percentile is 10 and the lowest scores are at Zero percentile is 5 for Basketball players.

Basketball Throws for Accuracy

The above table indicates that the highest scores of basketballs throw for accuracy test are at 100th percentile is 25 and the lowest scores are at Zero percentile is 13 for Basketball players.

Basketball Dribble Test:

The above table indicates that the highest scores of basketball dribble test are at 100th percentile is 23 and the lowest scores are at Zero percentile is 11 for Basketball players.

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Conflict of interest

The authors declare no conflicts of interest.

References

- [1] Aastrand, P. O. (1956). Human physical fitness with special reference to sex and age. *Physiological reviews*, 36(3), 307-335.
- [2] Bal, B.S. (2024). Distribution of grades and percentile norms of students of physical education for locomotor competence. *International Journal of Physiology, Nutrition and Physical Education*, 9(1),150-154.
- [3] Bal, B.S., & Sharma, S. (2024). Construction of physical fitness norms for the students of athletics background. *International Journal of Physical Education, Sports and Health*, 11(2), 243-248.
- [4] Bal, B.S., & Singh, B. (2018). A comparative study of cardiovascular fitness of kayaking players among Indian northern region universities. *International Journal of Yogic, Human Movement and Sports Sciences*,3(2),778-782.
- [5] Blair, S. N., Kohl, H. W., 3rd, Paffenbarger, R. S., Jr, Clark, D. G., Cooper, K. H., & Gibbons, L. W. (1989). Physical fitness and all-cause mortality. A prospective study of healthy men and women. *JAMA*, 262(17), 2395–2401.
- [6] Huang, Y. C., & Malina, R. M. (2002). Physical activity and health-related physical fitness in Taiwanese adolescents. *Journal of physiological anthropology and applied human science*, 21(1), 11-19.
- [7] Kim, J.K., Son, W.I., Sim, Y.J., Lee, J.S., & Oli Saud, K. (2020). The Study of Health-Related Fitness Normative Scores for Nepalese Older Adults. *International Journal of Environmental Research and Public Health*, 17(8),2723.
- [8] Lamoureux, N. R., Fitzgerald, J. S., Norton, K. I., Sabato, T., Tremblay, M. S., & Tomkinson, G. R. (2019). Temporal trends in the cardiorespiratory fitness of 2,525,827 adults between 1967 and 2016: a systematic review. *Sports Medicine*, 49, 41-55.
- [9] Ortega, F. B., Ruiz, J. R., Castillo, M. J., & Sjostrom, M. (2008). Physical fitness in childhood and adolescence: a powerful marker of health. *International journal of obesity*, 32(1), 1-11.
- [10]Ren, T., Yan, J., & Sun, Q. (2021). Sociodemographic Correlates of Organized Sports Participation in a Sample of Middle School Students in China. *Front Public Health*, 9, 730555.
- [11]Sharkey, B. J. (1990). *Physiology of Fitness*. *Human Kinetics*,1(4), 7-8.
- [12]Singh, K., & Singh, R. (2017). Comparison of selected physical fitness components of badminton and basketball players. *Int J Appl Res*, 3(4), 236-40.

- [13] Tomkinson, G.R., Carver, K.D. Atkinson, F., Daniell, N.D., Lewis, L.K., Fitzgerald, J.S., Lang, J.J., & Ortega, F.B. (2018). European normative values for physical fitness in children and adolescents aged 9–17 years: results from 2 779 165 Eurofit performances representing 30 countries. *Br J Sports Med*, 52, 1445–1456.
- [14] Zajko, C., W. J., Proctor, D. N., Singh, M. A. F., Minson, C. T., Nigg, C. R., Salem, G. J., & Skinner, J. S. (2009). Exercise and physical activity for older adults. *Medicine & science in sports & exercise*, 41(7), 1510-1530.