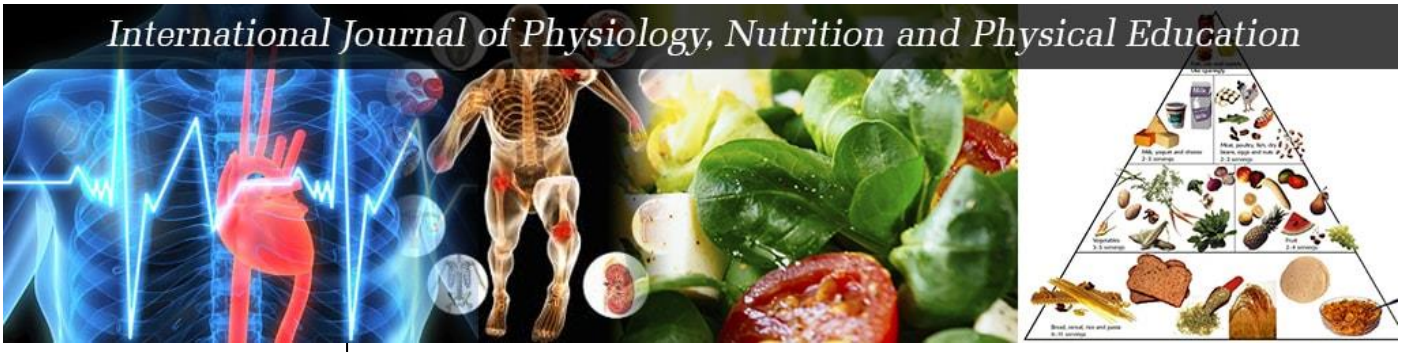

ISSN: 2456-0057
IJPNPE 2024; 9(1): 110-114

www.journalofsports.com
Received: 09-01-2024
Accepted: 16-02-2024

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Constructing physical fitness test items (PFTI) norms of power lifting players

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Abstract
The purpose of this study was to construct Norms of Physical Fitness Test Items of Power Lifting Players. To obtain data, the investigators had selected Twenty Five (N=25) state level Power lifting Players between the age group of 18-28. The Muscular Strength was measured by Handgrip Strength Test, Muscular Power was measured by Vertical Jump Test, Muscular Endurance measured by Pull-Up Test, Running Speed was measured by 30-Meter Dash Test, Running Agility was measured by Illinois Agility Test, Jumping Ability was measured by Standing Long Jump Test, Throwing Ability was measured by Overhead Medicine Ball Throw, Flexibility was measured by Sit and Reach Flexibility Test, and Balance was measured by Stoke Balance Stand Test, 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 grade i.e., very good, good, average, poor, and very poor.

Keywords: Muscular strength, muscular power, muscular endurance, running speed, running agility, jumping ability, throwing ability, flexibility, balance

Introduction
The roots of power Lifting are found in traditions of strength training stretching back as far as ancient Greek and Roman times. Power Lifting is a strength sport that consists of three attempts at maximal weight on three lifts: “squat” “bench press” and “dead lift. As in the sport of Olympic weightlifting, it involves the athlete attempting a maximal weight single lift of a barbell loaded with weight plates.

THE Squat
In the squat the lift starts with the lifter standing erect and the bar loaded with weights resting on the lifter's shoulders. At the referee's command the lift begins. The lifter creates a break in the hips, bends his knees and drops into a squatting position with the hip crease (the top surface of the leg at the hip crease) below the top of the knee. The lifter then returns to an erect position. At the referee's command the bar is returned to the rack and the lift is completed.

The Bench press
In the bench press her or his back resting on the bench, the lifter takes the loaded bar at arm's length. The lifter lowers the bar to the chest. When the bar becomes motionless on the chest, the referee gives a press command. Then the referee will call 'Rack' and the lift is completed as the weight is returned to the rack.

The Dead Lift
In the dead lift the athlete grasps the loaded bar which is resting on the platform floor. The lifter pulls the weights off the floor and assumes an erect position. The knees must be locked and the shoulders back, with the weight held in the lifter's grip. At the referee's command the bar will be returned to the floor under the control of the lifter.
Throughout recorded history, people have performed feats of strength that have left both spectators and athletes alike astonished. As the popularity of strength and power sports such as powerlifting, weightlifting, throwing, and strongman has increased, so have research efforts

addressing these sports. Strength is an important fitness characteristic for strength and power sports, particularly powerlifting, and can be defined as the ability to produce maximal force irrespective of the duration of time it takes to achieve a given force output. In competition, power lifters attempt one-repetition-maximum (1 RM) loads for the three "power lifts": back squat, bench press, and deadlift. Each lift is contested under strict judging conditions and the maximum loads successfully lifted for each competition lift are summed together for a powerlifting total. Given the focus on strength and the limited number of movements a power lifter performs in a competition, the primary training adaptation desired for powerlifting is to improve maximal force output in all three competitive lifts. Force production is one of three bio motor abilities (i.e., strength, speed, endurance) used to classify physical skills and has been suggested to be the most important skill to improve sporting tasks [1]. Therefore, strength and power athletes outside of powerlifting often incorporate power lifts in their normal training (e.g., weightlifters back squatting; throwers bench pressing; strongman competitors deadlifting), and in preparation for competition, to improve or maintain sporting tasks. However, power lifters train with high specificity and do not typically incorporate movements derived from other strength and power sports (e.g., clean-and-jerk; discuss throw at various loads; truck pull) [2]. To improve upper- and lower-body force production, power lifters often use rigorous training routines with high specificity over several weeks or months leading to a major competition in hopes of performing at their highest level on competition day. Scientific studies aimed at improving maximal strength often use short-term periodized programs (i.e., 1-4 months) to plan and implement training rather than long-term training programs (i.e., 1 year) [3]. In sport science, long-term training studies are often cut short due to limitations such as athlete availability, coach cooperation, and conflicting holiday and competition schedules. Training for powerlifters typically includes some variation of a periodized training plan or a series of short-term periodized programs (e.g., using three distinct training phases over 12 weeks) with the goal of improving 1 RM performance on competition day [4-6]. Several studies have addressed maximal strength adaptations relative to powerlifting using both competitive powerlifters (i.e., those who compete in sanctioned competitions) and non-competitive powerlifters (i.e., those who train with power lifts regularly and meet a specific relative load-to-body mass lifting ratio, but do not compete in sanctioned competitions) [7-9]. This is important considering that most strength and power athletes implement the power lifts to some degree in their normal and pre-competition training regimens to improve or maintain maximal strength and, in turn, competition outcomes. Additionally, the efficacy of using training cessation to improve maximal strength has also been questioned [10].

Materials and Methods

Twenty Five (N=25), male state level Power Lifting Players between the age group of 18-28 years volunteered to participate in the study. All the subject were informed about the objective and protocol of the study. The following Physical Fitness Test Items were selected for the present study:

Physical Fitness Test Items

i) Muscular Strength.
ii) Muscular Power.
iii) Muscular Endurance.
iv) Running Speed.
v) Running Agility.
vi) Jumping Ability.
vii) Throwing Ability.
viii) Flexibility.
ix) Balance.

The score of each Physical Fitness Test Items were recorded by researcher on the basis of performance in test. The subjects were given adequate demonstration, practice trial and required instructions for all the tests.

Table 1: Description of Physical Fitness Test Items and Tests

Sr. No.	Physical Fitness Items	Tests
1.	Muscular Strength	Handgrip Strength Test
2.	Muscular Power	Vertical Jump Test
3.	Muscular Endurance	Pull-Up Test
4.	Running Speed	30 Meter Dash
5.	Running Agility	Illinois Agility Test
6.	Jumping Ability	Standing Long Jump Test
7.	Throwing Ability	Overhead Medicine Ball Throw
8.	Flexibility	Sit and Reach Flexibility Test
9.	Balance	Stork Balance Stand Test

Statistical Technique

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 score were classified into five grade i.e., very good, good, average, poor, and very poor.

Results

For each of chosen variable, the result pertaining to Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of Physical Fitness Test Items of Twenty Five (N=25), male state level Power lifting Players are brought forth in Table-2.

Table 2: Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of Physical Fitness Test Items of Power lifting Players of State Level (N=25)

Sr. No.	Test Items	Mean Standard Deviation		Hi	Low
1.	Muscular Strength	Mean SD	48.16 6.16	58	36
2.	Muscular Power	Mean SD	64.36 6.16	72	58
3.	Muscular Endurance	Mean SD	21.16 3.54	26	16
4	Running Speed	Mean SD	4.36 1.95	4.6	4
5	Running Agility	Mean SD	13.21 7.84	14.20	12.10
6	Jumping Ability	Mean SD	2.22 5.06	2.30	2.10
7	Throwing Ability	Mean SD	20.2 1.38	22	18
8	Flexibility	Mean SD	3.4 1.15	5	2
9	Balance	Mean SD	37.64 2.98	41	31

Table-2 shows that in Muscular Strength, the mean score was 48.16and standard deviation score was 6.16. In Muscular Power, the mean score was 64.36 and standard deviation score was 6.16. In Muscular Endurance, the mean score was

21.16 and standard deviation score was 3.54. In Running Speed, the mean score was 4.36 and standard deviation score was 1.95. In Running Agility, the mean score was 13.21 and standard deviation was 7.84. In Jumping Agility, the mean score was 2.22 and standard deviation was 5.06. In Throwing Ability, the mean score was 20.2 and standard deviation score was 1.38. In Flexibility, the mean score was 3.4 and standard deviation score was 1.15. In Balance, the mean score was 37.64 and standard deviation score was 2.98.

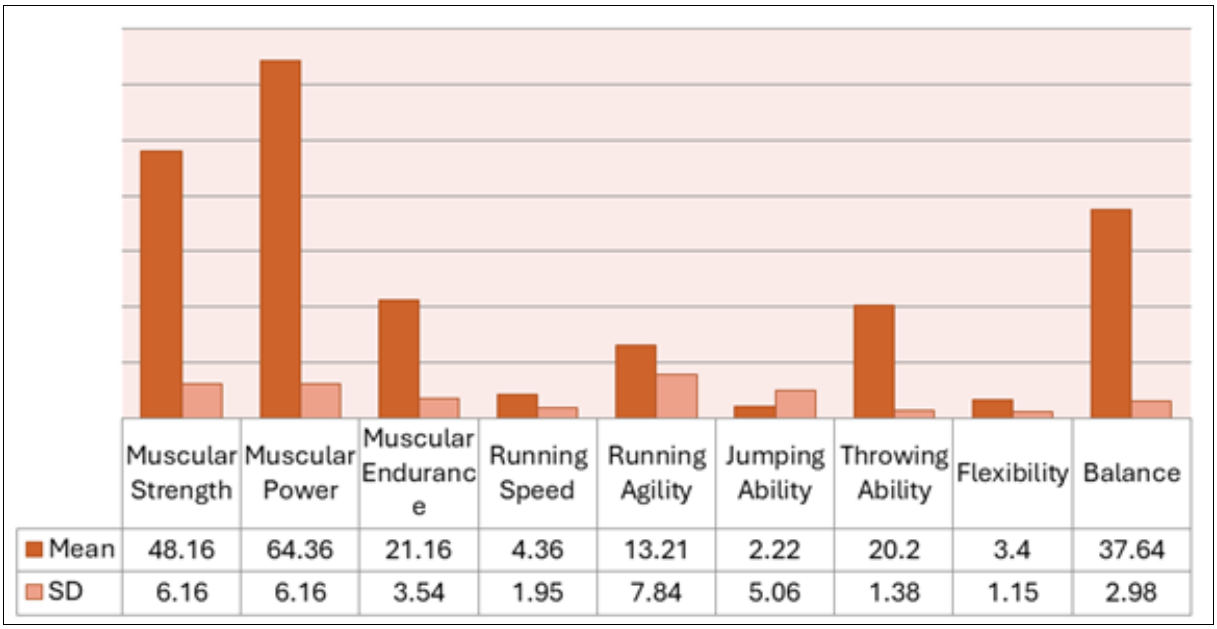
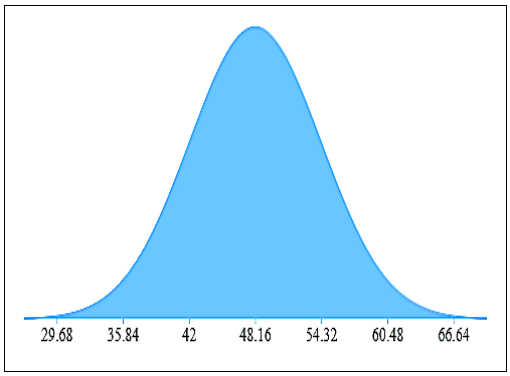


Fig 1: Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of Physical Fitness Test Items of Power Lifting Players of State Level (N=25)

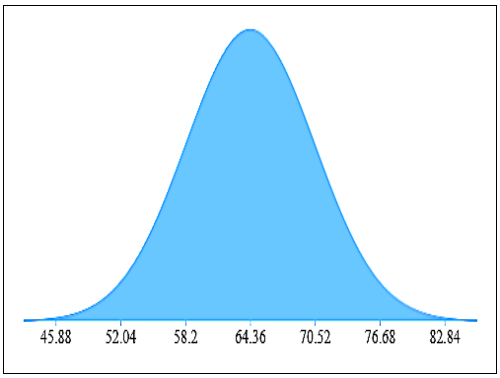
Table 3: Distribution of Grades under Normal Distribution for the Physical Fitness Test Items of Power Lifting Players of State Level (N=30)

Test Items	Very Poor	Poor	Average	Good	Very Good
Muscular Strength	Less than (<) 35.84	35.84- 42	42-54.32	54.32-60.84	Greater than(>) 60.48
Muscular Power	Less than (<) 52.04	52.04-58.2	58.2-70.52	70.52-76.68	Greater than (>) 76.68
Muscular Endurance	Less than (<) 14.08	14.08-17.62	17.62-24.7	24.7-28.24	Greater than (>) 28.24
Running Speed	Greater than (>) 8.26	8.26-6.31	6.31-2.41	2.41-0.46	Less than (<) 0.46
Running Agility	Greater than (>) 28.89	28.89-21.05	21.05-5.37	5.37- -2.47	Less than (<)-2.47
Jumping Ability	Less than (<) -7.9	-7.9- -2.84	-2.84-7.28	7.28-12.34	Greater than (>) 12.34
Throwing Ability	Less than (<) 17.44	17.44-18.82	18.82-21.58	21.58-22.96	Greater than (>) 22.96
Flexibility	Less than (<) 1.1	1.1-2.25	2.25-4.55	4.55-5.7	Greater than (>) 5.7
Balance	Less than (<) 31.68	31.68-34.66	34.66-40.62	40.62-43.6	Greater than (>) 43.6

1. In Muscular Strength, the scores below 35.84 are considered very poor, from about35.84-42 is considered poor, 42-54.32 is considered average, 54.32-60.84 is considered good and the scores above 60.48 are considered very good.
2. In Muscular Power, the scores below 52.04 are considered very poor, from about 52.04-58.2 is considered poor, 58.2-70.52 is considered average, 70.52-76.68 is considered good and the scores above 76.68 are considered very good.
3. In Muscular Endurance, the scores below 14.08 are considered very poor, from about 14.08-17.62 is considered poor, 17.62-24.7 is considered average, 24.7-28.24 is considered good and the scores above 28.24 are considered very good.
4. In Running Speed, the scores above 8.26 are considered very poor, from about 8.26-6.31 is considered poor, 6.31-2.41 is considered average, 2.41 -0.46 is considered good and the scores below 0.46 are considered very good.
5. In Running Agility, the scores above 28.89 are considered very poor, from about 28.89-21.05 is considered poor, 21.05-5.37 is considered average, 5.37--2.47 is considered good and the scores below - -2.47 are considered very good.
6. In Jumping Ability, the scores below -7.9 are considered very poor, from about -7.9- -2.84 is considered poor,-2.84-7.28 is considered average, 7.28-12.34 is considered good and the scores above 12.34 are considered very good.
7. In Throwing Ability, the scores below 17.44 are considered very poor, from about 17.44-18.82 is considered poor, 18.82-21.58 is considered average, 21.58-22.96 is considered good and the scores above 22.96 are considered very good.
8. In Flexibility, the scores below 1.1 are considered very poor, from about 1.1-2.25 is considered poor, 2.25-4.55 is considered average, 4.55-5.7 is considered good and the scores above 5.7 are considered very good.
9. In Balance, the scores below 31.68 are considered very poor, from about31.68-34.66 is considered poor, 34.66-40.62 is considered average, 40.62-43.6 is considered good and the scores above 43.6 are considered very good.


29.68
35.84
42
48.16
54.32
60.48
66.64

(A)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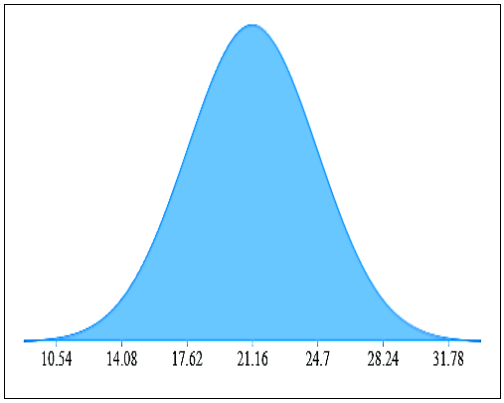
52.04
58.2
64.36
70.52
76.68
82.84

(B)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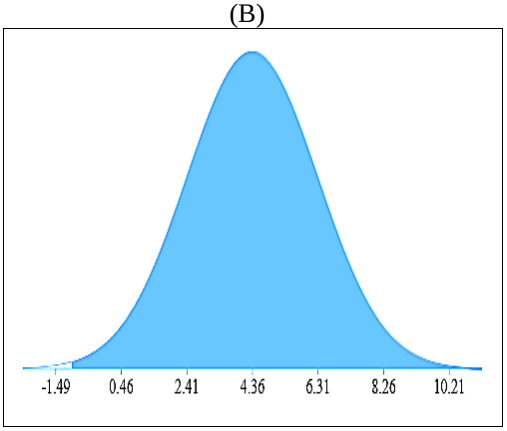
17.62
21.16
24.7
28.24
31.78

(C)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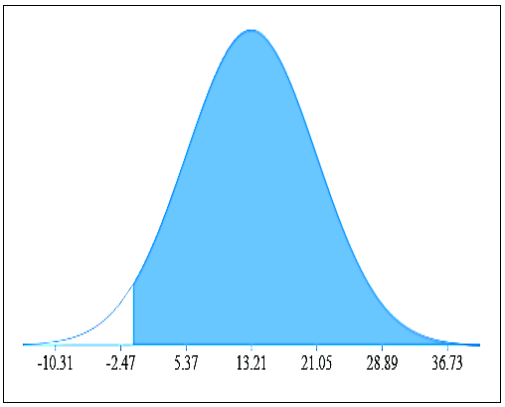
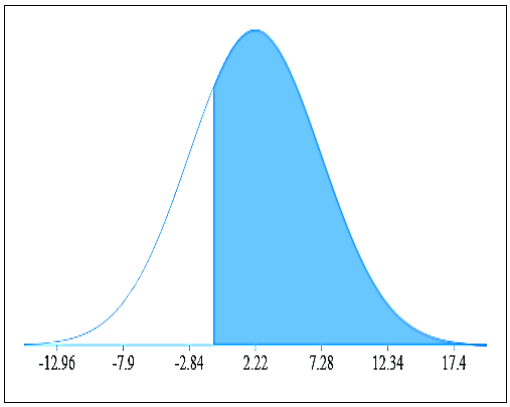
0.46
2.41
4.36
6.31
8.26
10.21

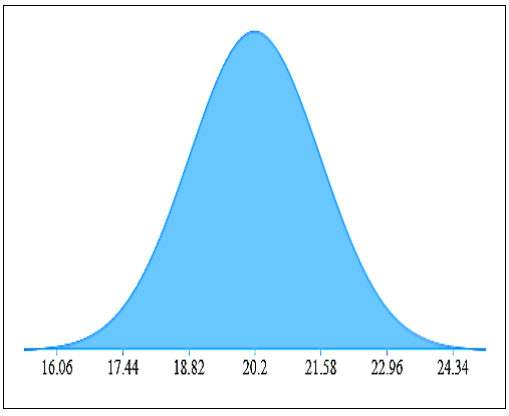
(D)


-10.31
-2.47
5.37
13.21
21.05
28.89
36.73

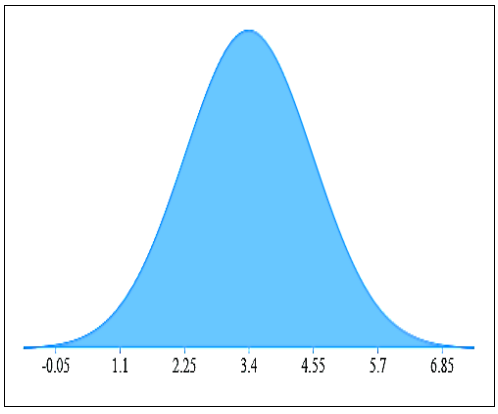
(E)


-12.96
-7.9
-2.84
2.22
7.28
12.34
17.4

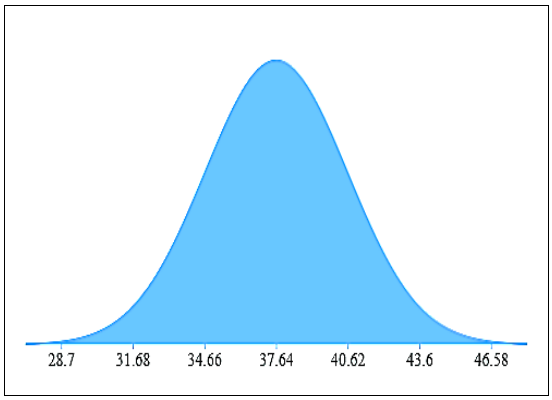
(F)


16.06
17.44
18.82
20.2
21.58
22.96
24.34

(G)


-0.05
1.1
2.25
3.4
4.55
5.7
6.85

(H)



(I)

Fig 2: Normal distribution of Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power, c. Muscular Endurance, d. Running Speed, e. Running Agility, f. Jumping Ability, g. Throwing Ability, h. Flexibility &i. Balance) of Power Lifting Players of National Level (N=25)

Conclusion

The roots of powerlifting trace back to ancient Greek and Roman strength traditions. This sport comprises three attempts at maximal weight on three lifts: squat, bench press, and deadlift. Athletes aim to lift a barbell loaded with weights in a single effort. Training for powerlifting focuses on improving maximal force output in these lifts, often through periodized programs. A study of 25 male state-level powerlifters revealed their performance across various physical fitness test items, aiding coaches and trainers in tailoring training programs for elite athletes. Such normative data guides the optimization of training schedules to enhance athletes' performance in powerlifting.

Acknowledgements

Heartiest thanks and appreciation are extended to all players who served as subjects for this study and without whose help this study could not have been completed.

Recommendation

Physical Education teachers, coaches and athletic trainers may utilize the findings of the present study by preparing or modifying the existing training schedules for Power Lifting Player. Normative data regarding Physical Fitness Test Items will help the coaches and trainers to regulate the training programme for elite athletes.

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