



NORMATIVE VALUE OF 2KM TIME TRIAL RUNNING TEST IN COLLEGE GOING CRICKET PAYERS: AN OBSERVATIONAL STUDY

¹ Dr. Rajiv D. Limbasiya, ²Dr. Sujit Vasava, ³Dr. Maitri Sheth, ³Dr. Sadaf Ansari, ³Dr. Prasanna Patel,
³Dr. Urmila Mali, ³Dr. Dvijesha Patel

¹ PT, Ph.D, Principal IC and Associate professor, The Sarvajanic college of physiotherapy, Veer Narmad
south Gujarat University, Surat.

²Ph.D scholar, Assistant Professor, Shrimad Rajchandra college of physiotherapy, Uka Tarsadia
university, Bardoli, surat.

³BPT, Shrimad Rajchandra college of Physiotherapy, Uka Tarsadia university, Bardoli.

ABSTRACT

Background: Being a cricket player, an athlete requires good physical fitness for better performance including good speed and endurance to sustain the long hours of game without being fatigue and performing well. It is important to recognize variation in performance to prescribe specific exercises to athletes.

Aim of Study: To find normative value of 2Km time trial running test in college going cricket players.

Objective of the study: To find the normative value of 2Km time trial test through measurement of endurance and speed.

Materials and method: A total of 100 college going male cricket players were taken for the study as per the inclusion and exclusion criteria. Their demographic details were collected and their vitals were measured before and after the test. Time was measured using a stopwatch as the player covered the distance of 2Km.

Result: We observed that the time taken by the majority of the players out of 100 was more than the time limit set by the BCCI. And from the players who completed the test, the majority of age population was from 18-25. The least time taken by a player to complete the test is 6 minutes and 34 seconds and the maximum time taken is 14 minutes and 38 seconds.

Conclusion: We established normative values for the performance on the 2Km time trial test and noted differences in the time durations across demographic groups and the groups of different skilled players. This data will be helpful to the coaches in interpreting the fitness levels of players and accordingly set the training sessions.

Keywords: Normative value, 2Km Time Trial Test, cricket players, speed, college population.

INTRODUCTION

Normative data comprises of observations or values that are usual or expected in a defined population. It is important for health care providers as they can obtain standards of care and rehabilitation process. ⁽¹⁾ In case of sports, normative data of a relevant population of teams or individuals can be useful in interpreting performance data. ⁽²⁾ Cricket is an established sport with a long history since the 16th century. It is played worldwide and has developed into an industry allowing many individuals to pursue a career as a professional athlete. A highly skilled sport and an ever-changing game, which makes players and teams focus on developing as top-class athletes. With modern cricket, players travel more than former times and hence the consideration for physical fitness is increasing. It is considered to be an intermittent sport, characterized by prolonged low-intensity activity, interspersed by periods of high-intensity movements such as bowling and batting. The physical demands of cricket depend on the match format like, T20, one-day or test cricket and players' on-field position such as bowler or batsman. There are similar traits between bowlers and batsmen, such as performing maximal sprints whilst approaching a bowling delivery and sprinting between the wickets to score runs. ⁽³⁾ Despite its popularity and demand, cricket does not have specific fitness tests and relies on the tests and norms of other sports. The specific fitness demands of the sport are therefore not fully understood. Specific fitness testing are important predictors of successful sporting performance. They require specific fitness testing as the player must possess different physical skills for different physical activities like speed and agility for running and fielding, power and strength for batting and throwing and endurance to give optimum performance in formants with 50 bowling overs or after hitting a good amount of score like a century. During a T20, high-intensity efforts are required as compared to that of both test matches and 1-day matches. This indicates that the distance is not affected by the duration of the match, but it is affected by the intensity of the effort by the fielders as more work is required in a shorter space of time. All of the disciplines require full body movements so that the respective tasks can be executed properly on the field and this need good physical fitness of participant ⁽⁴⁾

Physical fitness can be considered as an integral measure for body function as it involves different physiological systems and responses which includes cardiovascular system, musculoskeletal system, respiratory system and the endocrine system involving metabolic components. ⁽⁵⁾ The muscular endurance, the ability of an isolated muscle group to perform repeated contractions over a period of time (dynamic endurance) ⁽⁶⁾ and speed that is a function of distance covered per unit of time are vital components of physical fitness especially for the athletes to maintain their optimum performance level. ⁽⁷⁾ Physical fitness is increasingly important, specifically for cricket players due to various tours for several months. And it has been found that cricketers generally rely on the aerobic energy system and the energy expenditures are generally low for cricket but the fast bowlers during their bowling overs and fielders during sprinting for the ball are considered as exceptions in this case. ⁽⁸⁾

Fitness testing is a vital method for monitoring training adaptations, performance data and level of physical fitness in general population as well as in trained athletes. Mainly, field based tests are preferred in case of epidemiological studies or fitness assessment as its advantages includes less equipment requirements, simultaneous participants' screening, less expenses and time efficiency. ⁽⁹⁾ Pre participation screening is commonly used to measure potential intrinsic injury risk factors by identifying characteristics of the musculoskeletal system that may predispose an athlete to injury, or to identify incomplete recovery from a previous injury. ⁽¹⁰⁾ Recently, an increase of quantitative analysis of an athlete's performance involved in a team sports has been observed. The process of team selection involves analysis, research and also the quantification of individual performance and the quality of his game which is considered to be an important factor to be a team member. ⁽¹¹⁾ And the analysis of physical demands of cricket training activities is necessary to assure fulfillment of game demands with adequate training. ⁽¹²⁾

The only fitness test for cricketers until now was the 'Yo-Yo Test'. It was initially developed for soccer players but then was adapted by many team sports including the Indian cricket team. It is a maximal aerobic endurance fitness test that involves running between two markers, placed 20 meters apart. Audio cues are used to indicate the players to run. The players must start the run towards the other marker with the first beep, while they must reach the second cone before the second beep and then turn back towards the starting point before the third beep. It gets tougher as the number of shuttles increases with an increase in the frequency of the beats. After the completion of 40 meters distance, the player is given a ten-second active break and then the

test is again continued.⁽¹³⁾ If a player fails to cross a cone before the beep, he is given a warning and after three warnings, the test is ended before completion. The Yo-Yo Test involves acceleration, deceleration and rapid change of direction. But according to officials, there is a scope in yo-yo test that the players could trick in it by cutting corners and running a shorter distance than 20 meters and it also requires too many tools and can get complicated.⁽¹⁴⁾

The Board of Control for Cricket in India has now introduced a speed-endurance test named, '2km time trial test'. It is expected to reveal an athlete's fitness levels, about the cardio-vascular functioning and they won't be able to mask their injuries as well. The two- kilometer time trial limit is set at eight minutes and fifteen seconds for fast bowlers and eight minutes and thirty seconds for batsmen, spinners and wicketkeepers and has become mandatory for India's centrally-contracted cricketers. It is considered to be a good screening test in terms of musculoskeletal as well as cardio-vascular fitness. Through it, one can obtain a quantifiable data and know whether a particular fitness regime is working for the athlete or modifications are to be done. It also helps in developing running mechanics, developing breathing patterns and knowing the body better as wrong running patterns would result in waste of energy.⁽¹⁵⁾

To measure the various components of physical fitness of an athlete, various fitness tests are used and one of them is the '2Km Time Trial Test'. It is used by the BCCI to measure the speed and endurance of the athlete and know whether they can be termed 'fit' or not. Cricket is played worldwide and that has led many youngsters to pursue cricket as their career. Along with the Yo-Yo Test, BCCI has made the 2Km Time Trial Test a compulsory entrance test for all the players. The council has set the bar at 8 minutes 15 seconds for fast bowlers and 8 minutes 30 seconds for batsmen, spinners and wicket-keepers for the completion of the test by covering the distance of 2 Km within the time limit. Until now, there is no such normal quantitative data obtained for young cricket aspirants' population. There are higher chances of these players to not complete the test within the time limit set by the council. The need of the study is to provide coaches and the young aspirants a qualitative and quantitative data or a normative value of the time limit of the test in their population and to find out the number of players who can complete the test within the time limit given by the council. This result can be used to rate the 2Km time trial test performance and measure the physical fitness levels and identify youngsters with low physical fitness level. The aim and objective of this study is to find the normative value of 2km time trial test through measurement of completion time of test of healthy college going male cricket players which can be used as a reference by coaches to identify players with good physical fitness.

MATERIALS AND METHOD

Source of data: Cricket academies of Surat and Bardoli

Study method: Simple convenient sampling

Study design: Observational study

Sample size: 100

Criteria of selection: Healthy College going male cricket players playing continuously for at least one month with the age between 18 to 30 years, able to understand the technique and those who are willing to participate were included. Those who were having any acute injury, recent fracture of lower limb or upper limb or spine, neurological conditions, any pulmonary conditions like Asthma and abnormal pre-examine blood pressure was excluded

Procedure: Prior approval for the study was obtained from Uka Tarsadia University and the cricket academies located in Surat and Bardoli. A total of 100 male cricket players, who met the inclusion criteria and voluntarily agreed to participate, were enrolled in the study. The objectives and procedures of the study were thoroughly explained to each participant, and informed consent was obtained.

To minimize discomfort and reduce the risk of heat-related issues, data collection was conducted primarily during the cooler hours of the morning and evening. Demographic details such as name, age, height, weight, and body mass index (BMI) were recorded. Additionally, baseline vital signs—including blood pressure and pulse rate—were measured to rule out any underlying conditions such as hypertension or hypotension. Before beginning the test, participants were encouraged to perform warm-up exercises of their choice. The physical test involved a 2-kilometer run, which the players were instructed to complete as quickly as possible. The 2-km distance was structured as five laps around a standard 400-meter athletic track. Timing began the moment the player started running and was recorded using a stopwatch until the test was completed. Following the run, blood pressure and pulse rate were reassessed to ensure there were no signs of physiological distress or abnormalities. Finally, each player underwent lower limb stretching exercises to aid in muscle relaxation and recovery.

RESULTS

Table: 3.1 – Descriptive Analysis of Demographic Data.

(N=100)	Mean	Standard Deviation
Age	20.67	2.00
Height	170.85	9.77
Weight	60.27	11.32
BMI	20.65	3.82

Table: 3.2 – Descriptive Analysis of Vital Signs.

(N=100)		Mean	Standard Deviation
Blood pressure (before test)	Systolic BP (mm Hg)	126.67	9.16
	Diastolic BP (mm Hg)	79.08	6.82
Pulse rate (before test) (bpm)		82.57	10.98
Blood pressure (after test)	Systolic BP (mm Hg)	135	12.12
	Diastolic BP (mm Hg)	84	8.10
Pulse rate (after test) (bpm)		106.47	21.13

Table: 3.3- Total number of players who were able and unable to complete the test within the time limit of 8 minutes and 30 seconds

(N=100)	Time Taken Within 8 mins 30 secs	Time Taken Beyond 8 mins 30 secs
Number of players	31	69

Table: 3.4 - Total number of players in different age groups who completed the test within 8 minutes and 30 seconds.

	Age Group 18-20 (year)	Age Group 21-25 (year)	Age Group 26-30 (year)
Total No. of Players	15	15	1

Table: 3.5 – Normative Value of 2Km time trial test.

(N=100)	Minimum Time Taken	Maximum Time Taken	Mean	Standard Deviation
Normative Value	6:34	14:38	9.80	4.34

Table 3.6 – Normative value of time taken by type of players.

(N=100)	Minimum Time Taken	Maximum Time Taken	Mean	Standard Deviation
Batsman (N= 43)	7:08	14:00	9.90	4.54
Bowler (N= 28)	6:34	14:09	10.14	4.08
Wicket- keeper (N= 6)	7:53	9:29	8.08	3.15
Allrounder (N= 23)	6:46	14:35	9.62	4.55

DISCUSSION

An observational study was done on cricket players to determine the normative value of 2Km time trial running test in college going male players. The players were asked to cover the running distance of 2 kilometer to obtain the time they require to complete the test. In the study, total 100 male cricket players were included with the mean age of 20.67. Demographic details of the players were taken and their vitals were measured before and after the test and using the stopwatch, time taken by the player to complete the test was measured. The test was performed mainly during morning and evening hours to avoid effect of extreme heat exposure on players' performance. ⁽¹⁶⁾

The result of the present study was comprehended using 2 Kilometer time trial test performed by the cricket players. The total number of players out of 100, who has completed the test within the time limit of 8 minutes and 30 seconds are 31 players and 69 players are unable to complete it within the time limit. Therefore, this statistic clearly shows that the majority of players (69%) are unable to complete the test within the time limit.

Christina Carr et al (2017) ⁽¹⁷⁾, studied changes in strength, power and speed across a season in English county cricketers. The purpose of the study was to determine the changes in lower body strength, jump and sprint performance of 12 English county cricketers. It was measured through countermovement jumps, 20-m sprints on four separate occasions and back-squat strength testing on 3 separate occasions across a competitive season and concluded that neither the demands of competitive cricket season nor the current in-season practices provide a sufficient stimulus to maintain strength, power and speed in cricketers and the coaches must implement a frequent high-load strength-training program for the players.

The total number of players who completed the test within time limit are 31, out of which, 15 (49%) players belong to the age group 18-20 years, 15 (48%) players belong to the age group 21-25 years and only 1 (3%) player belongs to the age group 26-30 years. This shows decline of speed as age increases, but the number of players is unequally distributed in the age groups and hence we cannot comment on effect of age on speed of the player. The mean value of 2Km time trial test in 18-30 years of population is 9.80 ± 4.34 . The time limit set by the Board of Control for Cricket in India (BCCI) is eight minutes and fifteen seconds for fast bowlers and eight minutes and thirty seconds for batsmen, spinners and wicketkeepers. In present study, the mean value obtained for bowlers is 10.14 ± 4.08 , for batsmen is 9.90 ± 4.54 , for wicket-keepers is 8.08 ± 3.15 and for all-rounders is 9.62 ± 4.5 . This shows that the mean time of bowlers is higher than that of other three groups of players. And contrary to the time limits of BCCI, the mean time of this players are higher as the professional athletes are adapted to the high endurance trainings and repeated exercises due to which their cardiovascular functioning gets improved whereas this young player due to lack of chronic adaptations to regular endurance and power training shows acute responses to such tests. ⁽¹⁸⁾

Dan Fransson et al (2018) ⁽¹⁹⁾, examined the skeletal muscle and performance responses across two different exercise training modalities. 39 well trained male soccer players were divided into two groups, a speed endurance training and a small-sided game group. The result concluded that the speed endurance training improved the muscle oxidative capacity and exercise performance more profoundly than small-sided game training. **Chandu Gurappa Lamani(2020)** ⁽¹⁹⁾, studied a discriminant analysis of specific fitness testing profiles of cricket players. The purpose of the study was to compare the four different group of cricket players' basing on their motor skills. 38 cricket players of 19 to 24 years of age group and those with minimum

three years of playing experience of BCCI, university and college matches were included and were divided into four groups as per their skills. Analysis and comparison of specific motor skills among fast bowlers, spinners, batsman and wicket-keeper was done. The result concluded that specific motor fitness variables of each group showed significant difference.

In contrary to our result, **Johnstone et al (2010)**⁽²⁰⁾, studied physiologic profile of professional cricketers. The purpose of the study is to provide a physiologic profile of 15 professional cricketers. The players had to complete a series of field-based fitness assessments which included body composition, flexibility, upper and lower body strength, speed and explosive power. Differences were found between physiologic profiles of batsmen and bowlers and it was observed that bowlers had a great indicated capacity than the batsmen and achieved a better result in maximal repeated sprints.

Limitations of Study: Age group ratio was unequal, number of bowlers, batsmen, wicket-keepers and all-rounders were unequal, factors affecting the player's performance like muscle strength, range of motion of ankle and lower limb has not been considered and the study was restricted to limited area.

Future Recommendations: Study can be done with large sample size with equal age and player distribution, Multicentric study involving players of various states can be done.

CONCLUSION

The present study provides a comprehensive set of normative values for the 2 Km Time Trial Test in college going male cricket players. The normal range obtained for the age group 18-30 years, minimum time is 6 minutes and 34 seconds and the maximum time is 14 minutes and 38 seconds with a mean of 9.80 ± 4.34 . These values can be used to identify players with optimum physical fitness and can be useful to plan the training program according to the player and his physical fitness.

REFERENCES

1. Normative data: their definition, interpretation, and importance for primary care physicians. O'Connor, P J. 1990.
2. Normative Profiles of Sports Performance. O'Donoghue, Peter. s.l. : International Journal of Performance Analysis in Sport 5(1):104-119, 2005.
3. Physical profiling of international cricket players: an investigation between bolwers and batters. Weldon A, Clarke N, Pote L, Bishop C. 2020.
4. A DISCRIMINANT ANALYSES OF SPECIFIC FITNESS TESTING PROFILES OF CRICKET PLAYERS. Lamani, Chandu Gurappa. s.l. : European Journal of Physical Education and Sport Science, 2020, Vol. 6.
5. Normative Yo-Yo Intermittent Recovery Level 1 and Yo-Yo. Boris Schmitz, Carina Pfeife, Kiana Kreitz b, Matthias Borowski b, Andreas Faldumb. s.l. : Journal of Science and Medicine in Sport, 2019.
6. Kisner C, Colby LA (eds), Burnett CN, Glenn TM. Principles of aerobic exercise, Therapeutic Exercise: Foundations and Techniques. s.l. : Jaypee Brothers, 1996.
7. Sanders B, Nemeth WC. preparticipation physical examination.
8. A review of cricket fielding requirements. D MacDonald, MSc, et al. 2013, Vol. volume 25.
9. Associations of Maximal Strength and Muscular Endurance Test Scores with Cardiorespiratory Fitness and Body Composition. Vaara, Jani P, et al. 8, s.l. : Journal of Strength and Conditioning Research, 2012, Vol. 26.
10. The reliability of musculoskeletal screening test used in cricket. Dennis RJ, Finch CF, Elliott BC, Farhart PJ. 2008.
11. New performance measure in Cricket. Shah, Dr. Parag. Issue 3, s.l. : IOSR Journal of Sports and Physical Education (IOSR-JSPE), May – June. 2017, Vol. Volume 4.
12. Comparison of Training and Game Demands of National Level Cricketers. Petersen, Carl J, et al. issue 5, s.l. : Journal of Strength and Conditioning Research, May 2011, Vol. volume 25.
13. Wood, R. The Complete Guide to the Yo-Yo Test" . The Complete Guide to the Yo- Yo Test. (2018), <https://www.theyoyotest.com/>.
14. Saha, rajdeep. BCCI introduces new mandatory fitness rule for Team India. 2021, news bytes.
15. Koshie, Nihal. 2k time trial: Why cricketers will have to train and think like middle- distance runners

- now. 2021, the Indian Express.
16. Effect of Ambient Temperature on Cardiovascular Drift and Maximal Oxygen Uptake, *Medicine & Science in Sports & Exercise*. LAFRENZ, ANDREW J.1, et al. Issue 6 - p 1065-1071, June 2008, Vol. Volume 40.
 17. Changes in Strength, Power, and Speed Across a Season in English County Cricketers. Christina Carr, John J. McMahon, and Paul Comfort. 1, s.l. : *International Journal of Sports Physiology and Performance*, 2017, Vol. 12.
 18. Jack H. Wilmore, David L. Costill. *physiology of sport and exercise*. 2004.
 19. A DISCRIMINANT ANALYSES OF SPECIFIC. Lamani, Chandu Gurappa. issue 9,s.l. : *European Journal of Physical Education and Sport Science*, 2020, Vol. volume 6.
 20. Physiologic Profile of Professional Cricketers. Johnstone, James A and Ford, Paul A. issue 11, s.l. : *Journal of Strength and Conditioning Research*, 2010, Vol. volume 24.
 21. Physiologic Profile of Professional Cricketers. Johnstone, James A and Ford, Paul A. issue 11, s.l. : *Journal of Strength and Conditioning Research*, 2010, Vol. volume 24