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Construction and Standardization of Specific Physical Fitness Test Battery for Circle Style Kabaddi Players

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Abstract – The purpose of the study was to construct and standardize the specific physical fitness test battery for college level Circle Style male Kabaddi Players. The descriptive type study was designed to collect the data on selected 21 physical fitness test items and the statistical procedure was adopted. With the purposive sampling technique a sample of 216 circle style male kabaddi players was taken from sixteen teams which were qualified for the league stage or qualified for the semifinal of the inter college tournament of selected universities i.e. PU Chandigarh, Pbi.U Patiala, GNDU Amritsar and KU Kurukshetra during the session of 2.017-18. The results were obtained through the SPSS verson 21.0. Factor Analysis technique was applied to develop the Specific Physical Fitness Test Battery of eight test items namely medicine ball throw, dips, 50 meters run, flamingo balance test, shuttle run, ball reaction exercise, 600 meters run and bridge test. A short specific physical fitness test battery of three test items was also constructed. The percentile norms were developed from the whole data.

Keywords: Specific Physical Fitness, Circle Style Kabaddi, Muscular Power, Speed, Cardio-Vascular Endurance, Validity.

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1. INTRODUCTION

1.1 Specific physical fitness

"Each sports activity demands different types and levels of different motor abilities and when a sportsman possesses that he is said to have a specific physical fitness. It is the specific fitness which makes it possible for a player to perform unusual and extraordinary movements and to do so at a very high standard of efficiency. It is also termed as performance fitness". (Singh, 1984).

The physical training for players must be based on the concept of specificity of exercise. For establishing training methods, a player must give importance to specific training which optimally adopts the specific factors involved in his/her game or event. The exercise mission must be specific to the training goal.

1.2 Circle Style Kabaddi

The "circle kabaddi" or Punjab style, for which the World Cup was organized, is quite different from the "national style". As the name suggests, it is played in a circular ground instead of the rectangular one as is the case in the "national style". After a raider and a defender tag, it is the display of strength and skill of the two players from the opposite sides. (The Hindu, 2012)

This game is becoming a popular game in many parts of the world and there is an increasing demand with regard to fitness skill and related capabilities of the circle style kabaddi players. The promotion and evaluation of the level of physical fitness is considered essential in Circle Style Kabaddi.

1.3 Related Literature

Recently many specific physical fitness test batteries have been developed for the players of different games.

Ball, B. S. and Singh, G. A. (2018) constructed Physical Fitness Test Items (PFTI) Norms of Taekwondo Players.

Khodaskar (2017) developed and standardized a physical fitness test battery for the selection of kabaddi players.

Monika, Ms. (2014). Constructed and standardized a specific motor fitness test for hockey players. Deshmukh (2016) also constructed test and selection norms for hockey players at university level.

Mahadeo (2016) constructed a motor fitness test and standardization of skill tests for female volleyball players of Solapur University Solapur and Rohit (2017) also constructed and standardized volleyball skill tests for men players.

Belorkar (2016) constructed a physical fitness test and developed norms for inter-collegiate female players of north Maharashtra region.

There is a wide scope for research in Circle Style Kabaddi, yet limited work has been done in this area. Keeping the importance of specific physical fitness of Circle Style Kabaddi players, the investigator therefore, was design a study to construct and standardize the specific physical fitness test battery for Circle Style Kabaddi players. This study is an attempt to construct specific physical fitness test battery to measure specific fitness of Circle Style Kabaddi players.

2. OBJECTIVES OF THE STUDY

To construct and standardize the specific physical fitness test battery for college level Circle Style Male Kabaddi Players.

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3. DELIMITATIONS OF THE STUDY

The study was delimited to the following fitness components: muscular power, muscular strength endurance, speed, balance ability, agility, reaction time, cardio-vascular endurance and flexibility.

4. METHODOLOGY

4.1 Design of the Study

The descriptive type study was designed to collect the data and the statistical procedure was adopted to construct and standardize the specific physical fitness test battery for Circle Style male Kabaddi players.

4.2 Selection of Physical Fitness Test Items

With the consult of coaches and experts of circle style kabaddi 21 physical fitness test items from eight physical fitness components (muscular power - handgrip strength test, overhead medicine ball throw and standing broad; strength endurance - dips (push-ups) test, pull ups and sit ups ; speed - 15 meters run test, 30 meters run test and 50 meters run test ; balance ability - long nose balance test and flamingo balance test; agility - shuttle run, burpee (squat thrust) test and SEMO agility test; reaction time - ball reaction exercise test and nelson hand reaction time test; flexibility - bridge test, sit and reach test and extent flexibility) were selected on the basis of their face validity.

4.3 Sample

With the purposive sampling technique a sample of 216 circle style male kabaddi players of 18 to 25 years was taken from sixteen teams which were qualified for the league stage or qualified for the semifinal of the inter college tournament of selected universities i.e. PU Chandigarh, PU Patiala, GNDU Amritsar and KU Kurukshetra during the session of 2.017-18

4.4 Validity

Face validity, construct validity and comparison validity were established for the selected physical fitness test items.

5. STATISTICAL PROCEDURE (CONSTRUCT VALIDITY)

Statistical Package for Social Sciences (SPSS), version 21.0. SPSS software was used to statistical calculations from the basic to the advanced level. Factor analysis was applied to construct the specific fitness test battery for Circle Style Kabaddi Players by following five steps:

first correlation matrix; second Communalities Extraction; third Kaiser Meyer Olkin (KMO) & Bartlett's Test (measuring the strength of relationship among the Variables); fourth Eigen Values, Extraction Sums of Squared Loadings & Rotation Sums of Squared Loadings and fifth Factor Matrix & rotated factor matrix (Varimax Rotation) were presented.

The Pearson-Product Moment Technique was used to inter-correlate the score from the twenty one test items. The inter-correlation matrix was initially obtained. Principal component analysis method was used to extract factors. Varimax rotation was used to set rotated factor matrix.

5.1 Inter Correlation

Inter Correlation of selected twenty one test items was obtained. Correlation Matrix indicated the significant correlation between physical fitness test items.

5.2 Communalities Extraction

The Kaiser Criterion is said to be reliable when the averaged extracted communalities at least more than 0.70 and when there are less than 30 variables, or the averaged extracted communalities is equal or above .60 and the sample size is above 250 cases (Field, 2009). The average of Communalities Extraction of data of the study was **0.72 and variables were 21**. So, the **Kaiser Criterion** was reliable for the study.

5.3 Kaiser Meyer Olkin (KMO) and Bartlett's Test (measuring the strength of relationship among the Variables)

The Kaisers-Meyer-Olkin (KMO) measure of sampling adequacy score 0.94 was above the recommended level of 0.50, Kaiser (1974) and the Bartlett's test of sphericity was significant (Sig. < 0.001). So, these values indicated that there were adequate inter-correlations between the items which allowed the use of factor analysis

5.4 Eigen Values

Table 1

Initial Eigen Values, Extraction Sums of Squared Loadings and Rotation Sums of Squared Loadings of Variables

Total Variance Explained				
	Factors	Total	% of Variance	Cumulative %
Initial Eigen values	1	11.99	57.08	57.08
	2	1.93	9.19	66.27
	3	1.1	5.22	71.49
Extraction Sums of Squared Loadings	1	11.99	57.08	57.08
	2	1.93	9.19	66.27
	3	1.1	5.22	71.49
Rotation Sums of Squared Loadings	1	5.19	24.71	24.71
	2	5.01	23.87	48.58
	3	4.81	22.91	71.49

Three factors were identified from the table 2 with Eigen values are greater than one. The initial Eigen values for these three factors were 11.99, 1.93 & 1.10. The % of Variances of Extraction Sums of Squared Loadings for these three factors was 57.08, 9.19 & 5.22 and % of Variance of Rotation Sums of Squared Loadings were 24.71, 23.87 & 22.91.

5.5 Rotated Factor Loading

Table 2

Rotated Factor Loading

(Varimax Solution)

(By removing the clutter of low (0.5 or less) correlation)

	Rotated Component Matrix[a]			
Fitness components		Factors		
		1	2	3
Muscular Power	Handgrip Strength Test			0.7
	Medicine Ball Throw			**0.85**
	Standing Broad Jump			0.74
Strength Endurance	Dips (Push-ups) Test			**0.67**
	Pull Ups	-0.63		
	Sit Ups	-0.59		
Speed	15 Meters Run Test	0.77		
	30 Meters Run Test	0.74		
	50 Meters Run Test	**0.8**		
Balance ability	Long Nose balance Test	0.54		
	Flamingo Balance Test		**0.64**	-0.52
Agility	Shuttle Run		**0.71**	
	Burpee (Squat Thrust) Test	-0.57		
	SEMO Agility Test		0.68	
Reaction ability	Ball reaction Exercise Test	**0.7**		
	Nelson hand Reaction time Test		0.54	-0.54
Cardio-Vascular Endurance	600 meters Run		**0.79**	
	Cooper's 12 Minutes Run/walk		-0.68	
Flexibility	Bridge Test		0.61	**-0.63**
	Sit and Reach Test		-0.55	0.6
	Extent Flexibility		-0.54	0.62
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 6 iterations.				

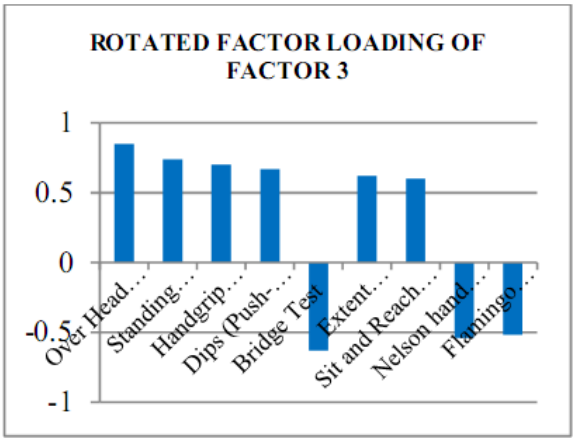

Figure 3. Graphical presentation of rotated factor loading of factor -3

5.7 Development of A Short Specific Physical Fitness Test Battery

The selection of a short specific physical fitness test battery consisting of 3 tests of specific physical fitness exhibited in the table 4 is based upon the factor loading test validity (construct validity). The test items, which were included in the specific physical fitness test battery for Circle Style Kabaddi Male Players, have been show in the table 4.

The investigator, for the purpose of construction of a specific physical fitness test battery for the present context has identified factors in areas such as speed and reaction ability factor, cardio-vascular endurance, agility and balance ability factor and muscular power, strength endurance and flexibility factor of the circle style kabaddi male players. Each test measured something special to itself.

Table 3

Short test battery for the specific physical fitness of Circle style kabaddi male players

Sr. No.	Fitness Components	Selected Test Items
1	Speed and Reaction Ability	50 M Run
2	Cardio-Vascular Endurance	600 M Run
3	Muscular Power and Flexibility	Medicine Ball Throw

Owing the above mentioned concept, three physical fitness test items, one each from each fitness factor having the highest loading were selected to construct a Short Specific Physical Fitness Test Battery for Circle Style Male Kabaddi Players.

5.8 Analysis of Variables to Select One Test Item from Each Physical Fitness Component

The investigator analyzed the highest rotated loading of variables according to the table no. 4 to select one test item from each physical fitness component.

Table 4

Fitness components	Test items	Rotated factor loading
Muscular Power	Handgrip Strength Test	0.7
	Medicine Ball Throw	**0.85**
	Standing Broad jump	0.74
Strength Endurance	**Dips (Push-ups) Test**	**0.67**
	Pull Ups	0.63
	Sit Ups	0.59
Speed	15 Meters Run Test	0.77
	30 Meters Run Test	0.74
	50 Meters Run Test	**0.8**
Balance Ability	Long Nose balance Test	0.54
	Flamingo Balance Test	**0.64**
Agility	**Shuttle Run**	**0.71**
	Burpee (Squat Thrust) Test	0.57
	SEMO Agility Test	0.68
Reaction Ability	**Ball reaction Exercise Test**	**0.7**
	Nelson hand Reaction time Test	0.54
Cardio-Vascular Endurance	**600 meters Run**	**0.79**
	Cooper's 12 Minutes Run/walk	0.68
Flexibility	**Bridge Test**	**0.63**
	Sit and Reach Test	0.6
	Extent Flexibility	0.62

Table no. 4 indicated that all the muscular Power tests with different modes of administration proved to be good measures of the muscular Power. Test namely Over Head Medicine Ball Throw have the highest loading of 0.85 and other muscular Power variables, Handgrip Strength Test and Standing Broad jump came out with 0.70 and 0.74 loadings.

All the Strength Endurance tests with different modes of administration proved to be good measures of the Strength Endurance. Test namely Dips (Push-ups) Test have the highest loading of 0.67 and other Strength Endurance variables, Pull Ups and Sit Ups came out with 0.63 and 0.59 loadings.

All the speed tests with different modes of administration proved to be good measures of the speed. Test namely 50 Meters Run Test have the highest loading of 0.80 and other Speed variables, 15 Meters Run and 30 Meters Run came out with 0.77 and 0.74 loadings.

Table no. 4.16 indicated that all the predicted Balance Ability tests with different modes of administration proved to be good measures of the Balance Ability. Test namely Flamingo Balance Test have the highest loading of 0.64 and other Balance Ability variables, Long Nose balance Test came out with 0.54 loadings. Graphical presentation of these tests is presented in figure 4.

Table no. 4 indicated that all the Agility tests with different modes of administration proved to be good measures of the Agility. Test namely Shuttle Run Test

have the highest loading of 0.71 and other Agility variables, Burpee (Squat Thrust) Test and SEMO Agility Test came out with 0.57 and 0.68 loadings.

All the Reaction Ability tests with different modes of administration proved to be good measures of the Reaction Ability. Test namely Ball reaction Exercise Test have the highest loading of 0.70 and other Reaction Ability variable, Nelson hand Reaction time Test came out with 0.54 loadings

All the Cardio-Vascular Endurance tests with different modes of administration proved to be good measures of the Cardio-Vascular Endurance. Test namely 600 meters Run Test have the highest loading of 0.79 and other Cardio-Vascular Endurance variable, Cooper's 12 Minutes Run/walk Test came out with 0.68 loadings.

All the Flexibility tests with different modes of administration proved to be good measures of the Flexibility. Test namely Bridge Test have the highest loading of 0.63 and other Flexibility variables, Sit and Reach Test and Extent Flexibility Test came out with 0.60 and 0.62 loadings. Graphical presentation is presented in Figure 5.

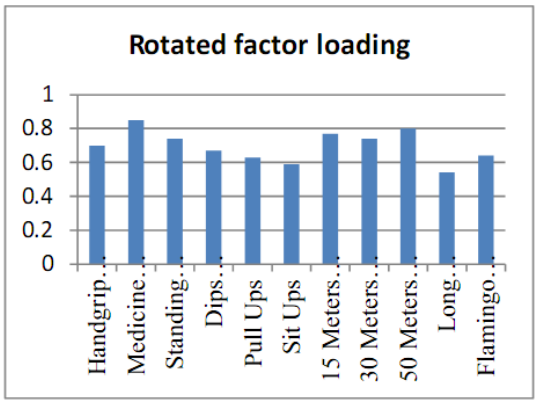

Figure 4 Graphical presentation of rotated factor loading of the tests of muscular power, strength endurance, speed and balance ability components.

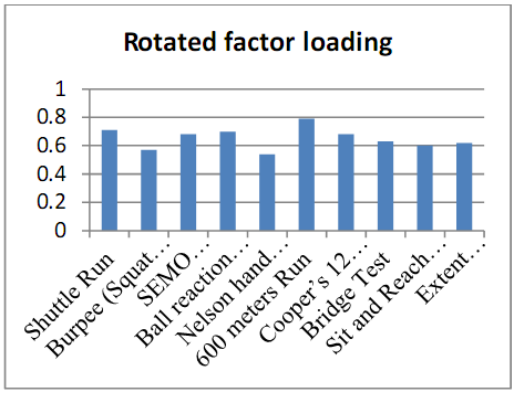

Figure 5 Graphical presentation of rotated factor loading of the tests of agility, reaction ability, cardio vascular endurance and flexibility components.

5.9 Development of a Specific Physical Fitness Test Battery

The selection of specific physical fitness test battery consisting of 8 variables of fitness exhibited in the table 5. is based upon the factor loading test validity (construct validity). The test items, which were included in the specific physical fitness test battery for Circle Style Kabaddi Male Players, have been show in the table 5.

Table 5

Test battery for the specific physical fitness of Circle style kabaddi male players

Sr. No.	FITNESS COMPONENTS	SELECTED TEST ITEMS	Loading
1	Muscular Power	Medicine Ball Throw	**0.85**
2	Muscular Strength Endurance	Dips (Push-Ups)	**0.67**
3	Speed	50 M Run	**0.80**
4	Balance Ability	Flamingo Balance Test	**0.64**
5	Agility	Shuttle Run	**0.71**
6	Reaction Ability	Ball Reaction Exercise Test	**0.70**
7	Cardio-Vascular Endurance	600 m Run	**0.79**
8	Flexibility	Bridge Test	**0.63**

Owing the above mentioned concept, eight physical fitness test items, one each from each fitness components having the highest loading were selected to construct a Specific Physical Fitness Test Battery for Circle Style Kabaddi Male Players.

The investigator, for the purpose of construction of a specific physical fitness test battery for the present context has identified factors in areas such as muscular power, muscular strength endurance, speed, balance ability, agility, reaction ability, cardio-vascular endurance and flexibility of the circle style kabaddi male players. Each test measured something special to itself.

6. COMPARISON VALIDITY, RELIABILITY AND OBJECTIVITY OF THE TEST BATTERY

Comparison validity was established by comparison of specific physical fitness test battery between successful and unsuccessful players. The 't' values for all the selected test items were ranged from 5.36 to 15.92 which were significant at .05 level confidence, To compute the reliability of the test items, the test and re-test method was employed on 30 circle style male kabaddi players on two different days with an interval of one day in between by the

investigator himself. The reliability coefficient correlation values were ranged from .84 to .98 and these were significant at .05 level of confidence. To compute the objectivity, 25 circle style kabaddi male players were tested on two different days with an interval of one day by two different experts. The 'r' value ranged from 0.72 to 0.97 which were significant at .05 level of confidence. The obtained significant value revealed that the direction for administration was specific and clear for the performance as well as evaluation.

These findings confirm that the investigation of physical fitness test battery is a highly specific one and is a most valid tool to measure the physical fitness of the Circle style Kabaddi Players**.** So the newly specific physical fitness test battery for circle style male kabaddi players is valid, reliable and objective. This battery is also good for administrative feasibility. It is affordable, manageable and administrative. Not any costly equipment is required for the tests and a short time is required to administrative the tests.

7. DEVELOPMENT OF THE NORMS

Without norms no test is applicable. The development of norms was one of the objective of the study. In the present study norms have been prepared for the assessment of specific physical fitness of circle style male kabaddi players from the sample of 216 Circle Style male Kabaddi players. The norms have been developed through percentile rank.

On the basis of Percentile Norms, Grades for common weight and height of Selected Specific Physical Fitness Test Items are given below:

Table 6

Grades for common weight and height

Test items	Below Average	Average	Above Average	Excellent
Medicine Ball Throw	<10.37	10.37-11.35	11.36-12.13	>12.13
Dips	<32	32-43	44-50	>50
50 m Run	>7.10	7.10-6.88	6.87-6.79	<6.79
Flamingo Balance	>3	3 or 2	1	1
Shuttle Run	>12.87	12.87-11.74	11.73-11.13	<11.13
Ball Reaction Exercise Test	>138.35	138.35-127.55	127.54-115.83	<115.83
600 m Run	>2.51	2.51-2.31	2.30-2.19	<2.19
Bridge Test	>49.35	49.35-44.40	44.39-38.10	<38.10

8. DISCUSSION OF FINDINGS

Inter correlation of selected twenty one test items was obtained. Correlation Matrix indicated the significant correlation between physical fitness test items. Inter-correlation, This clearly indicated that the variables of each physical fitness components had identical characters and either of the tests could measure one aspect in common.

The Kaiser Criterion was applied. The average of Communalities Extraction of data of the study was .72 and the variables were 21. So, the Kaiser Criterion was reliable for the study and it was applied.

Factor analysis was applied to select the test items from the 21 test items. The Kaisers-Meyer-Olkin (KMO) measure of sampling adequacy score 0.94 was above the recommended level of 0.50 and the approximate of chi-square was 4162.87 with 210 degrees of freedom, which was significant at 0.05 level of significance. Bartlett's test of sphericity was significant (Sig. < 0.001). So, these values indicated that there were adequate inter-correlations between the test items which allow the use of factor analysis.

Factor analysis technique of statistics was applied to select the test items for the test battery of specific physical fitness for circle style male kabaddi players. Three factors were identified with Eigen values were greater than one. All the remaining factors were not significant.

The eight tests (one from each fitness components) were found to be of high rotated loading values and **selected for the newly test battery** such as Medicine Ball Throw 0.85, Dips (Push-Ups) Test 0.67, 50 Meters Run 0.80, Flamingo Balance Test 0.64, Shuttle Run Test 0.71, Ball Reaction Exercise Test 0.70, 600 M Run / Walk 0.79 and Bridge Test 0.63.

Results of the muscular power components show that the circle style kabaddi players should have higher rate of upper body muscular power as they have thrown quickly to anti with upper body during the struggle that is necessary for the better performance. The selected test items is Medicine Ball Throw test that measures the upper body power.

Results of Strength Endurance components show that the circle style kabaddi players should have higher rate of Strength Endurance of arms as they do continue efforts with arm strength in the playground that is necessary for the better performance. The selected test item is dips test that measures the strength and endurance of the arms.

Results of Speed components show that the circle style kabaddi players should have higher rate of Speed for nearly 50 meters. The circle style kabaddi is played in a circle of 22 meters radius. The player runs approximately more than 40 meters in a raid. The selected test item 50 meters run is a test of speed with the better reaction ability to quick start. However the other two test of speed, 30 meters run test and 15 meters run test have also significant loading.

Results of balance ability components show that the circle style kabaddi players should have higher rate of static Balance ability as they are required to maintain the balance during the struggle that is necessary for the better performance. In this game often players push each other during the struggle when they are stabile on one foot. The player who lose the balance during the struggle and not able to regain the balance quickly after the balance disturbing movements**,** he often lose the point. So, static balance is required for the better performance in the Circle style kabaddi. The selected test item is Flamingo Balance Test that measures the static balance.

Results of the agility components show that the circle style kabaddi players should have higher rate of agility as they have quickly move and covered a short distance with speed in the playground that is necessary for the better performance. The selected test item is shuttle run of agility that measures the ability to quickly move and covered a short distance with speed.

Results of the reaction ability components show that the circle style kabaddi players should have higher rate of reaction ability with quickly move and covered a short distance with speed in the playground that is necessary for the better performance. The selected test item is Ball Reaction Exercise Test of reaction ability that measures the reaction ability to quickly move and cover a short distance with speed.

The results of Cardio-Vascular Endurance components show that circle style kabaddi players should have higher rate of Cardio-Vascular Endurance as they do continue struggle during the 30 second raid. Many players do struggle continue in every raid for many raids to win the match. In the match of circle kabaddi the player who has not required level of Cardio-Vascular Endurance, he can't maintain the level of his performance in the whole match. This game requires a high load with speed for a distance. The selected test item 600 meters run / walk is a test of Cardio-Vascular Endurance that measure the ability to maintain the normal respiration when the player takes a high intensity of load than the test of 12 minutes run/ walk test.

Results of first factor show that the circle style kabaddi players should have higher rate of flexibility of Spine and shoulders as they should have more flexibility in the spine and shoulders for the better performance. Circle style kabaddi is called also mini wrestling. Like wrestling in circle style kabaddi during the struggle the player many times bends his spine and shoulder to back for the requirement of the movement. The selected test item Bridge Test is a test of Spine and shoulders flexibility. However the other two test of flexibility, sit & reach test and extent flexibility test also have high loading.

A Short Specific Physical Fitness Test Battery for Circle Style Male Kabaddi Players was also constructed. Three physical fitness test items, one from each fitness factor namely 50 M Run (Speed and reaction ability factor), 600 m Run (Cardio-Vascular Endurance factor) and Medicine Ball Throw (Muscular Power and flexibility factor) having the highest loading were selected to construct a Short Specific Physical Fitness Test Battery for Circle Style Male Kabaddi Players.

Comparison validity was established by comparison of specific physical fitness test battery between successful and unsuccessful players. The 't' values for all the selected test items were ranged from 5.36 to 15.92 which were significant at .05 level confidence, To compute the reliability of the test items, the test and re-test method was employed on 30 circle style male kabaddi players on two different days with an interval of one day in between by the investigator himself. The reliability coefficient correlation values were ranged from .84 to .98 and these were significant at .05 level of confidence. To compute the objectivity, 25 circle style kabaddi male players were tested on two different days with an interval of one day by two different experts. The 'r' value ranged from 0.72 to 0.97 which were significant at .05 level of confidence. The obtained significant value revealed that the direction for administration was specific and clear for the performance as well as evaluation.

These findings confirm that the investigation of physical fitness test battery is a highly specific one and is a most valid tool to measure the physical fitness of the Circle style Kabaddi Players**.**

So the newly specific physical fitness test battery for circle style male kabaddi players is valid, reliable and objective. This battery is also good for administrative feasibility. It is affordable, manageable and administrative. Not any costly equipment is required for the tests and a short time is required to administrative the tests.

The percentile norms have been developed. Circle style kabaddi is a combative game, so weight and height also affect the performance. With the consult of experts, coaches and former players of circle style kabaddi made the three categories namely light, middle and heavy of weight and two of the height. These categories were also suitable for the collected data of the study. Different categories of weight and height were compared with the use of ANOVA Test and Post Hoc Test (Scheffe Test). But the results show that there is not effect of weight for the flamingo balance test & bridge test and not effect of height for the dips test, flamingo balance test & bridge test.

9. CONCLUSIONS

Within the limitations of the present study, the following conclusions are enumerated:

1. A specific physical fitness test battery for circle style male kabaddi players consisting of eight test items namely medicine ball throw(muscular power), dips (Muscular strength endurance), 50 meters run (speed), flamingo balance test (balance ability), shuttle run (agility), ball reaction exercise (reaction ability), 600 meters run(cardio-vascular endurance) and bridge test (flexibility) was yielded by the factor analysis.

2. A short specific physical fitness test battery for circle style male kabaddi players consisting of three test items namely medicine ball throw (muscular power) , 50 meters run (speed) and 600 meters run (cardio-vascular endurance) was also constructed.

3. The specific physical fitness test battery for circle style male kabaddi players developed by the researcher is valid, reliable and objective to assess the fitness ability of the players.

4. Successful and unsuccessful circle style male kabaddi players showed significant differences on all eight test items namely medicine ball throw, dips, 50 meters run, flamingo balance, shuttle run, ball reaction exercise, 600 meters run and bridge test.

5. The percentile norms for specific fitness test battery were developed for common weight and height of circle style male kabaddi players.

6. The newly developed specific physical fitness test battery meet the criterion of scientific authenticity i.e. reliable, objective and valid.

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