DOI: 10.7860/JCDR/2025/80478.21638

A Literature Review Assessing Psychometric Properties of Field-based Cardiorespiratory Fitness Tests Across Diverse Populations

Darshil Mishra, BPT Student, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.
Sandeep Pattnaik, BPT, MPT (Orthopaedics), PhD. (Physiotherapy), Assistant Professor, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Sandeep Pattnaik,

BPT, MPT (Orthopaedics), PhD. (Physiotherapy), Assistant Professor, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, Haryana, India.

E-mail: physiosandeep94@gmail.com

ABSTRACT

Cardiorespiratory Fitness (CRF), is a vital health metric that affects performance and physical health in a variety of groups. A range of assessment methods exist, including laboratory-based test likes step tests, cycle ergometer test, treadmill test, and field-based test. Some of them are performed in maximal while a few are done at submaximal level. Choosing the optimal CRF test can be difficult due to the wide range of available options. It is further complicated by age, health status, and available resources and other demographics. This literature review therefore, aims to critically evaluate the reliability and validity of various field-based CRF tests across different populations. To achieve this an extensive search was conducted across databases PubMed, and EMBASE, for full-text English language articles exploring the psychometric properties of different field-based CRF tests, published between 2014 to 2024. Only observational studies were considered, regardless of geographical location.Keywords including “Cardiorespiratory Fitness,” “Field-Based Tests,” “Validity,” “Reliability,” “VO2max,” and related terms with Boolean terms were used to conduct search. Data on validity, reliability, demographic characteristics, their utility in a variety of populations and important findings were then retrieved from utilised in a variety of populations. Analysis of the retrieved articles suggested that the 30-15 Intermittent Fitness Test was well suited for military infantry, exhibiting moderate to high validity (r = 0.695 - 0.930) and high reliability (Intraclass Correlation {ICC}=0.960 - 0.975), while the 4x10 Shuttle Run Test showed unusually high reliability (ICC = 0.998) for adults. In comparison, the Yo-Yo Intermittent Recovery Test Level 1 demonstrated moderate to excellent reliability (ICC = 0.78–0.98) and validity (r = 0.74) for young athletes.Conversely, the Yo-Yo Intermittent Recovery Test Level 2 demonstrated good reliability (ICC = 0.86 - 0.96) but poorer validity (r=0.47) for elite athletes. These results emphasise how crucial it is to choose tests that are appropriate for particular demographics.

Inconsistencies in all tests, however, highlight the necessity of population-specific modifications and standardised procedures and feasibility studies of each tool in different population.

Keywords: Exercise test, Health status, Oxygen consumption.