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# Construction of norms of skill related component of physical fitness of basketball player

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**Abstract**
The present study was conducted to construct norms for selected Skill related components of Basketball players. For the purpose of the present study, forty eight (N=48), male Basketball players of Guru Nanak Dev University, Amritsar between the age group of 18-28 years were selected as subjects. The 50 meter dash test was used to measure speed shuttle run test was used to measure agility overhead medicine ball throw test was used to power nelson scale test was used to measure reaction time alternate wall toss test was used to measure co-ordination and standing balance test was used to measure the balance. 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 Speed, the mean score was 9.01 and standard deviation score was 9.59. In Agility, the mean score was 13.21and standard deviation score was 1.34. In Power the mean score was 8.76and standard deviation score was 1.32. In Balance the mean score was 43.03and standard deviation score was 6.47. In Co-ordination the mean score was 36.33 and standard deviation was 8.04. In Reaction Time the mean score was 7.89 and standard deviation was 3.32 of Guru Nanak Dev University, Amritsar.

**Keywords:** Norms, speed, agility, power, balance, co-ordination and reaction time

## 1. Introduction

Skills and fitness are the very heart and core of physical education because through physical activity only all the other learning and accomplishments attributed to physical education and sports become possible. This area is best measured through what is empirically called physical performance tests. Skill related fitness includes training to improve speed, agility, balance, coordination, power and reaction time. These are usually use to help athlete improves performance for their particular sports activity. Although there has been research performed on this topic for many years (see, for example, Ayres, 1965) [1], the renewed interest may be caused by concern that today's children do not maintain appropriate levels of physical activity and physical fitness (Tremblay *et al*., 2011) [10], and there have also been reports of declining motor competence (Bardid, Rudd, Lenoir, Polman, & Barnett, 2015; Kambas *et al*., 2012) [2]. Despite the known benefits to health outcomes (Janssen & LeBlanc, 2010; Timmons *et al*., 2012) [6], evidence suggests that many children do not meet the recommended amount of daily physical activity (Kolle, Steene-Johannessen, Andersen, & Anderssen, 2010; Verloigne *et al*., 2012) [7]. In addition, evaluation of education systems worldwide by testing children's skills and knowledge in important key subjects may have increased the focus on academic results and efforts to improve the educational systems Several mechanisms related to changes in brain structure and cognitive function have been discussed when explaining the possible effects of physical activity on brain health in children (for a complete overview, see reviews by (Donnelly *et al*., 2016; Hillman *et al*., 2017; Voelcker-Rehage & Niemann, 2013) [12]. The constructs of physical activity, physical fitness, cardiovascular fitness, and motor competence are interrelated, but the results indicate that these different aspects of exercise and activity are differently associated with the brain structure, cognition, and function (Haapala, 2013; Voelcker-Rehage & Niemann, 2013) [5, 12]. Higher physical fitness and higher cardiovascular fitness in children has been related to a larger volume of the subcortical structures such as the basal ganglia and hippocampus (Chaddock *et al*., 2010, 2012) [4]; additional evidence suggests that children who are more fit have a higher integrity of white matter microstructure and cortical thickness (see Hillman *et al*., 2017). These structures are related to the modulation of executive control such as inhibition, memory, cognitive flexibility, and attention, which are cognitive operations that often are referred to as "gate keepers" to learning and academic achievement (Voelcker-Rehage & Niemann, 2013) [12].

More recently, studies on the association between motor coordination and cognitive function in children have emerged (Haapala *et al*., 2015; Van der Fels *et al*., 2014) [5], but the link between this kind of research and specific brain structures and functions is unclear. According to Koutsandréou, Wegner, Niemann, and Budde (2016) [8], improvement of the working memory is significantly better for children undergoing motor exercise compared with a cardiovascular exercise training group and a control group. It is suggested that coordination and motor skill learning taps into the neurophysiological motor system to a greater extent than the metabolic processes involved in fitness and physical activity, and that this has specific mechanistic effects on the brain structure and function via influence of the neural synapses and network (Koutsandréou *et al*., 2016; Voelcker-Rehage & Niemann, 2013) [8, 12]. The underlying mechanisms that are different between types of physical activity and brain structure/function are diverse and complex, and they are beyond the scope of the present study.

Reading is a skill that, in many societies, will determine success because decoding of written text to attain meaning is a prerequisite to gain knowledge from books. The reading process presupposes the graphemic encoding of visually presented words that in turn is recoded into speech and meaning is activated in semantic memory corresponding to comprehension (Revlin, 2013) [9].

## 2. Material and Methods

### 2.1 Selection of Subjects

For the purpose of the present study, forty eight (N=48), male Basketball players of Guru Nanak Dev University, Amritsar between the age group of 18-28 years were selected as subjects.

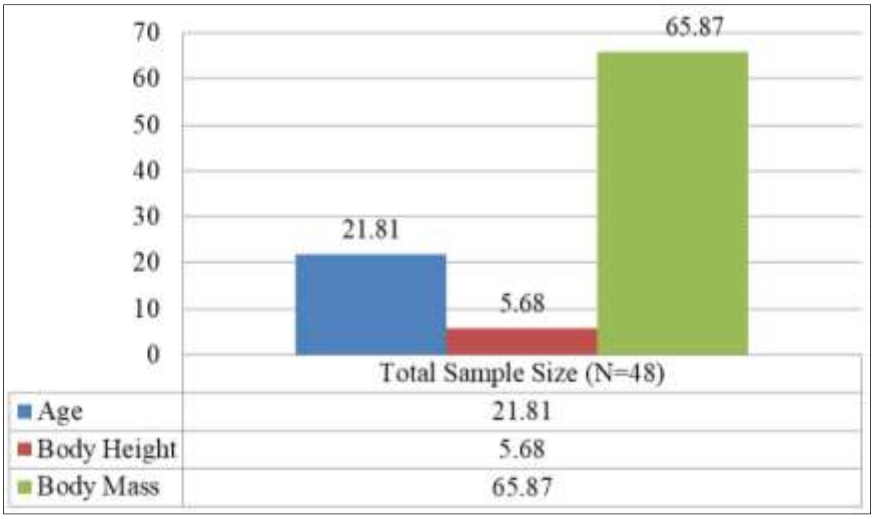



**Fig 1:** Subject's Demographics of basketball players of Guru Nanak Dev University, Amritsar (N=48).

## 3. Selection of Variables

A feasibility analysis as to which of the variables could be taken up for the investigation, keeping in view the availability of tools, adequacy to the subjects and the legitimate time that could be devoted for tests and to keep the entire study unitary and integrated was made in consultation with experts. With the above criteria's in mind, the following skill related components were selected for the present study:

### 3.1 Skill related components

i. Speed
ii. Agility
iii. Power
iv. Balance
v. Coordination
vi. Reaction time

## 4. Statistical Analysis

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.

## 5. Results

For each of the chosen variable, the result pertaining to Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of selected Skill related components of students are presented in the following tables:

**Table 1:** Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of selected Skill related components of forty eight (N=48), male Basketball players of Guru Nanak Dev University, Amritsar.

| Sr. No. | Variables | Mean ± Standard Deviation | | Hi | Low |
|---|---|---|---|---|---|
| 1. | Speed | Mean | 9.01 | 11.98 | 7.56 |
| | | SD | 9.59 | | |
| 2. | Agility | Mean | 13.21 | 16.34 | 10.84 |
| | | S.D | 1.34 | | |
| 3. | Power | Mean | 8.76 | 10.63 | 5.36 |
| | | S.D | 1.32 | | |

| | | | | | |
|---|---|---|---|---|---|
| 4. | Balance | Mean | 43.03 | 58.94 | 31.42 |
| | | S.D | 6.47 | | |
| 5. | Co-ordination | Mean | 36.33 | 54 | 20 |
| | | S.D | 8.04 | | |
| 6. | Reaction Time | Mean | 7.89 | 15.8 | 2.8 |
| | | S.D | 3.32 | | |

Table 1 shows that in Speed, the mean score was 9.01and standard deviation score were 9.59.In Agility the mean score was 13.21and standard deviation score was 1.34. In Power the mean score was 8.76and standard deviation score was 1.32. In Balance the mean score was 43.03and standard deviation score was 6.47. In coordination the mean score was 36.33and standard deviation score was 8.04. In Reaction time the mean score was 7.89 and standard deviation score was 3.32of Guru Nanak Dev University, Amritsar (N=48) has been presented graphically in figure 2.

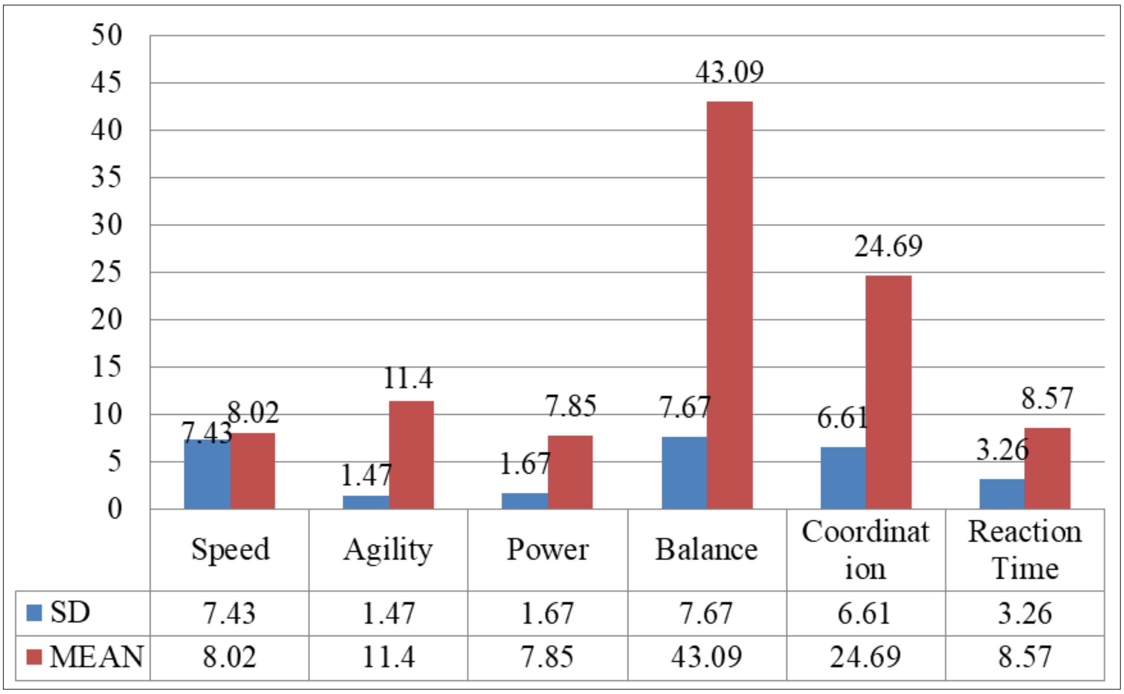
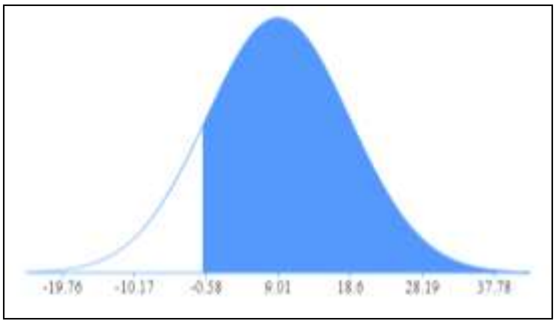



**Fig 2:** Descriptive Statistics (Mean & Standard Deviation) of selected Skills (i.e., speed, agility, power, balance, coordination, balance.) of skill related component of players of Guru Nanak Dev University, Amritsar (N=48).

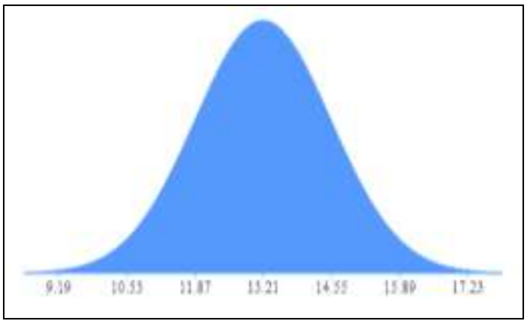
**Table 2:** Grading for the selected skill related component of students of Guru Nanak Dev University, Amritsar (N=48).

| Variables | Very Poor | Poor | Average | Good | Very Good |
|---|---|---|---|---|---|
| Speed | Greater than (>) 28.19 | 28.19-18.6 | 18.6- -0.58 | -0.58- -10.17 | Less than (<) -10.17 |
| Agility | Greater than (>) 15.89 | 15.89-14.55 | 14.55-11.87 | 11.87-10.53 | Less than (<) 10.53 |
| Power | Less than (<) 6.12 | 6.12-7.44 | 7.44-10.08 | 10.08-11.4 | Greater than (>)11.4 |
| Balance | Less than (<) 30.09 | 30.09-36.56 | 36.56-49.5 | 49.5-55.97 | Greater than (>) 55.97 |
| Coordination | Less than (<) 20.25 | 20.25-28.29 | 28.29-44.37 | 44.37-52.41 | Greater than (>) 52.41 |
| Reaction time | Greater than (>) 14.53 | 14.53-11.21 | 11.21-4.57 | 4.57-1.25 | Less than (<) 1.25 |

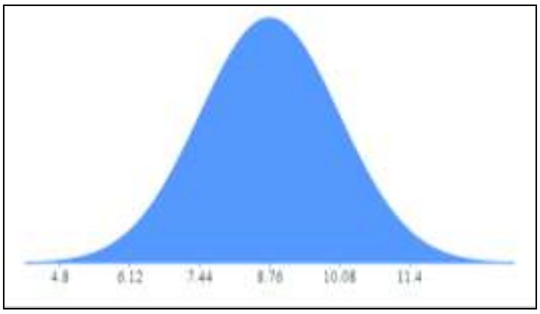
The values listed in table 2 gives a guide to expected scores for skill related components of Players (N=48) of Guru Nanak Dev University, Amritsar for speed, Agility, power, balance, coordination, and reaction time. In speed the scores above than 28.19 are considered very poor from about 28.19-18.6is considered poor 18.6- -0.58 is considered average -0.58- -10.17 is considered good and the scores below than -10.17 are considered very good. In agility, the scores above 15.89 are considered very poor from about 15.89-14.55 is considered poor 14.55-11.87 is considered average 11.87-10.53 is considered good and the scores below 10.53 are considered very good. In power the scores below 6.12 are considered very poor from about 6.12-7.44 is considered poor 7.44-10.08 is considered average 10.08-11.4 is considered good and the scores above 11.4 are considered very good. In balance the scores below 30.09 are considered very poor from about 30.09-36.56 is considered poor 36.56-49.5 is considered average 49.5-55.97 is considered good and the scores above 55.97 considered very good. In coordination, the scores below 20.25 are considered very poor from about 20.25-28.29 is considered poor 28.29-44.37 is considered average 44.37-52.41 is considered good and the scores above 52.41 are considered very good. In reaction time the scores above 14.53 are considered very poor from about 14.53-11.21is considered poor 11.21-4.57is considered average 4.57-1.25 is considered good and the scores below 1.25 are considered very good.



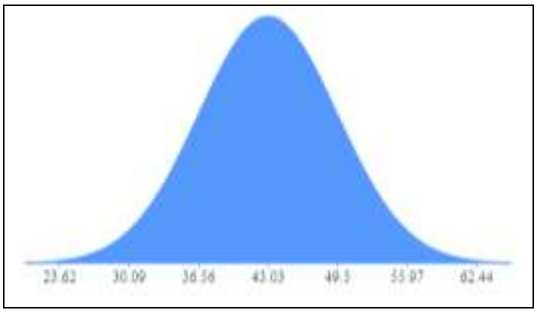

(i)



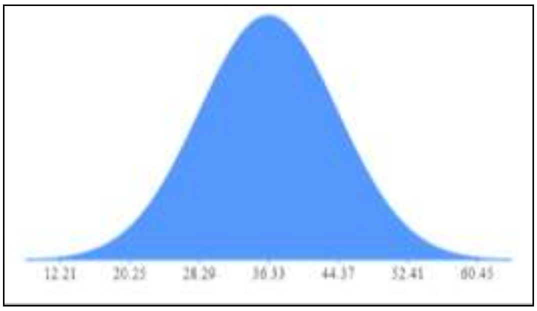

(ii)



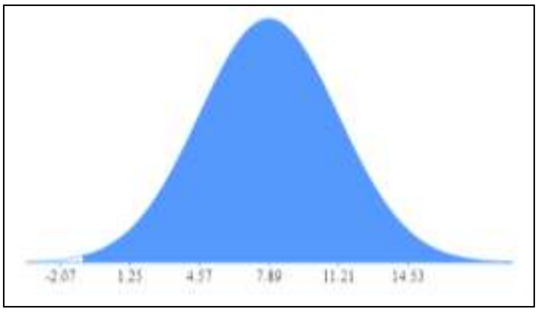

(iii)




(iv)




(v)




(vi)

**Fig 3:** Normal distribution of selected skill related component (i.e., speed, agility, power, balance, coordination, balance.) of Guru Nanak Dev University, Amritsar (N=48).

## 6. Conclusions

To conclude, it is evident that in speed the scores above 28.19 are considered very poor from about 28.19-18.6 is considered poor 18.6- -0.58 is considered average -0.58- -10.17 is considered good and the scores below than -10.17 are considered very good.

To conclude, it is evident that in agility, the scores above 15.89 are considered very poor from about 15.89-14.55 is considered poor 14.55-11.87 is considered average 11.87-10.53 is considered good and the scores below 10.53 are considered very good.

To conclude, it is evident that in power the scores below 6.12 are considered very poor from about 6.12-7.44 is considered poor 7.44-10.08 is considered average 10.08-11.4 is considered good and the scores above 11.4 are considered very good.

To conclude, it is evident that in balance the scores below 30.09 are considered very poor from about 30.09-36.56 is considered poor 36.56-49.5 is considered average 49.5-55.97 is considered good and the scores above 55.97considered very good.

To conclude, it is evident that in coordination, the scores below 20.25 are considered very poor from about 20.25-28.29 is considered poor 28.29-44.37 is considered average 44.37-52.41 is considered good and the scores above 52.41 are considered very good.

To conclude, it is evident that in reaction time the scores above 14.53 are considered very poor from about 14.53-11.21 is considered poor 11.21-4.57 is considered average 4.57-1.25 is considered good and the scores below 1.25 are considered very good.

## 7. Recommendations

Physical education teachers, coaches and athletic trainers may utilize the findings of students.

The study can be broadened by involving players of different performance levels (i.e. state, national, and international).

A similar study may be undertaken using larger sample for overall better consistency of result.

## 8. Acknowledgements

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