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Construction Of Recreational Upper Body Strength Test And Recreational Abdominal Strength Test For School Going Children

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ABSTRACT

This study aimed to develop a tool to accurately assess the upper body strength and abdominal strength alongside recreational elements to foster a positive attitude toward exercise. Conducted among 120 boys aged 13-15 from randomly selected government high schools in Jammu, the study focused on development of strength tests. Tests were designed based on expert recommendations and literature, with reliability assessed through test-retest methods using the Pearson Product Moment Correlation Coefficient. The objectivity was developed by correlating the scores of two different testers using the Pearson Product Moment Correlation Coefficient. Also the criterion validity was developed by correlating the scores of the newly developed tests with the already standardized physical fitness tests. Results showed that the constructed tests i.e. recreational upper body strength test and recreational abdominal strength test demonstrated high reliability, validity, and objectivity, establishing their suitability for standardized fitness assessment.

Keywords: Recreation, physical fitness, upper body strength, abdominal strength

INTRODUCTION

Recreation is a fundamental aspect of human life, encompassing a wide range of activities that people engage in during their leisure time. “Recreation refers to activities pursued for enjoyment, relaxation, and leisure. However, the world is far richer and more complex than in these blissful activities. Recreation is an essential component of human well-being and goes beyond temporary enjoyment” (Driver et al., 2010). “It is a powerful remedy that satisfies our desires, strengthens our bodies, and generates the fire in our souls” (Kelly et al., 2018). “Humans have understood the inherent benefits of leisure throughout history. The ancient Greeks, who placed a strong emphasis on intellectual and physical activities, as well as the modern emphasis on work-life balance, showed that leisure is not a useless enjoyment but rather an essential human need, which is acknowledged by societies nowadays” (Henderson & Rosenberg, 2007). “It enables us to set ourselves free from the fatigue of everyday life, build meaningful relationships with people, and connect with our inner selves” (Driver et al., 2010). The health benefits of leisure activities exceed just your own satisfaction. “Research has shown that recreational activities improve physical health by lowering blood pressure, enhancing general fitness, and reducing stress” (Pretty et al., 2005). “Additionally, it increases memory, stimulates creativity, and improves cognitive function. Also, it is essential for building communities, creating social links, and advancing cross-cultural understanding” (Fredman et al., 2014). The value of recreation is more important than ever in a society where jobs and advances in technology are taking over. It serves as a reminder that humans are beings with a deep desire for connection, joy, and discovery rather than

merely parts of a machine. Engaging in recreational activities such as hiking, drawing, or just hanging out with loved ones gives an opportunity to rediscover our humanity and appreciate life to the fullest.

Physical fitness tests are carefully constructed assessments that examine several aspects of one's physical fitness. These assessments are useful for assessing health-related and skill-related factors, forming the foundation for designed exercise prescriptions, tracking progress, and making educated fitness intervention decisions. To ensure accuracy and efficacy in measuring an individual's physical capabilities, these tests must be carefully developed with scientific principles, reliability, and validity in mind. The first step in creating physical fitness tests is to have an adequate understanding of the particular components of fitness that are being evaluated. Flexibility, agility, balance, coordination, speed, power, muscular strength, and cardiorespiratory endurance are a few examples of these components. Every element requires an individual testing procedure that is consistent with the scientific ideas supporting the construct under investigation. "As part of the building process, the validity and reliability of the fitness tests are established. Validity guarantees that the test measures the things it says it will measure, while reliability assures consistency and reproducibility of findings. The validity and efficacy of the tests depend on these psychometric characteristics. To determine the validity and reliability of the fitness evaluations, rigorous scientific procedures, statistical analysis, and pilot testing are used during the building process" (Kluwer, 2018). These recognized guidelines for exercise testing and prescription offer valid procedures for developing health-related fitness assessments. Various fitness experts consider this publication as a fundamental resource that directs the development of tests for numerous elements, including muscular strength, flexibility, and cardiorespiratory endurance. The evidence-based methods place a strong emphasis to guarantee the validity and reliability of fitness evaluations. The national strength and conditioning association provides guidance on how to create evaluations for skill-related fitness tests that emphasize agility, balance, coordination, speed, and power. A manual from the national strength and conditioning association, offers helpful guidance on creating tests that concentrate on these skill-related elements. This source acts as a manual for researchers and fitness experts who are creating tests for athletes and others who want to get better at a certain sport. To sum up, creating physical fitness assessments is a methodical, scientific procedure. It requires a thorough comprehension of the elements of fitness, adherence to scientific standards, and the validation and reliability of results. Fitness professionals may create efficient tests that contribute to reliable evaluations of an individual's health and skill-related fitness by using guidelines from authoritative resources like the national strength and conditioning association and the American college of sports medicine.

MATERIALS AND METHODS

Participants

This study set out to develop a recreational upper body strength test and recreational abdominal strength test for school going children. There were 120 boys, aged 13 to 15, who served as subjects from two government high schools which were chosen at random to participate in this study.

Procedure

After a thorough identification process, the test items were found to be strongly connected to the different fitness components that were chosen. Recreational physical activities have been proven to be highly associated with physical fitness in several research. Regardless of personal observation, the

researcher had chosen the relevant physical fitness components by doing thorough associated literature searches (Internet, Library, journals, books, etc.). The test construction process was familiarized through the use of a variety of test and measurement books and online resources. The study was conducted in two phases to develop and standardize recreational physical fitness tests. In the preliminary phase, 60 students from two schools were selected to identify challenges and refine test accuracy. Based on expert input, testing procedures were modified. In the pilot phase, 120 students from four schools participated, leading to further refinement. Following were the chosen experts:

Name	Designation	Institution
Dr. Joseph Singh	Professor	Department of Sports Biomechanics, LNIPE, Gwalior
Dr. Amandeep Singh	Professor and Head	Guru Nanak Dev University, Amritsar
Dr. Nishan Singh Deol	Professor and Head	Punjabi University, Patiala
Dr. Vinita Bajpai	Associate Professor	Department of Sports Biomechanics, LNIPE, Gwalior
Dr. Yajuvendra Singh Rajpoot	Associate Professor	LNIPE, Gwalior
Dr. Yatendra Kumar Singh	Associate Professor	LNIPE, Gwalior

Following were the test items which were tested and finalized for the final recreational physical fitness test items:

TEST ITEM	COMPONENT	OBJECTIVE
Recreational Abdominal Strength Test	Strength and Endurance	To assess strength and endurance
Recreational Upper Body Strength Test	Strength and Endurance	To assess strength and endurance

Criterion Measures for Administration of Test Procedure

Recreational Upper Body Strength Test

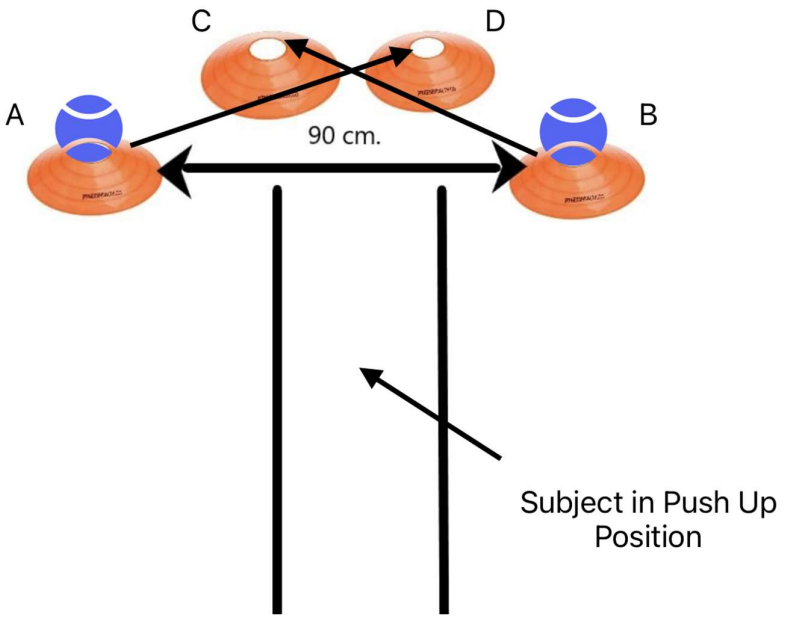
Objective: To assess the strength component through recreational activity

Marking Area Dimension: measuring tape, markers, stopwatch, balls.

Test Area Setup: Two markers are placed 90 cm. apart on opposite sides. From the center point two markers are placed 20 cm. above.

Figure 1

Marking Area Dimension of Recreational Upper Body Strength Test



Procedure: The subject will stay in full arm plank position in the center of 90 cm apart markers. Two balls are placed on top of those markers A & B. The subject needs to displace the ball from A to D and then from B to C with alternate hands while staying in plank position. Then the subject will again displace the ball from D to A and C to B continuously for 1 minute.

Scoring: The number of times the subject will successfully displace the ball in 1 minute will be the score of the subject. The subject with the maximum number of ball displaces will be considered as the winner.

Recreational Abdominal Strength Test

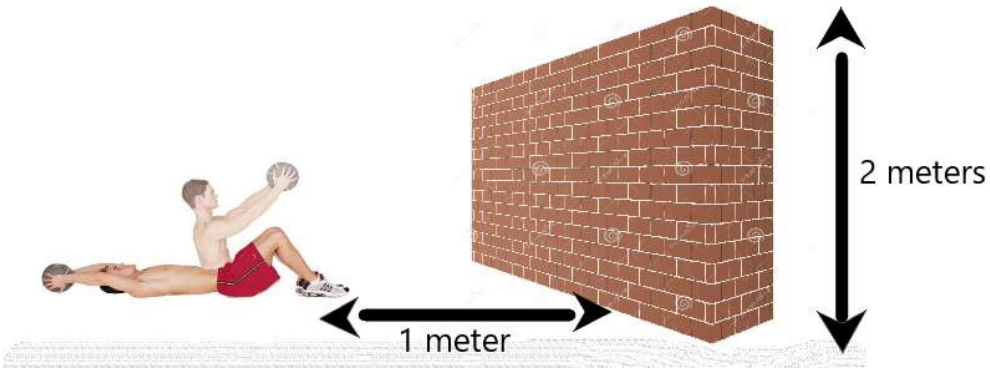
Objective: To assess the strength component through recreational activity.

Equipment Required: measuring tape, stopwatch, ball, and vertical wall.

Marking Area Dimension: A line is marked 1 meter from the plain vertical wall.

Figure 2

Marking Area Dimension of Recreational Abdominal Strength Test



Procedure: The subject will lay down in a sit up position with legs folded before 1 meter apart line from the wall. The subject will have a ball in his hands and he will be required to do a full abdominal sit up until his back is between 60 to 90 degrees from the ground. Then he will throw the ball on the wall with height 2 meters and will catch the rebound ball and go back to his initial sit up position. Then he will repeat the same activity continuously for 1 minute.

Scoring: The number of successful sit ups with catching the rebound ball in 1 minute will be the score of the subject. The subject with the maximum number of successful catches will be considered the winner.

Validity

For the test items selected to be the criterion for assessing the recreational upper body strength and recreational abdominal strength of schoolchildren, face validity was established. All of the recreational fitness tests were selected using information from the literature that was attainable, their face values, and the comments and suggestions of different officials and experts.

Reliability

The test and retest approach was employed to calculate the test item's reliability. There was a one-day delay between the two testing days for 120 individuals. On both days, the researcher conducted the tests personally. The test-retest reliability coefficient was computed using the Pearson product moment correlation coefficient technique.

Objectivity

To ensure the test's objectivity, the newly created items were administered to the same subjects by two separate testers. The Pearson product moment correlation coefficient method was used to determine the correlation between the two sets of scores.

Statistical Procedure

Descriptive statistics including the mean, median, and standard deviation were used in the computations. In order to establish dependability, the researcher used the Pearson Product Moment Correlation Coefficient to correlate the test-retest scores that were collected from the individuals. The Pearson product moment correlation coefficient was used to establish objectivity between the two sets of scores obtained from the same participants by the two testers. The Pearson product moment correlation coefficient was used to compare the results of newly created recreational physical fitness tests with the standardized physical fitness tests in order to verify criterion validity. Norms were developed using the sigma and percentile scales. A significance level of 0.05 was established.

RESULTS

The table below presents the statistical findings and analyses from all the methods used in this study.

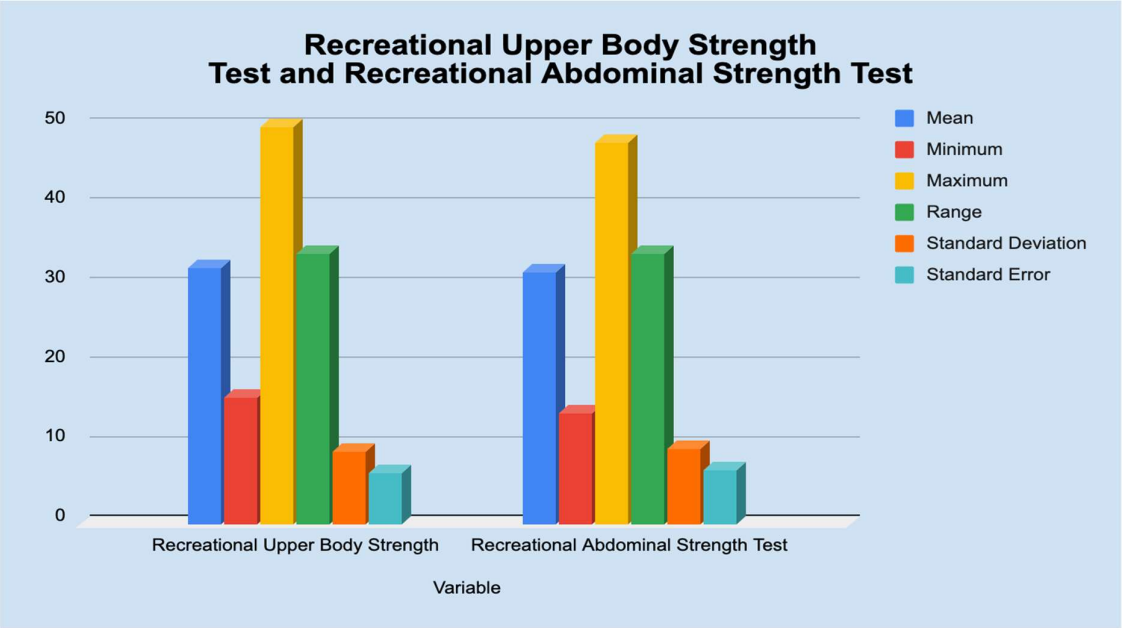
Table 1

Descriptive Analysis of Recreational Upper Body Strength and Abdominal Strength Test

Variable	N	Mean	Minimum	Maximum	Range	Standard Deviation	Standard Error
Recreational Upper Body Strength Test	1122	32.21	16	50	34	9.19	6.50
Recreational Abdominal Strength Test	1122	31.69	14	48	34	9.49	6.71

Figure 3

Graphical Representation of Mean, Standard Deviation and Standard Error of Recreational Upper Body Strength and Abdominal Strength Test



Establishment of Reliability of Recreational Upper Body Strength and Abdominal Strength Test

The reliability of the tests were determined using the test-retest method. To achieve this, tests were administered on two consecutive days under similar conditions by the same researcher to a group of 122 high school boys. Pearson product moment correlation coefficient was used to analyse the test-retest relationship of these tests.

Table 2

Test-Retest Reliability Coefficient of Recreational Upper Body Strength and Abdominal Strength Test

Test-Retest Score	Correlation Coefficient
Recreational Upper Body Strength Test	0.946
Recreational Abdominal Strength Test	0.911

Table above showed that the correlation coefficient for the test-retest of the recreational upper body strength test was extremely significant, with an r value of 0.946. Further, the table showed that the correlation coefficient for the test-retest of the recreational abdominal strength test was extremely significant, with an r value of 0.911. This illustrates that the reliability of recreational upper body strength tests and recreational abdominal strength tests was well established.

Establishment of Objectivity of Recreational Upper Body Strength and Abdominal Strength Test

To establish the objectivity of the various recreational physical fitness tests, two different testers (i.e researcher and physical education teacher) administered the tests on the same subjects. Then the collected data from both the testers was correlated using Pearson product moment correlation coefficient to establish the objectivity of the various tests.

Table 3

Objectivity Correlation Coefficient of Recreational Upper Body Strength and Abdominal Strength Test

Variable Score	Correlation Coefficient
Recreational Upper Body Strength Test	0.909
Recreational Abdominal Strength Test	0.931

Table above highlighted the objectivity correlation coefficient for the recreational upper body strength test, with an r value of 0.909. The recreational abdominal strength test also demonstrated a significant correlation coefficient of 0.931. These findings confirm the well-established objectivity of the recreational upper body strength and abdominal strength tests.

4.4 Establishment of Criterion Validity of Recreational Upper Body Strength and Abdominal Strength Test

To establish the criterion related validity, the scores of various newly constructed tests were correlated with the score of standardized tests.

Table 4

Correlation Coefficient of Recreational Upper Body Strength and Abdominal Strength Test

Newly Constructed Tests	Standardized Tests	Correlation Coefficient
Recreational Upper Body Strength Test	Push Ups	0.855
Recreational Abdominal Strength Test	Bent Knee Sit up	0.943

Table above showed the correlation coefficient for the newly constructed recreational upper body strength test and standardized upper body strength test, with a r value of 0.855. The newly constructed recreational abdominal strength test also showed a significant correlation with standardized abdominal strength having a value of 0.943. These findings support the well established criterion validity of recreational upper body strength and abdominal strength tests.

DISCUSSION AND CONCLUSION

The recreational upper body strength test has a reliability coefficient of 0.946, an objectivity correlation of 0.909, and a criterion validity correlation coefficient of 0.855. Upper body strength refers to the ability of the muscles in the upper body to exert force such as the chest, shoulders, arms, and back (Kraemer & Ratamess, 2004). The newly constructed upper body strength test involves subjects starting in a full arm plank position and then moving the ball from place to next place using both arms alternatively. This test evaluates the subject's upper body strength, endurance, and stability, as well as coordination while performing a dynamic task. If compared with the standardized AAPHER push up test which assesses the strength and endurance of the upper body muscles, primarily targeting the chest, shoulders, and triceps. The newly constructed recreational upper body strength test offers a comprehensive assessment of upper body strength, incorporating core stability and coordination.

The recreational abdominal strength test presents a reliability coefficient of 0.911, an objectivity correlation of 0.931, and a criterion validity correlation coefficient of 0.943. Abdominal strength

refers to the ability of the muscles in the abdominal region, including the rectus abdominis, obliques, and transverse abdominis, to generate force (McGill, 2007). The newly constructed abdominal strength test involves the subject lying in a sit-up position with legs folded performs a full abdominal sit-up until their back is at 70-90 degree angle from the ground while throwing the ball against the wall at a height of 2 meters and catches the rebound. This test evaluates the subject's abdominal strength, endurance, and coordination while incorporating dynamic movements and ball handling. If compared with the standardized AAPHER sit ups test which measures the strength and endurance of the abdominal muscles through repetitive trunk flexion. The newly constructed recreational abdominal strength test offers a comprehensive assessment of abdominal strength by incorporating dynamic movements and coordination. Also the combination of a sit-up with a ball throw and catch introduces a fun and challenging element. The inclusion of a ball throw and catch in addition to the sit-up adds variety to the exercise, preventing monotony and keeping participants mentally and physically engaged.

In conclusion, standardized recreational upper body strength and abdominal strength tests with high reliability, validity and objectivity are essential for assuring accurate and fair fitness assessments. They provide an important contribution to the field of recreational fitness and health promotion by boosting physical health, leading training methods, and supporting general well-being.

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