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## STUDY OF DISTRIBUTION OF GRADES UNDER NORMAL DISTRIBUTION FOR SPRINTING, JUMPING AND THROWING OF HINDU COLLEGE, AMRITSAR

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### ABSTRACT

**STUDY AIM:** The aim of this study was to determine the distribution of grades under normal distribution for sprinting (100 m & 200 m), jumping (long jump) and throwing (shot-put & javelin throw) of Hindu college, Amritsar. **MATERIAL AND METHODS:** Forty (N=40) female students at the college level from Hindu College, affiliated with Guru Nanak Dev University in Amritsar, Punjab, India, were chosen to participate in this research study. The scope of the study was specifically focused on the athletic disciplines of sprinting, jumping, and throwing. **STATISTICAL ANALYSIS:** The normality of the data was checked by using the Shapiro-Wilk (SW) 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., Excellent, Good, Average, Poor and Very Poor. The SPSS (Statistical Package for the Social Sciences) version 20.0 was used for all analyses. **RESULTS:** 100 M: - The Rating above 17.145 was very poor, 16.251-17.145 was poor, 14.463-16.251 was average, 13.569-14.463 was good whereas, rating below 13.569 was excellent. 200 M: - The Rating above 29.099 was very poor, 27.898-29.099 was poor, 25.496-27.898 was average, 24.295-25.496 was good whereas, rating below 24.295 was excellent. Long Jump: - The Rating below 0.471 was very poor, 0.471-1.42 was poor, 1.42-3.318 was average, 3.318-4.267 was good whereas, rating above 4.267 was excellent. Shot-Put: - The Rating below 1.316 was very poor, 1.316-2.289 was poor, 2.289-4.235 was average, 4.235-5.208 was good whereas, rating above 5.208 was excellent. Javelin: - The Rating below 3.296 was very poor, 3.296-6.23 was poor, 6.23-12.098 was average, 12.098-15.032 was good whereas, rating above 15.032 was excellent.

**Keywords:** Sprinting, Jumping, Throwing, Hindu College, Amritsar.

### INTRODUCTION

The most important objective of physical education and sports programs is human physical fitness. People from various areas of life have been interested in physical fitness testing, including the general public and professionals in the fields of physical education, health education, pedagogy, medicine, human biology, exercise physiology, and sports coaching [1]. A person is considered fit if they have enough energy to avoid becoming tired and enjoy life. Elderly adults who want to live a healthy, fulfilling life must maintain and increase their level of physical fitness [2]. Being physically fit is a prerequisite for competing athletes undergoing high-intensity training, since it enhances their technical and tactical proficiency and performance [3]. The special fusion of skill and physical fitness, technical, tactical, and psychological attributes is typically credited with athletes' great performance [4]. Sports injuries can result from an athlete losing their physical

fitness component, endangering their abilities [5]. A person's physical health is vital to their well-being and to the advancement and security of their country. It serves as the cornerstone of all other excellences. Since ancient times, man has always lived by the maxim "health and physical fitness [6]. Whether it's an individual activity or a team sport, physical fitness is essentially necessary for all activities and sports. In order to compare the physical fitness of participants in solo and team sports, this research was conducted [7]. It is impossible to ignore the importance of physical fitness as a topic in education. It is a very significant factor [8]. Athletes' success in team sports is influenced by a multitude of variables. Similarly, characteristics such as physical fitness and human body composition influence how well teams perform in professional and elite sports [9]. The ability of the body to adapt to and recover from demanding activity is known as physical fitness. While most people associate the word "fitness" with physical fitness, the description above suggests that physical fitness should only be considered one aspect of overall fitness. Total fitness is defined as being attentive without being overly fatigued and having enough energy for unanticipated crises [10]. Along with the rule modifications, physical fitness has gained importance as a crucial component of players' competitive abilities [11, 12]. The most important factor in determining an athlete's capacity for competition is their level of physical fitness. Having excellent physical fitness is a prerequisite for competing athletes undergoing high-intensity training, since it enhances their technical and tactical proficiency and performance [13]. One method of locating putative intrinsic, changeable risk factors for sports injuries is to assess physical fitness traits. A person's capacity to carry out everyday chores can be determined by a variety of traits, including physical fitness. Agility, balance, body composition, cardiovascular fitness, coordination, flexibility, muscular endurance, muscular strength, power, response time, and speed are some of the elements of physical fitness [14, 15, 16]. And in addition, we test if the presentation, to ice hockey parents, of social norms that are gaining in popularity i.e., 'dynamic' norms –, and which specifically encourage sportsperson ship, learning, and having fun in the context of ice hockey, will increase these parents' own self-determined (i.e., autonomous) motivation to adhere to these behaviors and values [17]. Social norms play a potent role in the realm of sports. Some norms can promote excessive competitiveness and discourage sportsperson ship. For example, sports contexts that normalize and legitimize harmful actions have been associated with increased antisocial behaviors among athletes [18]. At the intergroup level, the more athletes perceived that their own sports team endorses antisocial behaviors and identified strongly with this team, the more likely they were to engage in these antisocial behaviors themselves, even toward their own teammates [19]. Norms refer to what is encouraged and valued in a group (injunctive norm), and what most members of that group do concretely in terms of their behaviors [20].

## MATERIAL AND METHODS

### *Participants:*

Forty (N=40) female students at the college level from Hindu College, affiliated with Guru Nanak Dev University in Amritsar, Punjab, India, were chosen to participate in this research study. The scope of the study was specifically focused on the athletic disciplines of sprinting, jumping, and throwing.



**Figure-1: Hindu College, Amritsar, Punjab, India.**

Source: <https://www.hindustantimes.com/punjab/amritsar-s-hindu-college-common-to-manekshaw-ex-pm-manmohan-singh/story-NVSGuDmM785wyuEIZvrHhM.html>

## DESIGN OF THE STUDY

The research study employs quantitative data collection and analysis methods to investigate the Descriptive Statistics (Mean & Standard Deviation) & Percentile Plot (Hi & Low), Distribution of Grades under Normal Distribution and Percentile Norms for collegiate girls of Hindu College, Amritsar, Punjab, India.

## RESEARCH QUESTION

A carefully crafted research query enhances the lucidity of a study and sets a precise focal point, aiding in comprehending the research subject and delineating the objectives of the inquiry by addressing the aspects of what, why, and how.

**Table-1: Research question (what?, why? and how?).**

What?	Why?	How?
<ul style="list-style-type: none"> <li>☞ Study of Distribution of Grades Under Normal Distribution for Sprinting, Jumping and Throwing of Hindu College, Amritsar</li> </ul>	<ul style="list-style-type: none"> <li>☞ To determine Descriptive Statistics (Mean &amp; Standard Deviation) &amp; Percentile Plot (Hi &amp; Low), Distribution of Grades under Normal Distribution and Percentile Norms for collegiate girls of Hindu College, Amritsar, Punjab, India</li> </ul>	<ul style="list-style-type: none"> <li>☞ The normality of the data was checked by using the Shapiro-Wilk (SW) 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.,               <ul style="list-style-type: none"> <li>☞ Excellent</li> <li>☞ Good</li> <li>☞ Average</li> <li>☞ Poor</li> <li>☞ Very Poor</li> </ul> </li> </ul>

## SELECTION OF THE TEST ITEMS

Sprinting:

The speed test was utilized to gauge speed. The following were the test items that were utilized:

- i. 100 M
- ii. 200 M

Jumping:

The jumping test was performed to measure the explosive power of the legs. The following test item was employed:

- i. Long Jump

**Throwing:**

The throwing test was performed to measure explosive power of body. The test items that were used were as follows:

- i. Shot-Put
- ii. Javelin Throw

**ETHICAL CONSIDERATIONS**

Ethical considerations were duly considered in the execution of this study. The researcher reflected on a set of principles during the data collection and presentation phases, including the

- ☒ The principle of self-determination
- ☒ The principle of acceptance
- ☒ The principle of purposeful expression of feelings
- ☒ The principle of controlled emotional involvement
- ☒ The principle of confidentiality
- ☒ The principle of individualism
- ☒ The principle of non-judgmental attitude

**STATISTICAL ANALYSIS**

The normality of the data was checked by using the Shapiro-Wilk (SW) 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 SPSS (Statistical Package for the Social Sciences) version 20.0 was used for all analyses.

**SAMPLING TECHNIQUE**

In this study, the purposive sampling technique also known as judgment, selected, or subjective sampling—was applied. Researchers frequently think that by using reliable estimation, it is possible to obtain a sample that is representative of the population, saving time and money when choosing certain topic groups.

**SWOT ANALYSIS**

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

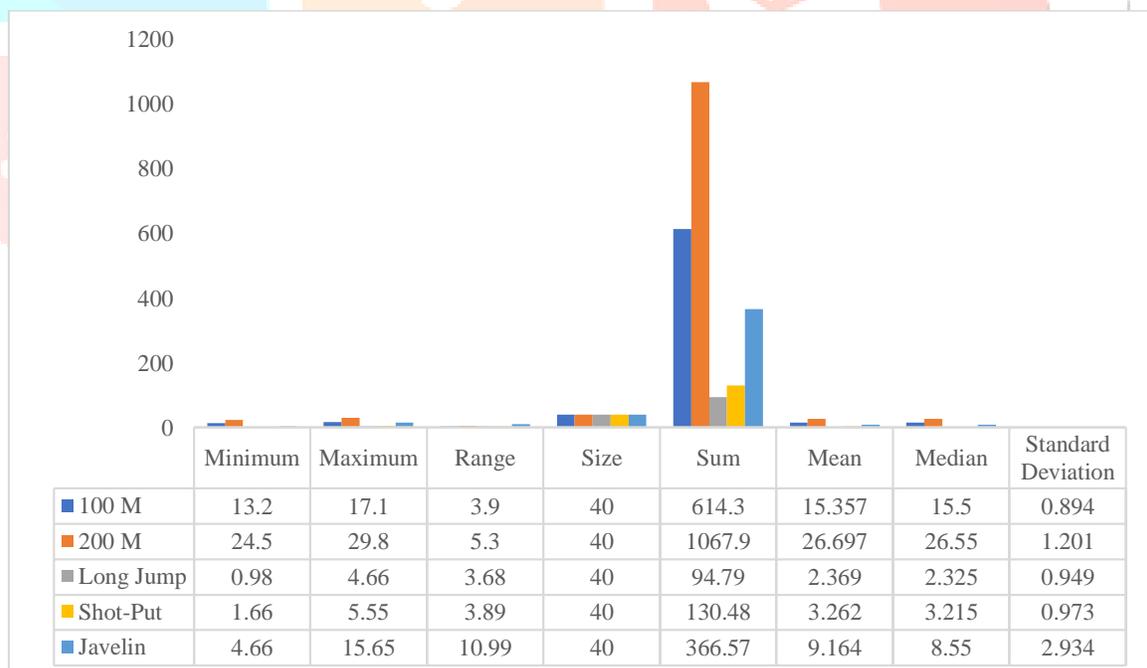
Sr. No.	SWOT	Inferences
1.	Strengths	The findings of this research have the potential to provide advantages to athletes, coaches, trainers, educators, physical education instructors, and sports psychologists, among various other stakeholders, with respect to the following occurrences: Sprinting: i. 100 M ii. 200 M Jumping: i. Long Jump Throwing: i. Shot-Put ii. Javelin Throw
2.	Weaknesses	The limited diversity observed among the athletes may hinder the generalizability of the findings to various other sports contexts.
3.	Opportunities	Research can aid in establishing the foundation for creating scientific training programs tailored to various sports categories.
4.	Threats	The researcher failed to consider extra factors like

		interest, attitude, cooperation, home environment, genetic makeup, socioeconomic status, cultural influences, religious beliefs, educational history, and dietary habits, all of which could have introduced potential threats to the validity of the study.
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## RESULTS

**Table-3: Descriptive data of physical performances (viz., 100 M, 200 M, Long Jump, Shot-Put and Javelin).**

	100 M	200 M	Long Jump	Shot-Put	Javelin
Minimum	13.2	24.5	0.98	1.66	4.66
Maximum	17.1	29.8	4.66	5.55	15.65
Range	3.9	5.3	3.68	3.89	10.99
Size	40	40	40	40	40
Sum	614.3	1067.9	94.79	130.48	366.57
Mean	15.357	26.697	2.369	3.262	9.164
Median	15.5	26.55	2.325	3.215	8.55
Standard Deviation	0.894	1.201	0.949	0.973	2.934
Variance	0.799	1.442	0.899	0.947	8.607
Interquartile Range	1.25	1.45	1.045	1.565	3.525
Sum of Squares	31.177	56.269	35.092	36.917	335.693
Mean Absolute Deviation	0.741	0.902	0.736	0.804	2.247
Root Mean Square	15.382	26.723	2.548	3.401	9.611
Std Error of Mean	0.141	0.189	0.150	0.154	0.463

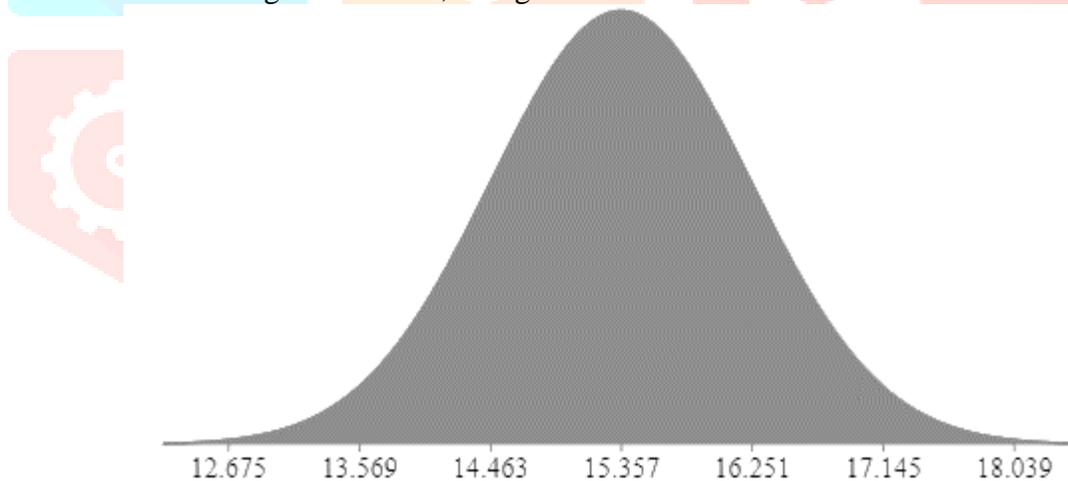


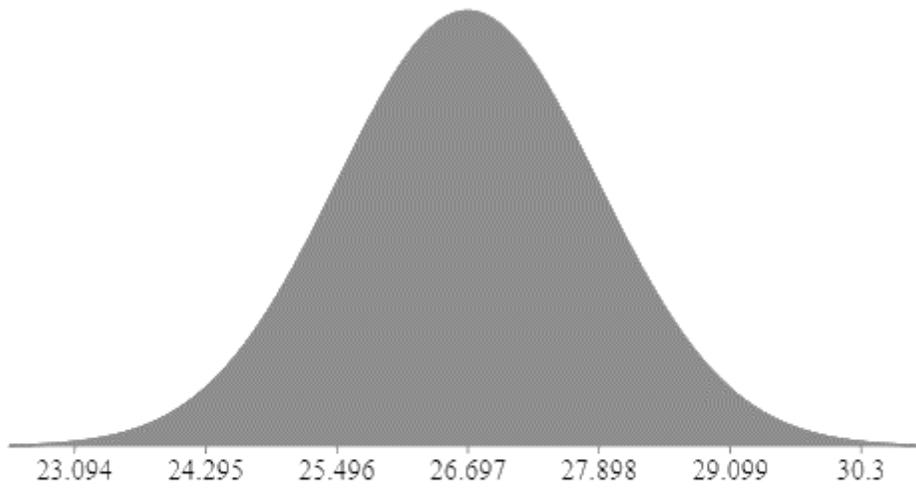
**Figure-2: Graphical illustration of descriptive data of physical performances (viz., 100 M, 200 M, Long Jump, Shot-Put and Javelin).**

**Table-4 Distribution of data of physical performances (viz., 100 M, 200 M, Long Jump, Shot-Put and Javelin).**

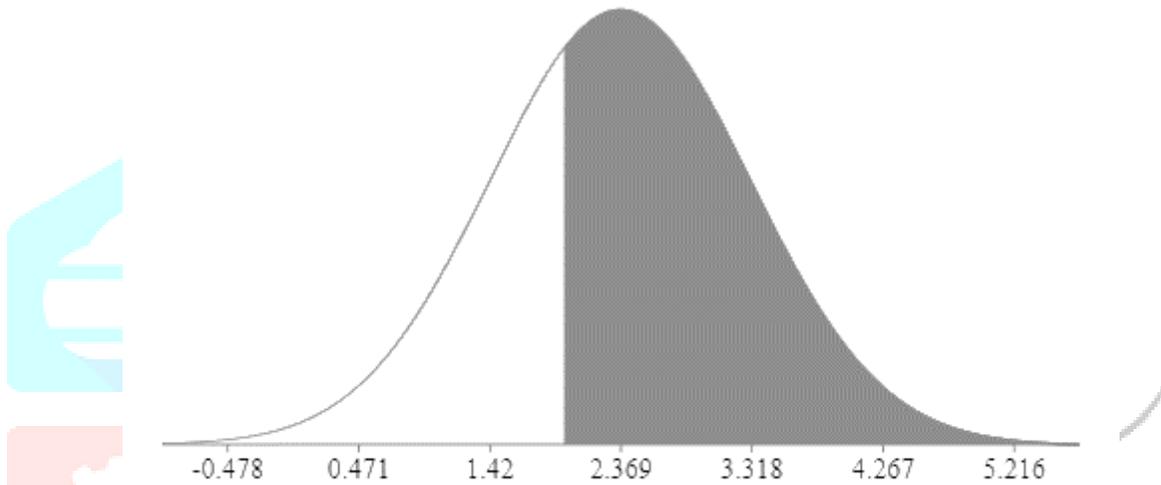
Physical performance	Very poor	Poor	Average	Good	Excellent
100 M	Rating above 17.145	16.251-17.145	14.463-16.251	13.569-14.463	13.569
200 M	Rating above 29.099	27.898-29.099	25.496-27.898	24.295-25.496	24.295
Long Jump	Rating below 0.471	0.471-1.42	1.42-3.318	3.318-4.267	4.267
Shot- Put	Rating below 1.316	1.316-2.289	2.289-4.235	4.235-5.208	5.208
Javelin	Rating below 3.296	3.296-6.23	6.23-12.098	12.098-15.032	15.032

- i **100 M:** - The Rating above 17.145 was very poor, 16.251-17.145 was poor, 14.463-16.251 was average, 13.569-14.463 was good whereas, rating below 13.569 was excellent.
- ii **200 M:** - The Rating above 29.099 was very poor, 27.898-29.099 was poor, 25.496-27.898 was average, 24.295-25.496 was good whereas, rating below 24.295 was excellent.
- iii **Long Jump:** -The Rating below 0.471 was very poor, 0.471-1.42 was poor, 1.42-3.318 was average, 3.318-4.267 was good whereas, rating above 4.267 was excellent.
- iv **Shot-Put:** -The Rating below 1.316 was very poor, 1.316-2.289 was poor, 2.289-4.235 was average, 4.235-5.208 was good whereas, rating above 5.208 was excellent.
- v **Javelin:** -The Rating below 3.296 was very poor, 3.296-6.23 was poor, 6.23-12.098 was average, 12.098-15.032 was good whereas, rating above 15.032 was excellent.

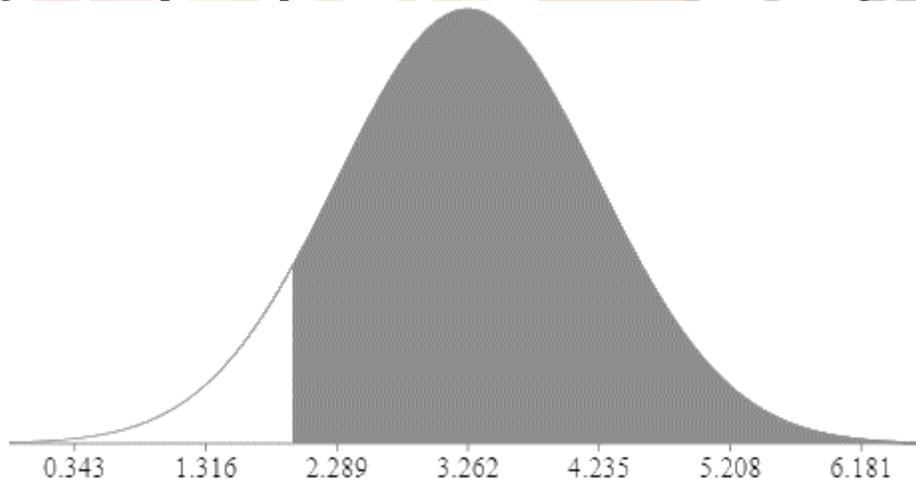
**Figure-3: Graphical representation of normal distribution of 100 M.**



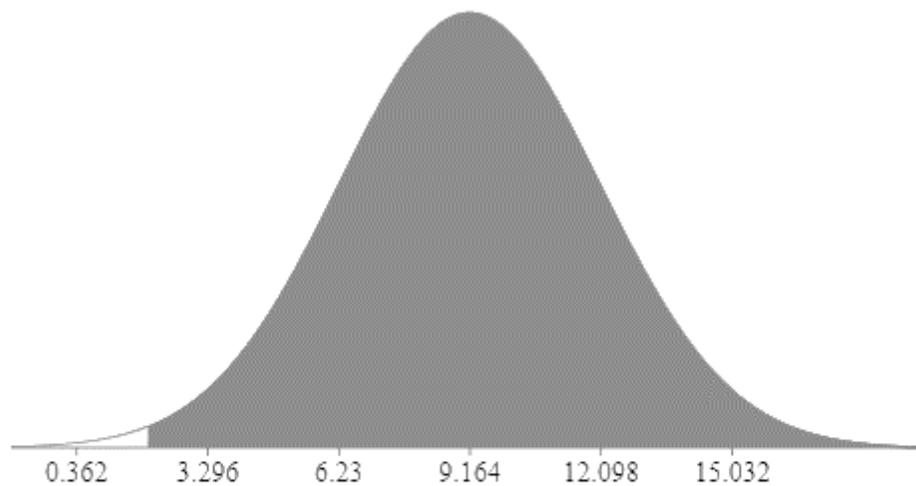
**Figure-4: Graphical representation of normal distribution of 200 M.**



**Figure-5: Graphical representation of normal distribution of Long Jump.**



**Figure-6: Graphical representation of normal distribution of Shot-Put.**



**Figure-7: Graphical representation of normal distribution of Javelin.**

### Conflict of Interest

The authors declare no conflicts of interest.

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