Naveen Shodh Sansar (An International Refereed / Peer Review Multidisciplinary Research Journal)
RNI No.- MPHIN/2013/60638, ISSN 2320-8767, E- ISSN 2394-3793, Scientific Journal Impact Factor (SJIF)- 8.054,
July to September 2025, E-Journal, Vol. I, Issue LI (51), ISO 9001:2015 - E2024049304 (QMS)

A Comparative Study of Aerobic Fitness Between U-22 and Senior Male Division-Level Cricket Players

Tarun Rawat* **Rahul Barod**** **Pooja Rawat*****

***Sports Officer, Swami Vivekananda Govt. College Budhni, Sehore (M.P.) INDIA**
****Sports Officer, Shri Raj Rajendra Jayantsen Suri Siksha Mahavidhyalaya, Ujjain (M.P.) INDIA**
*****Physical Education Teacher, Narmadapuram (M.P.) INDIA**

Abstract: Background: In cricket, aerobic capacity (VO2 max) facilitates sustained performance across extended match lengths, recuperation in between overs, and repeated sprint ability. VO2 max may be impacted by age, training age, and role-specific demands (quick bowling vs. spin, batting vs. fielding effort).
Objective: To compare the aerobic fitness between Under-22 and Senior (≥22 years) male division cricket players.
Methods: The purpose of this study was to compare the aerobic fitness (VO2 max) of division level male cricket players. There was 35 (N=35) trained male division level cricketers chosen for this study from Narmadapuram Division Cricket Association (NDCA), Madhya Pradesh, India. Researcher were selected 02 active cricket groups (a) U-22 Boys {n=18} (b) Senior Boys {n=17}. An estimation of VO2 max was calculated from the test results, using YO-YO Intermittent Recovery level-1 (YYIR1 test): (mL * kg^{-1} * min^{-1}) = IR1 distance (m) × 0.0084 + 36.4.Normality was checked by using skewness and kurtosis value in descriptive summary;group differences tested with independent t tests.
Results: Both groups displayed marginally similar mean values and significantly similar VO2 max. The study also revealed that VO2max of male cricket players of selected groups was in average range according to the norms and earlier research.
Conclusion: Differences in VO2 max between U-22 and Senior Boys division level players appearedsimilar. Conditioning programs are almost sameand prioritize aerobic maintenance in seniors and U-22 Boys development might be the reason behind same results.
Keywords: VO2 max, cricket, aerobic fitness, YO YO test, physiology.

Introduction - Cricket requires a special blend of sustained low-to-moderate intensity exercise (fielding, extended batting innings, multi-day matches) and sporadic high-intensity efforts (sprinting, repetitive run-ups for fast bowlers). Performance and recovery in all formats (T20 to multiday) are aided by adequate aerobic capacity, which promotes phosphocreatine resynthesis, lactate clearance, and thermoregulation. U-22 players' VO2 max may be impacted differently than senior players' due to age-related physiological changes and cumulative training experience. Comprehending these distinctions can help direct workload periodization, talent transition planning, and conditioning.

These days, sports sciences are crucial to the growth of physical education programs and sports in every country. It is commonly recognized that industrialized nations have made great progress in these fields. Fitness testing is crucial in cricket to assess player development, guide training plans, and maximize performance. By assessing young athletes, coaches can identify players who have special physical attributes that might help them succeed in cricket. Fitness testing may provide a precise picture of a player's current physical condition. Regular fitness testing allows athletes and coaches to track their development over time.The YO-YO test is one of the most important tests used in Cricket to evaluate the players' fitness and endurance performance. The test acts as a selection criterion in countries such as India, New Zealand and Australia, etc. For instance, to make it into the national cricket team of India, the players must attain a cut off fitness level of the YO-YO test which is set at 16.5.

One of the most crucial ele ments of physical fitness in cricket is aerobic fitness (VO2max) (Da Silva et al., 2008; Nikolaidis, 2011; Noakes and Durandt, 2000). According to Noakes and Durandt (2000), cricket players who have optimal level aerobic fitness (VO2 max) are better able to sustain repetitive high-intensity actions during a match, speed up their recuperation, and keep their physical condition at its peak throughout the game and season.

1.1 Objectives

Primary Objective: To compare the aerobic fitness by using VO2 max ($mL \cdot kg^{-1} \cdot min^{-1}$) between U-22 and Senior male division-level cricketers.

Secondary Objectives:

1. To assess the aerobic fitness of senior male division-level cricket players of Narmadapuram Division cricket association, Madhya Pradesh.
2. To assess the aerobic fitness of U-22 male division-level cricket players of Narmadapuram Division cricket association, Madhya Pradesh.

1.2 Hypotheses

H1: There will be significant difference in aerobic fitness of U-22 and senior male division- level cricketers.

2. Methods

2.1 Participants

- **Eligibility:** Male cricket players from division squads of Age 17–21 for U22; ≥22 for Senior group. Subjects must involve for minimum 3 years structured training.
- **Sampling & Sample Size:** The researcher usedstratified sampling by division cricket team groups. Total 35 male cricket players has been selected for the study, n = 18 from U-22group and n = 17 from Senior group.

2.2 Procedures

2.2.1 Fitness Test Procedure (YO YO IR Level-1)

Standardized warm up time given to the players for half an hour before actual testing; cones 20 m apart with 5 m recovery zone; and sound speaker placed with audio pace of YO-YO Test application. All subjects were given the opportunity to take the trial if they wanted to. Yo-Yo Recovery level-1 test has been used to assess aerobic fitness and to calculate VO2max of the players. If the line was not reached before the beep sound, the subject was warned and instructed to get there. Test participants are given a maximum of two warnings. Two more 'beeps' were to be heard, and they were to turn and try to keep up. The test must finish if the individual misses the line (within 2 meters) on two different ends after being warned.

2.2.2 Scoring. Convert to VO2 max estimate using validated equations. The total distance travelled before the athlete lost the ability to keep up with the recording is their score. VO2 max (ml/min/kg) estimation formula based on Yo-Yo IR1 test data. (not a substitute for lab VO2 max)

2.2.3 Calculation of VO2 max: For the **Yo-Yo Intermittent Recovery Test Level 1 (Yo-Yo IR1),** VO2 max can be estimated from the total distance covered using the regression equation by **Bangsbo et al.**

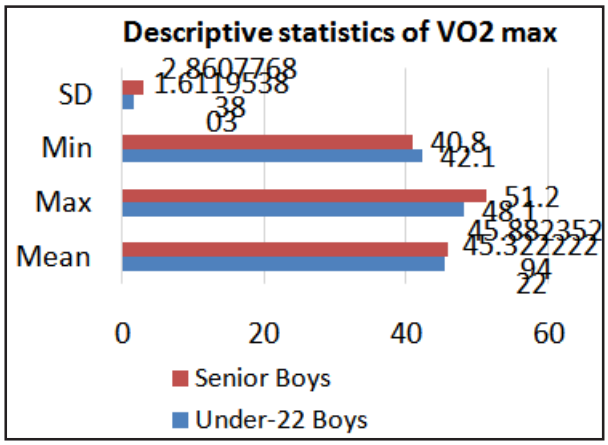
The formula is:

VO2 max = 36.4+(0.0084 ×YYIR1 distance in meters)

2.3 Statistical Analysis

- **Software used for data analysis:**Microsoft Excelwas used for analysing the data.
- **Pre processing:**The descriptive approach is used to assess the assumption of normality of data and for screening for outliers. Both group's skewness and kurtosis values fall between -1 and +1. The thumb rule indicates that the data has a normal distribution. So that we can go for parametric tests. Additionally, descriptive statistics are used to analyse data in order to determine variance, mean, and standard deviation.
- **Comparative Analysis:** Independent t-test was used to compare aerobic fitness of both selected groups i.e. U-22 and Senior male division level cricket players. As groups are unequal in numbers therefore two-sample assuming unequal variances analysis was used to analyse the difference between both groups.

3. Results:



Above graph depicts that the mean values of VO2 max are almost similar 45.32 and 45.88 (ml/kg/min)of U-22 and Senior male division level cricket players respectively of Narmadapuram Division Cricket Association. Graph also shows the maximum and minimum values of VO2 max in both groups separately. U-22 male cricket players found 48.1 maximum and 42.1 minimum VO2 max, However, Senior male cricket players group found 51.2 maximum and 40.8 minimum VO2 max. Standard deviation of senior group found 2.86 greater than U-22 group i.e. 1.61.

t-Test: Two-Sample Assuming Unequal Variances		
	Senior	**U-22**
Mean	45.88235294	45.32222222
Variance	8.184044118	2.75124183
Observations	17	18
Hypothesized	0	
Mean Difference		
df	25	
t Stat	0.703323848	
P(T<=t) one-tail	0.244176429	
t Critical one-tail	1.708140761	
P(T<=t) two-tail	0.488352859	
t Critical two-tail	2.059538553	

The table shows the comparative analysis of aerobic fitness with VO2 max level in both groups by using Yo-Yo IRL-1 aerobic fitness test. For data analysis by using MS Excel software after applying two sample unequal variances researchers found P value for two tail 0.48. As P value is greater than 0.05.

Therefore, we can conclude that there was no significant difference in aerobic fitness of both selected groups. It shows that U-22 and senior male division-level cricket players of the Narmadapuram division have similar aerobic fitness (VO2 max).It was also found that VO2 max of male cricket players of the present study was in average range when compared with the VO2 max norms reported by Robert (2012).

4. Discussion : According to the current study, there was not a significant difference in the aerobic fitness (VO, max) of male cricket players in the Under-22 and Senior divisions. This implies that aerobic capacity at this competitive level may not be determined solely by age group. Rather, the maintenance of cardiovascular fitness across age groups may be more significantly influenced by regular training exposure, role-specific demands, and total playing experience. The findings show that the aerobic profiles required for the demands of modern cricket are similar for U-22 and senior players.In order to determine if role demandsrather than ageaccount for variations, future research should evaluate aerobic fitness across playing roles (batters, fast bowlers, spinners, and wicketkeepers).

Acknowledgement: We would like to thank ***Mr. Anurag Mishra [Honorary Secretary, NDCA]*** for his valuable support in facilitating data collection and providing assistance throughout the research process. We are also grateful to *entire division association team* for their kind cooperation and help in completing this study.

References:-

1. https://www.researchgate.net/publication/374477882_Comparison_of_Aerobic_Fitness_VO_2max_of_Cricket_ Players_on_Basis_of_Their_Playing_Positions
2. https://shodhganga.inflibnet.ac.in/bitstream/10603/13761/8/08_chapter%201.pdf
3. Bangsbo J, Iaia FM, Krustrup P., The Yo-Yo Intermittent Recovery Test A Useful Tool for Evaluation of Physical Performance in Intermittent Sports, Sports Med 2008; 38 (1): 37-51.
4. Draper, N. and Whyte, G (1997) Here's a new running-based test of anaerobic performance for which you need only a stopwatch and a calculator. Peak Performance, 97, p. 3-5
5. https://www.topendsports.com/testing/tests/rast.htm
6. https://ijcrr.com/article_html.php?did=3685&issueno=0
7. https://fieldhockeybc.com/wp-content/uploads/2018/08/Fitness-Test-Protocol_2018.pdf
8. https://journals.lww.com/nscajscr/Fulltext/2010/11000/Physiologic_Profile_of_Professional_Cricketers.3.aspx?utm_source=chatgpt.com
9. https://www.researchgate.net/publication/308271006_VO2max_assessment_in_athletes_A_thorough_method_comparison_study_between_YoYo_ test_and_ direct_measurement

****