

Development and Validation of a Brief Self-Report Physical Readiness Test for Athletes*Arun Sangwan* Sarvdeep Kohli*****Abstract**

The present study developed and validated the Physical Readiness Test (PRT), a brief self-report instrument designed to assess multidimensional physical preparedness among athletes across five domains applicable to all sports: muscle strength, endurance level, nutritional status, match/sport-specific fitness, and overall health status. The six-item questionnaire was administered to 285 Indian athletes (age range 15–24 years; $M = 19.49$, $SD = 2.55$) competing in badminton, kabaddi, cross-country running, and yoga during tournaments held at the Maharshi Dayanand University Sports Complex, Rohtak, Haryana. Psychometric analyses revealed acceptable internal consistency (Cronbach's $\alpha = .78$ for the five-item scale), excellent item discrimination with large effect sizes (Cohen's d ranging from 2.01 to 2.97, all $p < .001$), and adequate corrected item-total correlations ($r = .49$ to $.66$). Principal component analysis identified a unidimensional factor structure explaining 53.4% of total variance, with all items loading substantially ($\geq .68$) on a single component. Convergent validity was established through a significant positive correlation between domain-specific assessment scores and overall perceived readiness ($r = .63$, $p < .001$). The PRT addresses important gaps in athlete monitoring by providing an efficient, culturally appropriate, and psychometrically sound instrument suitable for frequent assessment across diverse athletic populations and resource-limited settings in India.

Keywords: Physical readiness test, athlete assessment, test construction, sports psychology, self-report measurement, psychometric validation

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Introduction

Athletic excellence is built on a foundation of disciplined physical preparation. Every athlete, regardless of sport, must develop and maintain key physical capacities, including muscular strength, endurance, appropriate nutrition, sport-specific fitness, and good overall health, to perform well in training and competition (Kellmann et al., 2018). Among the many factors that influence athletic performance, physical readiness is often the most basic and essential requirement. Without adequate physical preparation, even the most skilled and mentally strong athlete cannot perform at their full potential.

Physical readiness refers to the extent to which an athlete's body is prepared to meet the demands of training and competition. It is not a single quality but rather a combination of several interrelated physical components that together determine

whether an athlete is fit to compete (Bourdon et al., 2017). The concept goes beyond simple fitness and includes the body's recovery state, nutritional status, freedom from injury or illness, and the specific physical capacities required by the athlete's sport.

Muscle Strength. Muscle strength is one of the most fundamental components of physical readiness. It refers to the ability of muscles to produce force during physical activity. Suchomel et al. (2016) conducted a comprehensive review and found that greater muscular strength is strongly associated with better performance in general sport skills such as jumping, sprinting, and change of direction. Their analysis across multiple studies showed that appropriate strength assessments consistently demonstrated significant relationships with sport performance. Lower-body strength was found to be

important for activities requiring explosive movements. The authors concluded that there may be no substitute for greater muscular strength in improving an athlete's overall performance.

Endurance Level. Endurance is the body's ability to sustain physical effort over a prolonged period without early fatigue. Joyner and Coyle (2008) reviewed the physiological factors that determine endurance performance and identified maximal oxygen uptake, lactate threshold, and running economy as the three primary determinants. Their analysis revealed that these three variables together explained a large proportion of the differences in endurance performance among athletes. Bangsbo et al. (2006) further demonstrated that sport-specific endurance tests correlated more strongly with actual match performance than general laboratory tests, highlighting the importance of assessing endurance in a way that reflects the demands of the specific sport.

Nutritional Status. Proper nutrition is essential for athletes to train effectively, recover adequately, and perform at their best. Burke et al. (2011) showed that athletes who followed periodized carbohydrate intake strategies achieved greater performance improvements than those on consistent intake plans. Mountjoy et al. (2014) presented the International Olympic Committee consensus statement on Relative Energy Deficiency in Sport (RED-S), which documents that inadequate energy availability leads to negative consequences, including impaired training adaptation, decreased glycogen stores, increased injury risk, reduced immune function, and poor performance in both male and female athletes. In the Indian context, Chatterjee and Bandyopadhyay (2016) assessed nutritional status among 340 Indian athletes and found that a majority failed to meet energy requirements, many exhibited micronutrient deficiencies, especially in iron, calcium, and vitamin D, and only a small proportion followed sport nutrition guidelines. These findings indicate

widespread nutritional inadequacy among Indian athletes.

Match/Sport-Specific Fitness. Sport-specific fitness refers to the integrated physical preparation needed to perform well in competitive situations. It combines multiple physical capacities such as strength, endurance, speed, agility, and flexibility in a manner relevant to the demands of the specific sport. Young and Farrow (2013) found that sport-specific reactive agility tests predicted performance better than generic change-of-direction tests, supporting the notion that assessment should match the demands of the athlete's sport. The specificity of physical preparation for competition is a widely recognized principle in sport science (Bourdon et al., 2017), and athletes who develop sport-relevant fitness capacities tend to perform better in competitive conditions.

Overall Health Status. An athlete's general health, including recovery quality, sleep, injury status, and illness status, is a critical component of physical readiness. Soligard et al. (2016) analysed the effects of injury and illness on performance at the 2015 European Games involving athletes across 20 sports and found that athletes who experienced health problems during competition showed dramatically reduced performance. Schwellnus et al. (2016) documented illness frequency and effects among elite athletes over 12 months and found that each illness episode resulted in several days of training lost. Illness occurring in the weeks before a major competition significantly reduced performance outcomes. Halson (2014) reviewed the role of sleep in athletic recovery and found that insufficient sleep substantially impaired exercise performance, particularly endurance and cognitive-motor tasks.

Self-Report Assessment in Sports. Traditional approaches to assessing physical readiness rely heavily on objective physiological testing, including maximal oxygen uptake, lactate threshold, isokinetic strength, and body composition analysis (Halson, 2014). While these laboratory-

based assessments provide precise measurements, they require specialized equipment, trained personnel, and substantial time, making frequent assessment impractical (Saw et al., 2016). Self-report instruments offer a practical alternative. Questionnaires require minimal time, no specialized equipment, and can be administered by support staff without extensive training (Hooper & Mackinnon, 1995). Saw et al. (2016) conducted a systematic review comparing subjective self-report measures with objective monitoring tools and found that subjective measures showed greater sensitivity and consistency in reflecting changes in training load than objective measures. They concluded that self-reported measures are highly effective for practical athlete monitoring.

Review of Literature

Research on athlete monitoring and physical readiness assessment has developed considerably in recent decades. Hooper and Mackinnon (1995) pioneered brief self-report monitoring with elite swimmers across a competitive season. Athletes completed daily ratings of fatigue, sleep quality, stress, and muscle soreness. Results showed that increases in negative ratings preceded performance decrements by two to four weeks, demonstrating the clinical utility of systematic subjective assessment. Kellmann and Kallus (2001) developed the Recovery-Stress Questionnaire for Athletes (RESTQ-Sport), a comprehensive 76-item instrument assessing stress and recovery across multiple dimensions. Although psychometrically sound and reliable, the instrument's 20- to 30-minute duration limits its practicality for routine monitoring.

Laurent et al. (2011) developed a brief Perceived Recovery Status Scale assessing fatigue, sleep quality, muscle soreness, stress levels, and mood. Validation demonstrated acceptable internal consistency ($\alpha = .83$) and test-retest reliability ($r = .77$) over 24 to 48 hours. The instrument showed sensitivity to changes in training load, with wellness scores

declining significantly during intensified training. McLean et al. (2010) validated a five-item wellness questionnaire among professional rugby players and found that low wellness scores predicted subsequent injury, supporting the predictive validity of brief self-report instruments. Gastin et al. (2013) examined perceptions of wellness for monitoring adaptive responses to training in Australian football players and reported that a brief self-report wellness measure was sensitive to weekly changes in training load.

Grove et al. (2014) developed and validated a brief self-report measure of training distress and performance readiness with competitive swimmers. Their measure demonstrated the ability to detect meaningful changes in athlete well-being during intensive training periods. Buchheit (2017) discussed the challenges in interpreting monitoring data in elite sport and emphasized the importance of using multiple simple tools rather than a single complex instrument. He argued that brief, easy-to-use questionnaires administered frequently provide more useful information than complex assessments done infrequently.

Foster et al. (2001) proposed the session rating of perceived exertion method as a simple tool for quantifying training load in athletes. This approach has been widely adopted in applied sport settings due to its simplicity and practicality. Coutts and Reaburn (2008) validated the Daily Analysis of Life Demands for Athletes (DALDA) and found it to be sensitive to changes in training load among semi-professional rugby league players. Taylor et al. (2012) surveyed fatigue-monitoring practices in high-performance sport and found that subjective questionnaires were the most used method, underscoring the practical value of self-report tools. Raglin and Morgan (1994) developed a scale to monitor training-induced distress in athletes that demonstrated sensitivity to indicators of overtraining.

Main and Grove (2009) proposed a multi-component assessment model for monitoring training distress among athletes

that combined mood disturbance measures with physical well-being measures. Robson-Ansley et al. (2009) investigated athletes' subjective mood responses to overreaching and found that mood-state changes preceded declines in physical performance, further supporting the value of self-report monitoring. Kenttä and Hassmén (1998) developed the Total Quality Recovery scale, a brief single-item tool for assessing perceived recovery that has been used in various sporting contexts. Mujika (2017) reviewed quantification of training and competition loads in endurance sports and emphasized the need for practical, easily administered monitoring tools. Drew and Finch (2016) conducted a systematic review on the relationship between training load and injury, illness, and soreness, concluding that appropriate monitoring tools are essential for injury prevention. Starling and Lambert (2018) examined monitoring athlete well-being using self-reported measures in professional rugby and found that even very brief daily questionnaires were effective for detecting changes in training adaptation. Nässi et al. (2017) developed English versions of the Acute Recovery and Stress Scale and the Short Recovery and Stress Scale, demonstrating satisfactory internal consistency and good construct validity, further expanding the range of brief self-report tools available for athlete monitoring.

Williams and Andersen (1998) presented their influential stress-injury model, proposing that psychological factors, including stress and anxiety, influence injury risk through both physiological and behavioural pathways. Their review supported this model, with perceived stress showing stronger relationships with injury occurrence than objective stressors, supporting the relevance of subjective assessment. Bourdon et al. (2017) published a consensus statement on monitoring athlete training loads, recommending that practitioners use both objective and subjective measures, with a particular emphasis on the sensitivity and practicality of self-report tools.

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In the Indian context, research on athlete monitoring tools is limited. Kumar and Pathak (2012) noted that most sports psychology instruments used in India have been developed and validated in Western contexts, with limited research on their validation with Indian athletes. Majumdar and Mehta (2010) discussed India's sporting landscape and highlighted the resource limitations faced by most Indian athletes, who train without access to comprehensive sports science support. These factors create a particular need for brief, accessible, and culturally appropriate assessment tools.

In summary, the existing literature shows that self-report measures offer practical advantages, including efficiency and accessibility, as well as predictive validity for athlete monitoring. Physical readiness includes multiple distinct but interrelated domains. Brief instruments enable frequent monitoring, which is essential for responsive training management. However, existing instruments primarily assess recovery and wellness rather than comprehensive physical readiness, and there is a notable absence of validated brief instruments specifically designed for Indian athlete populations.

Rationale of the Study

Despite the recognized importance of physical readiness in sports and the growing body of research on athlete monitoring, a validated brief instrument specifically assessing comprehensive physical preparedness has not been available, particularly for Indian athletes. India's sporting context presents unique challenges. Most Indian athletes train without access to regular laboratory testing, specialized equipment, or comprehensive sports science support (Majumdar & Mehta, 2010). This creates a clear need for accessible, validated assessment tools that enable effective athlete monitoring despite limited resources. Furthermore, the development of a culturally appropriate, bilingual (Hindi-English) instrument, validated with Indian athletes, addresses the gap identified by Kumar and Pathak (2012)

in the lack of indigenously developed assessment tools.

Objectives of the Study

The specific objectives of this study were: (a) to develop a theoretically grounded, brief self-report instrument assessing five domains of physical readiness applicable across sports, and (b) to establish its psychometric properties, including reliability, validity, and factor structure with Indian athlete populations.

Method

Research Design

This study employed a psychometric instrument development and validation design following established procedures for test construction (Hinkin, 1998). The research involved deductive item generation based on literature review, expert content validation, and empirical validation with a representative athlete sample. The cross-sectional design collected data during competitive tournaments.

Participants

Participants were recruited from athletes competing in tournaments held at the Maharshi Dayanand University Sports Complex in Rohtak, Haryana, during the 2015–2016 academic year. Recruitment took place during four tournaments: the North Zone Badminton Tournament (September–October 2015), the Inter-College Kabaddi Men's Tournament (September 2015), the Inter-College Kabaddi Men's and Women's Tournament (September 2015), the Inter-College Cross-Country Running Championship (October–November 2015), and the Inter-College Yoga Men's Championship (November 2015). The investigator approached athletes during non-competition periods and invited them to participate voluntarily. Those expressing interest provided written informed consent.

The final sample comprised 285 athletes. The sample included 125 badminton players (43.9%), 78 kabaddi players (27.4%), 63 cross-country runners (22.1%), and 19 yoga practitioners (6.7%). Gender distribution included 257 males (90.2%)

and 28 females (9.8%). Mean age was 19.49 years ($SD = 2.55$). Mean training experience was 3.9 years ($SD = 3.1$, range: 1–15 years). Sport-specific age characteristics showed badminton players with a mean age of 20.24 years ($SD = 3.24$), kabaddi players with a mean age of 18.90 years ($SD = 1.78$), cross-country runners with a mean age of 18.65 years ($SD = 1.12$), and yoga practitioners with a mean age of 19.74 years ($SD = 2.18$).

Inclusion and Exclusion Criteria

Inclusion criteria required active competitive participation in organized sport, current training minimum three times weekly, ability to comprehend Hindi or English, and voluntary consent to participate. Exclusion criteria included current significant injury preventing training participation, cognitive impairment affecting questionnaire comprehension, and incomplete questionnaire responses.

Test Construction

Conceptual Framework. Test development began with a comprehensive literature review identifying five theoretical domains constituting physical readiness: (a) muscle strength — the athlete's perception of physical task manageability and capability adequacy for sport-specific demands; (b) endurance level — perceived ability to maintain energy and performance intensity throughout training and competition; (c) nutritional status — the athlete's assessment of dietary effectiveness in supporting athletic goals; (d) match/sport-specific fitness — integrated confidence in physical preparation for competitive performance; and (e) overall health status — recovery quality, training responsiveness, and freedom from physical limitations.

Item Development. Following established test construction methodology (DeVellis, 2017; Hinkin, 1998), one item was generated per domain to create an ultra-brief instrument suitable for very frequent administration with minimal burden on athletes. Item writing emphasized clarity, simple language, indirect assessment of perceived outcomes and capabilities to reduce social desirability bias, current-state assessment, and applicability across diverse

sports. A sixth item assessed overall perceived physical readiness, designed to evaluate convergent validity by comparing the domain assessments (Items 1–5) with global perceived readiness.

Expert Review. Four expert reviewers (a sports trainer with over 10 years' experience, a sports nutritionist, and two psychology professors specializing in psychological assessment) evaluated initial items for content validity. All items achieved a mean expert rating of 4.2 or higher for clarity, relevance, and cultural

appropriateness. Expert agreement on construct assignment exceeded 90% for all items.

Final Test Items. The Physical Readiness Test comprises six items as presented in Table 1. Items 1 through 5 use a five-point Likert response format (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). Item 6 uses a five-point visual analog scale (1 = Minimum Physical Readiness; 5 = Maximum Physical Readiness).

Table 1

Physical Readiness Test Items with Corresponding Domains

Domain	Item (English)	Item (Hindi)
1. Muscle Strength	You can handle the physical demands of your sport without difficulty.	आप अपने खेल की शारीरिक माँगों को बिना किसी कठिनाई के संभाल लेते हैं।
2. Endurance Level	You are able to maintain your energy throughout your training or competition.	आप अपने प्रशिक्षण या प्रतियोगिता के दौरान अपनी ऊर्जा बनाए रख पाते हैं।
3. Nutritional Status	Your current eating habits are supporting your sports performance well.	आपकी वर्तमान खान-पान की आदतें आपके खेल प्रदर्शन में अच्छा सहयोग दे रही हैं।
4. Match/Sport-Specific Fitness	You feel physically prepared to perform at your best in upcoming competitions.	आप आगामी प्रतियोगिताओं में अपना सर्वश्रेष्ठ प्रदर्शन करने के लिए शारीरिक रूप से तैयार महसूस करते हैं।
5. Overall Health Status	You feel fit, well-recovered, and free from any physical problems.	आप स्वस्थ, अच्छी तरह रिकवर हुआ, और किसी भी शारीरिक समस्या से मुक्त महसूस करते हैं।
6. Overall Perceived Physical Readiness	On the scale of overall physical readiness, where do you place yourself? Circle one point. (1 = Minimum; 5 = Maximum)	समग्र शारीरिक तैयारी के पैमाने पर आप स्वयं को कहाँ रखते हैं? एक बिंदु पर गोला लगाएँ। (1 = न्यूनतम; 5 = अधिकतम)

Scoring Procedures. The Physical Readiness Score is calculated by summing Items 1 through 5, yielding total scores ranging from 5 (minimum readiness) to 25 (maximum readiness). Higher scores indicate greater physical readiness. Item 6 does not contribute to the total score; it serves as a criterion for convergent validity.

Bilingual Format. A bilingual format incorporating both English and Hindi was developed using standard back-translation procedures (Beaton et al., 2000). The final test booklet presented items in both languages simultaneously.

Procedure

Data collection occurred at tournament venues during competition periods.

Athletes were approached during breaks and between matches to minimize interference with competition preparation. Athletes completed the Physical Readiness Test (PRT) in small groups of three to five individuals after receiving standardized instructions in both Hindi and English. The administrator remained available during completion to answer questions. Response sheets were checked on-site to identify and address any missing responses. Total administration time per group averaged 20 minutes.

Statistical Analyses

Data analysis was performed using SPSS Version 20.0. Analyses included descriptive statistics, item discrimination analysis

using the upper-lower 27% method with independent samples *t*-tests (Ebel & Frisbie, 1991), corrected item-total correlations, inter-item correlations, reliability analysis using Cronbach's alpha (Nunnally & Bernstein, 1994), principal component analysis for factor structure examination, and Pearson correlation for convergent validity. Statistical significance was set at $\alpha = .05$.

Results

Descriptive Statistics

The final sample of 285 athletes showed no missing data across all items. Normality

Table 2

Frequencies and Percentages for All Six Items (N = 285)

Item	Response 1	Response 2	Response 3	Response 4	Response 5	<i>M</i>	<i>SD</i>
1. Muscle Strength	11 (3.9%)	41 (14.4%)	83 (29.1%)	105 (36.8%)	45 (15.8%)	3.46	1.04
2. Endurance	14 (4.9%)	52 (18.2%)	87 (30.5%)	100 (35.1%)	32 (11.2%)	3.29	1.05
3. Nutritional Status	21 (7.4%)	64 (22.5%)	73 (25.6%)	93 (32.6%)	34 (11.9%)	3.19	1.14
4. Match Fitness	9 (3.2%)	54 (18.9%)	76 (26.7%)	98 (34.4%)	48 (16.8%)	3.43	1.07
5. Overall Health	18 (6.3%)	48 (16.8%)	81 (28.4%)	104 (36.5%)	34 (11.9%)	3.31	1.08
6. Overall Physical Readiness	2 (0.7%)	23 (8.1%)	130 (45.6%)	90 (31.6%)	37 (13.0%)	3.49	0.84

Nutritional status (Item 3) received the lowest mean rating, with nearly 30% of athletes disagreeing or strongly disagreeing that their eating habits supported their performance. This aligns with research documenting nutritional inadequacies among Indian athletes (Chatterjee & Bandyopadhyay, 2016). Match/sport-specific fitness (Item 4) received a relatively high mean rating ($M = 3.43$), which may reflect that the data were

Table 3

Item Discrimination Analysis: Upper 27% vs. Lower 27% Groups (n = 76 per group)

Item	<i>t</i>	<i>p</i>	High Group <i>M</i>	Low Group <i>M</i>	Mean Difference	Cohen's <i>d</i>
1. Muscle Strength	14.96	< .001	4.41	2.47	1.93	2.43

assessment revealed all items demonstrated skewness and kurtosis values within acceptable limits (all $< |1.0|$; Tabachnick & Fidell, 2013). Mean item scores ranged from 3.19 ($SD = 1.14$) for nutritional status to 3.46 ($SD = 1.04$) for muscle strength. The total PRT score (Items 1–5) showed $M = 16.69$ ($SD = 3.93$), representing 66.8% of the maximum possible score, with approximately normal distribution (skewness = -0.15 ; kurtosis = -0.33). Table 2 presents the frequency distributions for all items.

collected during active competition, when athletes had presumably trained specifically for these events.

Item Discrimination Analysis

Item discrimination was assessed using the upper-lower 27% method. The top 27% ($n = 76$; high physical readiness group) and bottom 27% ($n = 76$; low physical readiness group) were compared using independent samples *t*-tests. Results are presented in Table 3.

2. Endurance	12.40	< .001	4.22	2.50	1.72	2.01
3. Nutritional Status	14.97	< .001	4.24	2.18	2.05	2.43
4. Match Fitness	18.29	< .001	4.50	2.36	2.15	2.97
5. Overall Health	13.93	< .001	4.25	2.37	1.88	2.26
6. Overall Physical Readiness	11.27	< .001	4.16	2.89	1.27	1.83

All items significantly discriminated between the high and low physical readiness groups. The t -values ranged from 11.27 to 18.29 (all $p < .001$), with Cohen's d effect sizes ranging from 1.83 to 2.97, far exceeding the 0.80 threshold for large effects (Cohen, 1988). Match/sport-specific fitness (Item 4) demonstrated the strongest discrimination ($t = 18.29$, $d = 2.97$), with high-readiness athletes averaging 4.50 versus 2.36 for low-readiness athletes. Endurance (Item 2) showed the lowest

discrimination among the five scale items ($d = 2.01$), though still very large. All items are well above acceptable thresholds for retention.

Internal Consistency Reliability

Cronbach's alpha for Items 1 through 5 was .78, exceeding the .70 acceptability threshold (Nunnally & Bernstein, 1994). This reliability is noteworthy given the test's brevity (only five items), as reliability generally increases with test length. Table 4 presents the complete reliability analysis.

Table 4

Internal Consistency Reliability Analysis (N = 285)

Item	Corrected Item-Total r	α if Item Deleted	M if Item Deleted	Variance if Item Deleted
1. Muscle Strength	.56	.74	13.22	10.51
2. Endurance	.50	.76	13.39	10.88
3. Nutritional Status	.49	.76	13.49	10.50
4. Match Fitness	.66	.70	13.26	9.80
5. Overall Health	.56	.74	13.38	10.33

Overall $\alpha = .78$ for five-item scale; $M = 16.69$, $SD = 3.93$.

All corrected item-total correlations exceeded .49, surpassing the .40 minimum recommended threshold (Nunnally & Bernstein, 1994). Match fitness demonstrated the strongest item-total correlation ($r = .66$), consistent with its superior discrimination. The alpha-if-item-deleted analysis revealed that removing any item would decrease overall reliability,

supporting the retention of all five items. Match fitness contributes most to reliability (α drops to .70 if deleted), while nutritional status contributes least but still meaningfully (α drops to .76 if deleted).

Inter-Item Correlations

All inter-item correlations were positive and statistically significant ($p < .001$), ranging from .27 to .51. Table 5 presents the complete inter-item correlation matrix.

Table 5

Inter-Item Correlation Matrix (N = 285)

Item	1	2	3	4	5
1. Muscle Strength	—				
2. Endurance	.43**	—			
3. Nutritional Status	.37**	.27**	—		
4. Match Fitness	.46**	.45**	.51**	—	
5. Overall Health	.43**	.38**	.36**	.51**	—

Note. ** $p < .001$

The moderate positive correlations support the conceptualization of items as assessing related but distinct facets of physical readiness. The strongest correlations emerged between match fitness and nutritional status ($r = .51$) and between match fitness and overall health ($r = .51$), consistent with these dimensions being closely interrelated in practice. The weakest correlation was between endurance and nutritional status ($r = .27$), suggesting these domains vary somewhat independently.

Factor Structure

Table 6

Principal Component Analysis: Eigenvalues and Variance Explained (N = 285)

Component	Eigenvalue	% Variance	Cumulative %
1	2.67	53.4	53.4
2	0.75	15.0	68.5
3	0.60	11.9	80.4
4	0.56	11.3	91.6
5	0.42	8.4	100.0

Table 7

Component Loadings (N = 285)

Item	Component 1 Loading
1. Muscle Strength	.74
2. Endurance	.68
3. Nutritional Status	.68
4. Match Fitness	.81
5. Overall Health	.74

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .81, exceeding the recommended minimum threshold and indicating the data were suitable for factor analysis (Kaiser, 1974). Bartlett's test of sphericity was significant ($\chi^2 = 356.51$, $df = 10$, $p < .001$). Principal component analysis was conducted on Items 1 through 5 (Item 6 was excluded as it serves as a validity criterion). One component emerged with an eigenvalue exceeding 1.0. Results are presented in Tables 6 and 7.

The first component explained 53.4% of the total variance with an eigenvalue of 2.67. All items loaded substantially on the single component with loadings of .68 or above, exceeding the .50 threshold for meaningful loadings (Stevens, 2009). Match fitness demonstrated the highest loading (.81), and endurance and nutritional status showed the lowest loadings (.68), though still both remained within the substantial range. The unidimensional structure supports the calculation of a total readiness score representing overall physical preparedness.

	Mean of Items 1–5	Significance
Item 6 (Overall Perceived Physical Readiness)	.63	$p < .001$

This substantial positive correlation supports convergent validity, demonstrating that systematic evaluation across specific readiness domains converges with athletes' intuitive perceptions of their global readiness. The correlation falls within the large range by conventional standards (Cohen, 1988), while remaining below .80, suggesting that Item 6 captures additional variance beyond the five specific domains. This is theoretically sensible, as overall readiness perception likely incorporates elements not explicitly assessed, such as confidence in technical skills, recent performance, or psychological readiness.

Discussion

The present study developed and provided initial validation of the Physical Readiness Test (PRT), a brief self-report instrument that assesses multidimensional physical preparedness among athletes. Results from 285 competitive Indian athletes demonstrated acceptable psychometric properties across multiple indicators.

The PRT demonstrated acceptable internal consistency ($\alpha = .78$) for the five-item scale, meeting the .70 acceptability criterion (Nunnally & Bernstein, 1994). This reliability is noteworthy given the brevity of the instrument. For comparison, Laurent et al. (2011) reported $\alpha = .83$ for their eight-item Perceived Recovery Status Scale, and McLean et al. (2010) reported $\alpha = .77$ for a five-item wellness questionnaire. The Arun Sangwan, Sarvdeep Kohli

Convergent Validity

The correlation between the mean of Items 1 through 5 (domain-specific assessments) and Item 6 (overall perceived readiness) was $r = .63$ ($p < .001$). This result is presented in Table 8.

Table 8

Convergent Validity: Correlation of Domain Assessment Mean with Overall Perceived Readiness (N = 285)

PRT's reliability of .78, with only five items, is comparable to that of other brief sport monitoring tools. When all six items were considered together, the alpha was .81. The slightly lower five-item alpha reflects the intentional design choice of using Item 6 solely as a validity criterion rather than a scale component.

Item discrimination analysis revealed excellent sensitivity, with all items significantly differentiating between high and low readiness groups and yielding very large effect sizes ($d = 2.01$ to 2.97). These values substantially exceed typical discrimination indices for psychometric instruments (Ebel & Frisbie, 1991). The strong discrimination likely reflects two factors. First, the items assess meaningful and noticeable aspects of physical readiness that athletes can reliably evaluate based on their daily training experiences. Second, the extreme group comparison (upper vs. lower 27%) maximizes discrimination by contrasting athletes at opposite ends of the readiness spectrum.

Corrected item-total correlations ranged from .49 to .66, indicating that all items contribute meaningfully to the total scale while maintaining adequate uniqueness. Match fitness showed the strongest item-total correlation ($r = .66$), suggesting that this integrated domain most directly captures overall readiness. This aligns with the conceptualization of sport-specific fitness as combining multiple physical capacities in sport-relevant contexts (Young

& Farrow, 2013). Nutritional status showed the weakest item-total correlation ($r = .49$), suggesting that nutrition varies more independently from other readiness dimensions. This is consistent with the finding by Chatterjee and Bandyopadhyay (2016) that nutritional practices among Indian athletes are influenced by factors beyond athletic training, such as economic constraints and cultural dietary habits.

The single-factor structure, which explains 53.4% of the variance, supports the interpretation of the PRT as measuring a general physical readiness construct. The moderate factor loadings (.68 to .81) and inter-item correlations (.27 to .51) indicate that items assess related but distinct facets of an underlying construct rather than redundant content. This unidimensional structure supports using a total score for overall readiness assessment, while individual item scores can still identify specific domains that may need attention.

Convergent validity was supported by the substantial correlation ($r = .63$) between domain-specific assessment and overall perceived readiness. This demonstrates that systematic evaluation across five domains converges with athletes' intuitive global perceptions of their readiness. The correlation below .80 indicates that global readiness perceptions also incorporate unmeasured elements such as psychological readiness, recent competitive experience, or confidence in technical skills, which is theoretically meaningful.

The finding that nutritional status consistently showed the weakest relationships with other domains (lowest item-total r , inter-item r range of .27 to .51) and the lowest mean rating ($M = 3.19$) deserves attention. This suggests that nutrition may be an area where many Indian athletes have specific deficits that do not necessarily correspond to their other physical readiness domains. Chatterjee and Bandyopadhyay (2016) documented widespread nutritional inadequacies among Indian athletes attributed to limited nutrition education, economic constraints, and cultural practices sometimes not aligned with sport nutrition

recommendations. The PRT's ability to identify this common concern demonstrates its practical relevance.

Match fitness, in contrast, consistently demonstrated the strongest relationships across all analyses — highest item-total correlation ($r = .66$), highest factor loading (.81), and strongest discrimination ($d = 2.97$). This supports its conceptualization as an integrative construct that combines multiple physical capacities in sport-relevant contexts. Unlike strength or endurance assessed separately, match fitness captures whether these capacities translate into effective competitive readiness (Young & Farrow, 2013).

The results are consistent with those of Saw et al. (2016), who found that subjective self-report measures provide valuable and sensitive information for athlete monitoring. The PRT extends this body of work by focusing specifically on physical readiness rather than general wellness or recovery, providing a more targeted assessment relevant to training and competition preparation.

The PRT provides a validated, practical assessment tool for monitoring physical readiness in settings where comprehensive physiological testing is unavailable, addressing a critical need in Indian sports where most athletes train without access to sports science laboratories and specialized equipment (Majumdar & Mehta, 2010). By enabling frequent and low-burden assessment, the PRT supports early identification of athletes experiencing declining readiness before serious consequences such as injury, illness, or overtraining develop, consistent with the preventive approach to athlete health recommended by contemporary sport science (Schwellnus et al., 2016; Bourdon et al., 2017). Its multidimensional structure further allows identification of specific readiness deficits, enabling coaches to guide individualized training adjustments — including modified training loads, nutritional intervention, additional recovery, or medical attention — rather than applying uniform programs across all athletes.

This work is subject to certain limitations. The use of a single item per domain is a key constraint, as reliable domain-specific assessment requires multiple items per domain. The sample consisted largely of male athletes (90.2%), restricting the applicability of the findings to female athletes. Additionally, the sample comprised university-level athletes from only four sports in one geographic region, limiting the generalizability of findings to other competitive levels, sports, age groups, and regions across India.

Conclusion

The Physical Readiness Test demonstrates acceptable psychometric properties in this initial validation, providing a brief, practical instrument for assessing multidimensional physical preparedness among athletes. Acceptable internal consistency ($\alpha = .78$), excellent item discrimination ($d = 2.01$ to 2.97), a coherent single-factor structure explaining 53.4% of variance, and convergent validity ($r = .63$) with overall perceived readiness support the instrument's reliability and validity. The PRT addresses the practical need for efficient, accessible readiness monitoring when comprehensive physiological testing is unavailable. The five-domain assessment of strength, endurance, nutrition, match fitness, and health provides diagnostically useful information for training individualization and intervention planning. The PRT offers a reliable basis for evaluating physical readiness in practical sports scenarios, making it especially useful in India, where limited resources can restrict access to more extensive assessment tools.

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Appendix A

Physical Readiness Test (PRT)

(Arun Sangwan and Sarvdeep Kohli)

DEMOGRAPHIC INFORMATION

Participant ID: _____ (For office use only)

Date: _____

Personal Information:

Name (Optional): _____

Age: _____ years

Gender: ☐ Male ☐ Female ☐ Other: _____

Sport Information:

Primary Sport/Event: _____

Position/Event (if applicable): _____

Years of training experience: _____ years

Current training frequency: _____ sessions per week

Competitive Level: ☐ Recreational/Club ☐ District ☐ State ☐ National ☐ International

Recent competition (within last month): ☐ Yes → Tournament/Event:

_____ ☐ No

Health Information:

Arun Sangwan, Sarvdeep Kohli

Current injury affecting training: ☐ Yes → Please describe: _____ ☐ No
 Current illness: ☐ Yes → Please describe: _____ ☐ No

PHYSICAL READINESS TEST

(Arun Sangwan and Sarvdeep Kohli)

Instructions: Before answering the statements, please read the following instructions carefully.

Through this test, we want to know how physically ready you are for your sport and upcoming events. Please read the following statements carefully. There are five alternatives for each statement. These alternatives are "Strongly Disagree (SD)", "Disagree (D)", "Neutral (N)", "Agree (A)", and "Strongly Agree (SA)". Among the five alternatives, put a tick mark (✓) on the one that suits you the most. There is no time limit for this task. It is provided in both Hindi and English, so read it carefully and thoughtfully before responding. Please respond based on how you honestly feel right now, not how you wish to feel or think you should feel. At the end, please ensure that you have responded to all the statements.

निर्देश: कथनों का उत्तर देने से पहले नीचे दिए गए निर्देशों को ध्यानपूर्वक पढ़ें।

इस परीक्षण के माध्यम से हम यह जानना चाहते हैं कि आप अपने खेल और आगामी प्रतियोगिताओं के लिए शारीरिक रूप से कितने तैयार हैं। कृपया निम्नलिखित कथनों को ध्यान से पढ़ें। प्रत्येक कथन के लिए पाँच विकल्प दिए गए हैं। ये विकल्प हैं — "पूर्णतः असहमत (SD)", "असहमत (D)", "अनिश्चित (N)", "सहमत (A)" और "पूर्णतः सहमत (SA)"। इन पाँच विकल्पों में से जो आपको अपने लिए सबसे अधिक सही लगे, उस पर सही (✓) का निशान लगाएँ। इस कार्य के लिए कोई समय सीमा नहीं है। यह आपको हिंदी और अंग्रेजी दोनों भाषाओं में दिया गया है, इसलिए इसे ध्यान से पढ़ें और कथन को अच्छे से समझकर ही उत्तर दें। कृपया ईमानदारी से बताएँ कि आप अभी कैसा महसूस कर रहे हैं, न कि आप कैसा महसूस करना चाहते हैं। अंत में यह सुनिश्चित कर लें कि आपने सभी कथनों पर निशान लगा दिया है।

1. You can handle the physical demands of your sport without difficulty.

आप अपने खेल की शारीरिक माँगों को बिना किसी कठिनाई के संभाल लेते हैं।

पूर्णतः असहमत (SD) असहमत (D) अनिश्चित (N) सहमत (A) पूर्णतः सहमत (SA)

1 2 3 4 5

2. You are able to maintain your energy throughout your training or competition.

आप अपने प्रशिक्षण या प्रतियोगिता के दौरान अपनी ऊर्जा बनाए रख पाते हैं।

पूर्णतः असहमत (SD) असहमत (D) अनिश्चित (N) सहमत (A) पूर्णतः सहमत (SA)

1 2 3 4 5

3. Your current eating habits are supporting your sports performance well.

आपकी वर्तमान खान-पान की आदतें आपके खेल प्रदर्शन में अच्छा सहयोग दे रही हैं।

पूर्णतः असहमत (SD) असहमत (D) अनिश्चित (N) सहमत (A) पूर्णतः सहमत (SA)

1 2 3 4 5

4. You feel physically prepared to perform at your best in upcoming competitions.

आप आगामी प्रतियोगिताओं में अपना सर्वश्रेष्ठ प्रदर्शन करने के लिए शारीरिक रूप से तैयार महसूस करते हैं।

पूर्णतः असहमत (SD) असहमत (D) अनिश्चित (N) सहमत (A) पूर्णतः सहमत (SA)

1 2 3 4 5

5. You feel fit, well-recovered, and free from any physical problems.

आप स्वस्थ, अच्छी तरह रिकवर हुआ, और किसी भी शारीरिक समस्या से मुक्त महसूस करते हैं।

पूर्णतः असहमत (SD) असहमत (D) अनिश्चित (N) सहमत (A) पूर्णतः सहमत (SA)

1

2

3

4

5

6. On the scale of Overall Physical Readiness, where do you place yourself? Circle one point.
समग्र शारीरिक तैयारी के पैमाने पर आप स्वयं को कहाँ रखते हैं? एक बिंदु पर गोला लगाएँ

Minimum Physical Readiness — (1 ——— 2 ——— 3 ——— 4 ——— 5) — **Maximum Physical Readiness**
(न्यूनतम शारीरिक तैयारी) (अधिकतम शारीरिक तैयारी)

Thank you for your participation! (भाग लेने के लिए धन्यवाद!)

Appendix B

Scoring Instructions for the Physical Readiness Test (PRT)

(For the Administrator/Researcher)

(Arun

Sangwan and Sarvdeep Kohli)

Step 1: Check for Completeness

Before scoring, ensure that the athlete has responded to all six items. If any item is left unanswered, the athlete should be asked to complete it. If the athlete declines to respond to a particular item, note it and proceed with available data. If more than one item (out of Items 1–5) is left blank, the questionnaire should be considered incomplete and excluded from analysis.

Step 2: Score Each Item

All items are positively scored. The score for each item is the number circled or marked by the athlete.

Response	Score
Strongly Disagree (पूर्णतः असहमत)	1
Disagree (असहमत)	2
Neutral (अनिश्चित)	3
Agree (सहमत)	4
Strongly Agree (पूर्णतः सहमत)	5

Step 3: Calculate Total Physical Readiness Score

Add the scores for **Items 1 through 5 only**.

Total Physical Readiness Score = Item 1 + Item 2 + Item 3 + Item 4 + Item 5

The total score ranges from **5 (minimum)** to **25 (maximum)**. Higher scores indicate greater physical readiness.

Important: Item 6 is **not** included in the total score. It is used separately for convergent validity assessment and for providing individual feedback to the athlete.

Step 4: Calculate Mean Domain Score

To compare with Item 6, calculate the mean of Items 1 through 5:

Mean Domain Score = (Item 1 + Item 2 + Item 3 + Item 4 + Item 5) / 5

This mean can be directly compared with the athlete's Item 6 response to assess whether the athlete's global self-perception aligns with his or her domain-specific assessment.

Step 5: Interpretation of Total Score

Total Score (Items 1–5)	Category
20 and above	High Physical Readiness
15–19	Average Physical Readiness
14 and below	Low Physical Readiness

Step 6: Interpretation of Individual Item Scores

Item Score	Interpretation	Recommended Action
4–5	Adequate	No immediate concern; continue current practices.
3	Neutral	Monitor this domain; the athlete may need guidance or further assessment.
1–2	Deficit	This domain requires attention and may need immediate intervention.

Appendix C

Athlete's	Physical	Readiness	Profile
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(Arun Sangwan and Sarvdeep Kohli)

(To be completed by the administrator and shared with the athlete)

PHYSICAL READINESS TEST — FEEDBACK REPORT

Athlete's Name: _____

Sport: _____

Date of Testing: _____

Competitive Level: _____

SECTION 1: OVERALL PHYSICAL READINESS

	Score
Total Physical Readiness Score (Items 1–5)	_____ / 25
Mean Domain Score (Items 1–5)	_____ / 5
Overall Perceived Readiness (Item 6)	_____ / 5

Overall Category: ☐ High (20 and Above) ☐ Average(15–19) ☐ Low (14 and Below)

Summary: Your overall physical readiness score is _____, which falls in the _____ range. This _____ indicates that _____.

SECTION 2: DOMAIN-SPECIFIC RESULTS

Domain	Your Score (/5)	Status	Remarks
1. Muscle Strength (मांसपेशीय शक्ति)	_____	☐ Adequate ☐ Neutral ☐ Deficit	
2. Endurance Level (सहनशक्ति स्तर)	_____	☐ Adequate ☐ Neutral ☐ Deficit	
3. Nutritional Status (पोषण स्थिति)	_____	☐ Adequate ☐ Neutral ☐ Deficit	
4. Match/Sport-Specific Fitness (मैच/खेल-विशिष्ट फिटनेस)	_____	☐ Adequate ☐ Neutral ☐ Deficit	
5. Overall Health Status (समग्र स्वास्थ्य स्थिति)	_____	☐ Adequate ☐ Neutral ☐ Deficit	

(Adequate = score 4–5; Neutral = score 3; Deficit = score 1–2)

SECTION 3: READINESS PROFILE CHART

(Mark the athlete's score on each domain to create a visual profile)

Score	1	2	3	4	5	
MS						Muscle Strength
EL						Endurance Level
NS						Nutritional Status
MF						Match/Sport-Specific Fitness
OH						Overall Health Status
OPR (Item 6)						Overall Perceived Readiness
	Very Low	Low	Neutral	Good	Excellent	

(Place a dot on each line corresponding to the athlete's score and connect the dots to create a readiness profile.)

SECTION 4: STRENGTHS AND AREAS FOR IMPROVEMENT

Identified Strengths (Domains scored 4–5):

1. _____
2. _____
3. _____

Areas Requiring Attention (Domains scored 3):

1. _____
2. _____

Areas Requiring Immediate Intervention (Domains scored 1–2):

1. _____
2. _____

Administrator's Name: _____

Signature: _____

Designation: _____

Date: _____

This feedback report is confidential and is intended solely for the benefit of the athlete named above. It should be discussed with the athlete in a supportive and constructive manner.