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Comparative analysis of physical fitness levels between performer and non-performer male baseball players

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Abstract
Baseball is a physically demanding sport that requires a unique combination of strength, power, speed, agility, and endurance. To perform at a high level, baseball players must possess a strong foundation of physical fitness, which encompasses cardiovascular endurance, muscular strength and endurance, flexibility, and body composition (American College of Sports Medicine, 2018) [1]. However, the physical demands of baseball can also increase the risk of injury, particularly to the shoulder, elbow, and knee joints (Conte et al., 2016) [2].
Despite the importance of physical fitness in baseball, there is a need for further research on the optimal training methods and programs for enhancing physical fitness in baseball players. This review aims to summarize the current literature on physical fitness in baseball players, with a focus on the components of physical fitness, training methods, and injury prevention strategies.
The researcher collected the data on sixty (N=60), Male players. The subjects were further divided into (N=30) Performer players and (N=30) non-performer among the age group of 18-28 years were selected. The subjects were purposively assigned from inter-college Panjab University players. This research was to examine the Physical fitness of Performer and Non-performer Baseball player.

Keywords: Physical fitness components, performer, non- performer baseball player, intercollege

Introduction
Baseball is a sport that demands a unique combination of physical skills, mental acuity, and strategic thinking. While much of the focus often lies on the mental aspects of the game, the physical fitness of baseball players plays a crucial role in their performance at the highest levels. The rigorous demands of baseball—whether it's sprinting around the bases, making split-second decisions, or throwing a 100-mph fastball—require players to possess a well-rounded fitness regimen.
Physical fitness for baseball players encompasses strength, agility, speed, endurance, and flexibility, all of which contribute to a player's ability to execute both offensively and defensively. Players need explosive power for batting, arm strength for pitching, and the agility to cover vast distances in the outfield or steal bases. Additionally, a player's ability to recover quickly and maintain focus throughout the long season is just as important as their physical conditioning.
In this context, high-level performance in baseball is not just about raw talent but also about how well players train and maintain their physical fitness. The pursuit of peak performance involves an integrated approach to strength training, cardiovascular conditioning, and sport-specific drills designed to enhance skills. This introduction explores how physical fitness directly correlates with a player's ability to perform under the pressures of major league baseball, underscoring the importance of physical conditioning in achieving elite performance.

Objective of the study
The Objective of the study was to:
1. Physical Fitness Components between Performer and Non-performer Male Baseball Players.
2. Provide Recommendation for baseball player for higher level training purposes

Hypothesis
Performer and Non-performer male Baseball players would significantly differ in Speed, Endurance, Agility Strength and Leg power from each other.
This hypothesis posits that male baseball players who perform at a high-level exhibit superior physical fitness in these key areas compared to those who do not perform at the same level. It suggests that high-level performers demonstrate enhanced physical attributes that are crucial for success in baseball, such as faster sprint times, greater endurance, improved agility, stronger overall body strength, and more powerful legs for explosive movements.

Methodology
To serve the purpose of the study, 60 Male Baseball Player were selected Purposively. The subjects were further divided into Performer and Non- Performer (the performer being the position holder in Intercollege Baseball tournament and Non- performer are those who did not secure in position in the tournament) of Panjab University, Chandigarh. An equal number of subjects were taken i.e, 30 N for both each.
To measure the variables of the subject various test were carried out.
To collect the data following tests were conducted.
- 50-yard dash for speed
- Modified pushups
- 600-yard run and walk
- Shuttle run (4 X 10 mts.)
- Leg power

1. 50 Yard Dash
Purpose: To measure speed.
Equipment: Stop watch, and marking powder
Procedure: At the start, the subjects to behind the starting line as soon as the command 'Go' was given; the subject ran across the finish line. Scoring: The score was recorded to the nearest (second) tenth of a second.

2. Modified Push UPS
Purpose: To measure shoulder strength
Equipment: Stool and stop watch.
Procedure: The push-up test for players is performed on a 14-inch-high, 20-inch-long, 15-inch-wide stool. It has been put about six inches from a wall on the floor. The individual grabs the stool's outer edges and takes a front leaning rest position, with the balls of the feet resting on the floor and the body and arms creating a right angle. As many times as possible, lower the body till the upper chest contacts the stools near edge, then raise it to a straight arm position. The subject's body should remain completely straight during the test. Half credit is provided if the body's ways or arches or if the subject does not go all the way up, up to 4 half credits. Scoring: One point was given each time when the subject completed modified push-ups only one trial was permitted.

3. 600 Yard run/walk
Purpose: To measure endurance.
Equipment: Track or arca marked for 600 yard and a stop watch.
Description: At the signal, the subject takes a standing start and begins running a 600-yard distance. Walking can be substituted for running. It is conceivable to have a dozen students run at the same time if they are paired up pri to the start of the event. As the students cross the finish line, cach child listens for and remembers his partner's time. Rule: Walking is permitted but the subject is to cover the distance in the shortest possible time. Scoring: Record in minutes and seconds.

4. Shuttle Run (4 x 10 mts.)
Purpose: To measure Agility.
Equipment: Steel tape, two stop watches and marking powder.
Description: When the instruction "go" was given, the subjects stood behind the line and began running towards the opposing line (a distance of 10 metres) and touching the line with their hands. They then turned towards the beginning line and touched the line again, quickly taking twin runs towards the same lines. When the subject crosses the starting line, Time Keeper begins his watch with the word 'go' and stops it. Scoring: Time was considered to rear half second.

5. Standing broad jump
Purpose: to measure leg power.
Equipment: A measuring tape and landing pit.
Procedure: The subject stood with his feet several inches apart behind a launch line. He then leapt forward by extending his knees and swinging his arms forward at the same time. The jump was measured from the closest imprint left by the jumper on landing to the take-off location. Centimetres were used to measure distance.

Satistical design
The Statistical Package for the Social Sciences (SPSS) was used for all analyses. The differences in the mean of each group for selected variable were tested for the significance of difference by unpaired 't` test. In all the analyses, the 5% critical level ($p<0.05$) was considered to indicate statistical significance.

Result and discussion

Table 1

S.No.	Physical Fitness Components	Subjects	Sample Size	Mean± S.D.	't" value
1.	Speed	Non- Performance	30	12.44±1.57	2.30*
		Performance	30	12.80±1.88	
2	Strength	Non- Performance	30	6.18±1.770	2.48*
		Performance	30	7.01±1.892	
3	Endurance	Non- Performance	30	2.83±0.5112	2.42*
		Performance	30	2.98±0.6102	
4	Agility	Non- Performance	30	19.98±1.4001	2.34*
		Performance	30	21.10±1.4090	
5	Leg Power	Non- Performance	30	160.07±30.242	2.12*
		Performance	30	162.72±31.25	

Significant at 0.05 level

The mean value and standard deviation of the two groups, i.e., Non-Performer and Performer with 't' score, are shown in Table-1. The calculated 't' score of Speed is 2.30*, Strength- 2.48*, Endurance-2.42*, Agility- 2.34*, Leg Power-2.12* and significant at the 0.05 level. The outcome is consistent with the researcher's hypothesis.

Conclusion and interpretation
The goal of this study was to compare and analyse the specified physical fitness components of Performer and Non- Performer Male Baseball Players of Panjab University Chandigarh. The investigation was undertaken on 60 Performer and Non- Performer Baseball players participating in Baseball intercollege Tournament. This posits that male baseball players who perform at a high-level exhibit superior physical fitness in these key areas compared to those who do not perform at the same level. It suggests that high-level performers demonstrate enhanced physical attributes that are crucial for success in baseball, such as faster sprint times, greater endurance, improved agility, stronger overall body strength, and more powerful legs for explosive movements. Five tests measuring five aspects of physical fitness were administered to the subjects. The results of these tests were examined using the 't' value

to determine the difference in physical fitness between Performer and Non- Performer Baseball players. The following conclusions were taken from the results presented, taking into account the of this study already mentioned. Performer Baseball players have better result than non-performer in all respects of testing. This study will help in assessing high level baseball Player and also coaches for selection procedure for future tournaments.

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