



“Construction of Norms on Explosive Power of West Bengal secondary school students”

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Abstract

Norms could be a scale that allows conversion from raw score to a score capable of comparison and interpretations. Norms are representative of some larger population. Skill related fitness has six components namely power, speed, agility, balance, coordination and reaction time. All these components are playing important role during sports activities. Power is the ability to employ a maximum force in as short a time as possible as in accelerating, jumping and throwing implements. Power is the ability to pass the body parts promptly while applying the maximum force of the muscles. Power is a composite of both speed and muscular strength. There are so many tests to measure power of an individual. But the researcher took Standing Broad Jump test to measuring leg explosive power of the school students. Objective of the present study were- 1. to construct norms in standing broad jump test of boys students, 2. to construct norms in standing broad jump test of girls students. 3. to measure leg explosive power of school students. Highly positive correlations were found during testing Validity and Reliability of the test item. Total 800 girls and 1000 boys' samples were collected from various schools in West Bengal ages between 9-14 years. After collection of data a percentile norms were prepared for boys and girls students. Percentile norms were prepared according to age group and sex wise.

Key words: Norms, Explosive Power, Percentile scale, Standing Broad Jump

Introduction

The term fitness is perhaps one of the most nebulous in the area of measurement in Physical Education. No more important objectives exist in the Physical Education and exercise than the attainment of physical fitness. Physical fitness is an all round objective with different meanings to different people. A more limited phase of physical fitness is motor fitness. It may be defined as a readiness or preparedness for performance with special regards for big muscle activity without undue fatigue. It concerns the capacity to move the body efficiently with force over a reasonable length of time. Motor fitness is gauged by performance and this performance is based on a composite of many factors. The most commonly mentioned fitness factors are strength, endurance, power, speed, agility, balance, flexibility, stamina etc. But one of the most fundamental aspects of physical education is the teaching and acquisition of specialized skill. Most of the “education through the physical” takes place by means of those skills that include sports or athletic activities as well as dance recognized as one of the major objectives of physical education. A sports skill is a unit and when compounded with other units into a group, along with certain rules, as sports or athletic games results. These units are based on the fundamental skills such as running, jumping, or throwing. Proficiency in these skills depends upon the basic factors that underline them, such as agility, speed, power or coordination.

Robson et al. (1978) executed a study on Physical Fitness Test Battery of elementary school students in the field of Physical Education. He took total 152 boys and 152 girls as sample from Kendriyo Vidyalaya of Gwalior and Madhya Pradesh. On the basis of the subject's physical fitness norms were prepared for systematized the children into category.

In the field of Physical Education Nehra (1984) coordinated a study on norms for boys athlete on field events from secondary schools in Haryana. From Rural and urban schools 1200 students ages 12-16 from each area were sort out for his study. According to age he divided the students into two groups, one below 15 years and another one above 15 years. For first group he selected four field events like discus throw, high jump, long jump and shot-put. On the other hand he selected six field items for second group and the test items were discus throw, shot-put, hammer throw, javelin throw, long jump and high jump.

A study was made on Kuwaits National Physical Fitness norms by Abdulnour (1988). AAHPER youth test were applied on total 6502 boys and girls, age range between 14-17 years. Test items were standing broad jump, flexed leg sit-ups, 50 meter dash, 600 meter run/walk, pull-ups for boys, and flexed arm hang for girls. T-test was used and significance level was 0.05.

Singh (1989) created a special physical fitness test for 14-18 years volleyball players. He selected 100 male volleyball players from northern states of India for his study test battery was developed with specific five test items and validity, reliability, objectivity, specificity were established before preparation of battery. Finally specific test battery was applied on 500 players and thereafter norms were constructed on age group.

Objectives of the study

Objectives of the present study were-

- i. to construct norms on explosive power through standing broad jump test of West Bengal school boys students,
- ii. to construct norms on explosive power through standing broad jump test of West Bengal school girls students,
- iii. to measure leg explosive power of girls and boys students.

Method and materials:

Variable: standing broad jump test was considered as variable for the present study.

Samples: Total 800 girls and 1000 boys' samples were collected from various schools in West Bengal ages between 10-13 years. Purposive sampling method was followed to select various schools in West Bengal.

Age group: 10 years (9.6 to 10.6 years), 11 years (10.6 to 11.6 years), 12 years (11.6 to 12.6 years), 13 years (12.6 to 13.6 years).

Tools used: standing broad jump (SBJ) test was used to measure leg explosive power of school students.

Test administration:

There are so many existing tests for measuring power. Among them these tests were available to the researcher. (1) Sargent vertical Jump (1921) (2) Vertical Arm pull test (Johnson, 1969), (3) Two-hand Medicine Ball Put (6 lb) (4) Shot-Put test (5) Standing Broad Jump test (AAHPER, 1976) (6) Vertical Power Jump Test (Glencross, 1960), (7) Margaria Anaerobic Power Test (1966) (8) Squat Jump (9) Drop Jump (10) 3 Hop Test (11) Two Hop Test (12) Margaria Kalamen Power Test etc.

Among the above mentioned tests, the researcher selected the standing broad jump test for measuring leg explosive power. Because this test is very easy to administer for the children and minimum equipments requires. This test item is also an established and valid test.

Equipments: Measuring tape, non-slip floor for takeoff and soft landing area. The take off line should be clearly marked.

Procedure: The subjects stand behind a line marked on the ground with feet slightly apart. A both leg foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without failing backwards. Three attempts are allowed.

Scoring: The measurement is taken from take off line to the nearest point of contact on the landing (back of the heels). Record the longest distance (cm) jumped, the best of three attempts.

After collection of raw scores age wise separate boys and girls percentile norms were prepared.

Analysis and interpretations:

Table no 1:

Age wise Mean and standard deviation of SBJ of boys and girls students

Age (Year)		Mean (cm)	Standard Deviation (cm)
10	Boys	143.03	19.72
	Girls	139.18	15.58
11	Boys	162.15	18.18
	Girls	154.05	15.02
12	Boys	171.37	17.5
	Girls	162.18	15.99
13	Boys	193.84	17.54
	Girls	166.2	16.58

It was found from table no 1 that according to age mean distance of standing broad jump were gradually increased in case of both boys and girls. It was also noted that the mean value of SBJ of boys higher than that of girls.

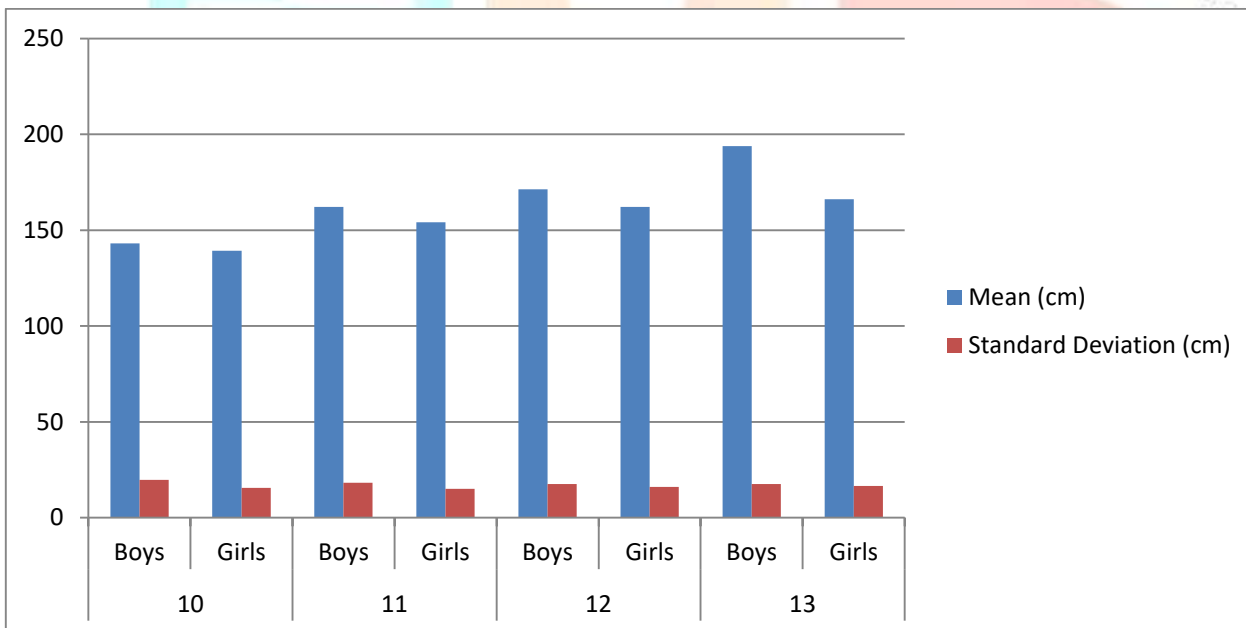


Fig. i. Age and sex wise graphical representation of Mean and Standard deviation of SBJ

Table no. 2

Normal probability distribution of the boys' students (Shapiro-Wilk test of normality)

Age	Skewness	Excess Kurtosis	P-value
10 yr	.089 (potentially symmetrical)	-.555 (potentially mesokurtic, normal like tails)	0.211 (>.0.5)
11 yr	-.107 (potentially symmetrical)	-.149 (potentially mesokurtic, normal like tails)	0.570 (>.0.5)
12 yr	-.231 (potentially symmetrical)	-.030 (potentially mesokurtic, normal like tails)	.092 (>.0.5)
13 yr	-.013 (potentially symmetrical)	-.413 (potentially mesokurtic, normal like tails)	0.530 (>.0.5)

From table no 2 it has been found that age wise all the data were normally distributed. For analysis of normality, Shapiro-Wilk test of normality was applied through SPSS software (version 21). In all cases P-value is greater than Alpha level (0.05) and null hypothesis (that the data are from a normally distributed population) is accepted.

Table no. 3:

Age wise percentiles values of standing broad jump (cm) of boys students

Percentile	Age			
	10 years	11 years	12 years	13 years
100	194	204	208	237
95	176	193	200.45	224.45
90	169.9	185	195	216.9
85	165	182	191	213
80	161	178	187	210
75	157	175	184	206.25
70	154	172	180.7	204
65	151	170	178	200
60	148	167	176	198.6
55	145	165	173	196
50	143	162	172	194
45	140	160	169	191.95
40	137.4	158	167	190
35	135	155	165	186.85
30	132	152	162	184
25	128.75	149.7	160	180
20	125	146	157	178
15	121	143	153	175
10	117	138.2	149.1	169.1
5	110.55	133	141.85	165

0	100	100	120	152
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From table no 3, it had been pointed out that in age of 10 years 25 percent students were jumped below 128.75 cm, 50 percent students jumped below 143 cm, 75 percent were jumped below 157 cm. In case of age group 11 years 25 percent students were jumped below 149.7 cm, 50 percent students jumped below 162 cm, 75 percent were jumped below 175 cm. In case of age group 12 years 25 percent students were jumped below 160 cm, 50 percent students jumped below 172 cm, 75 percent were jumped below 184 cm. In case of age group 13 years 25 percent students were jumped below 180 cm, 50 percent students jumped below 194 cm, 75 percent were jumped below 206.25 cm.

Table no. 4

Normal probability distribution of the girls' students (Shapiro-Wilk test of normality)

Age	Skewness	Excess Kurtosis	P-value
10 yr	.018 (potentially symmetrical)	-.57 (potentially mesokurtic, normal like tails)	0.253 (>.0.5)
11 yr	-.07 (potentially symmetrical)	-.498 (potentially mesokurtic, normal like tails)	0.395 (>.0.5)
12 yr	-.053 (potentially symmetrical)	-.482 (potentially mesokurtic, normal like tails)	.295 (>.0.5)
13 yr	-.239 (potentially symmetrical)	-.259 (potentially mesokurtic, normal like tails)	0.376 (>.0.5)

From table no 4 it has been found that age wise all the data of girls' students were normally distributed. For analysis of normality, Shapiro-Wilk test of normality was applied through SPSS software (version 21). In all cases P-value is greater than Alpha level (0.05) and null hypothesis (that the data are from a normally distributed population) is accepted.

Table no. 5

Age wise percentiles values of standing broad jump (cm) of girls students

Percentile	Age			
	10 years	11 years	12 years	13 years
100	174	190	197	203
95	165	180	189.05	192.85
90	160	175	183.1	188
85	155.15	170	180	183.15
80	153	166.2	177	181
75	150	165	173	178
70	147.3	162	170.3	175
65	145.35	160	168	173

60	144	158	166	171
55	141	155	164	169
50	140	154	162	167
45	137.55	152	160.55	165
40	136	150	158	163
35	133.65	147.65	157	160
30	130	145	153.7	157.7
25	128	143	151	155
20	125	140	148	152.8
15	121	138.85	145	148
10	118	135	141	144.9
5	114.95	130	135.95	135.95
0	103	120	125	120

From table no 5, it had been pointed out that in age of 10 years 25 percent students were jumped below 128 cm, 50 percent students jumped below 140 cm, 75 percent were jumped below 150 cm. In case of age group 11 years 25 percent students were jumped below 143 cm, 50 percent students jumped below 154 cm, 75 percent were jumped below 165 cm. In case of age group 12 years 25 percent students were jumped below 151 cm, 50 percent students jumped below 162 cm, 75 percent were jumped below 173 cm. In case of age group 13 years 25 percent students were jumped below 155 cm, 50 percent students jumped below 167 cm, 75 percent were jumped below 178 cm.

Conclusion:

On the basis of above result and discussion the following conclusions were drawn:

- 25th percentile score of boys' students of ages 10, 11, 12, 13 were 128.75, 149.7, 160 and 180 respectively.
- 50th percentile score of boys' students of ages 10, 11, 12, 13 were 143, 162, 172 and 194 respectively.
- 75th percentile score of boys' students of ages 10, 11, 12, 13 were 157, 175, 184 and 206.25 respectively.
- 100th percentile score of boys' students of ages 10, 11, 12, 13 were 194, 204, 208 and 237 respectively.
- 25th percentile score of girls' students of ages 10, 11, 12, 13 were 128, 143, 151 and 155 respectively.
- 50th percentile score of girls' students of ages 10, 11, 12, 13 were 140, 154, 162 and 167 respectively.
- 75th percentile score of girls' students of ages 10, 11, 12, 13 were 150, 165, 173 and 178 respectively.
- 100th percentile score of girls' students of ages 10, 11, 12, 13 were 174, 190, 197 and 230 respectively.

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