

## STUDY OF PHYSIOLOGICAL PARAMETERS OF FLOORBALL PLAYERS

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**ABSTRACT:** Floorball matches have duration of 60 minutes divided in two halves lasting 30 minutes each. During this time players cover a total distance ranging from 2000 to 6000 meters, based upon different situations: position on the field, tactical defensive and offensive characteristics of the team, characteristics of the game itself and so far and so forth. In a work presented by Cuesta (1988) Floorball players of the Spanish national team were shown to cover the following distances based upon playing position: Left Wing- 3557 meters, Right Wing-4083meters, Left Back- 3464 meters, Right Back- 2857 meters, Circle Runner (Pivot) 3531 meters.

The above-mentioned distances are close to the ones recorded in Konzak & Schake (in Cuesta, 1988) related to DDR players. In a study conducted in Italy with a specific apparatus (Play Controller, Phromos, Perugia) 5000 meters were covered by a right wing during an official match of the Italian Second league (unpublished work, see Figure 1.). It is important to affirm that of course, the total displacement of players on the field is affected by many different parameters. Tactical disposition, position on the field, characteristics of the match itself, are all factors which in some way can affect the amount of space covered by the players on the field. However, what is important to say is that Floorball players cover the total distance alternating high-intensity actions (sprinting, fast direction changes, jumping) with game phases characterised by relatively low metabolic demands due to the low intensity of the actions. It can be said then that the metabolic demands of modern Floorball involve the aerobic and anaerobic energy pathways. As a supportive evidence, Konzak and Schacke (in Cuesta, 1988), have shown that, during a Floorball match, players perform 190 rhythm variations, 279 change of direction, 16 jumps. Then, based upon what these authors say, an Floorball players performs a total of 485 high-intensity movements in 60 minutes. An average of 8 per minute. The sports training basically aims at improving the functional capacities of different body systems. The cardio-vascular endurance is determined by the proper functioning of the c.v.system. Thus, lungs functioning, proper blood pressure, low heart rate, low respiratory rate, fast recovery indicate high physiological fitness and improved performance.

Floorball is a team game and is played popularly by the world-wide nations. This game has got place in the Olympic Games. It is also played professionally in many European countries including Asia. In India, this game has become significant among other popular games.

**Key words:** HR, BP, RR, PEFr

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### INTRODUCTION

In Maharashtra, many teams participate in the state level championship in Floorball. Although such a competition is ever challenging, the Physiological status of the players of Maharashtra in this game seems to be questionable at the national level competitions. The same is true in the case of other games also.

Although scientific training and coaching programmes are accessible to the Floorball players, the real reason for failure is unknown. Nowadays, many sports scientists opine that selection of talented players is the key to success. Getting such ideas, many research workers in the field of Physical Education have developed research-based “Standard Selection Criteria” so that talented players can be chalked out. In the case Floorball, no such “Selection Criteria” is available in India.

Batteries of tests for team Floorball have not been developed in the India. The purpose of this investigation was to construct a team Floorball test battery that would be reflective of the physiological components that contribute to high levels of performance, and to establish a database of performances by the state Team Floorball players. Additional purposes for developing the test included using the test to screen potential players at the National level, to provide teachers in the schools and colleges with tests that are inexpensive and easy to administer, and to provide self-administered tests that would train the athletes to improve their performance in team Floorball.

The present study has, therefore, been undertaken for Floorball players in Maharashtra. Although the researcher has restricted his study for junior level Floorball players, the same could be applied for selecting players of other levels, as the results are promising.

## MATERIAL AND METHOD

This is a **normative survey**; it follows the principles of developmental research (Hubbard, 1973).<sup>1</sup> The test-items (Table1) were further confirmed to be included in the test, after taking opinions of various experts in the area of Physical Education and Sports and considering the long-standing professional experience of the present investigator. This, in fact, ensured the **content validity** of the test.

The data on large sample (n=600) were collected when the whole Maharashtra junior Floorball players gathered for state level competitions of State Association and Zilha Krida Parishad. The male Floorball players below the age nineteen years (i.e.15-19 years) were the subjects of this study. Total thirty-two district teams in Maharashtra state generally participate in Association’s state level competition and twenty-five teams of various age groups participate in Zilha Krida Parishad’s state level competition. Every team, representing each district, consists of twelve players. Thus, over all population of the state level junior Floorball players in Maharashtra state for two consecutive years have been considered as the total population for this study. This ensures that 100% population covered in this study. **BP** (nearest to 10 mm.Hg.) and **HR** (nearest 4 beats/ min.) were assessed by Omron BP apparatus. **RR** (Respiratory Rate) was assessed by chest movement **PEFR** ability was determined by Peak Flow Meter nearest to 10 lit./min.

The data were primarily analyzed to assess Mean, SD, and QD. *Item-Analysis* (Guilford & Fruchter, 1978; Bhattacharyya *et al.*, 1977)<sup>2,3</sup> was completed that confirms the item retains in the Test Battery. *Factor Analysis* (Fruchter, 1967)<sup>4</sup> was employed for final selection of test-items.

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<sup>1</sup> A.W. Hubbard, Research Methods in Health, Physical Education and Recreation. (Philadelphia: AAHPER, 1973), p.84.

<sup>2</sup> J.P. Guilford, & B. Fruchter, Fundamental statistics in psychology and education. (New Delhi: McGraw Hill Book Co., 1973), pp.98-119.

<sup>3</sup> D. Bhattacharyya, & A. Bhattacharyya, Evaluation and measurement in education. [Calcutta: Blacki (India) Employees Cooperative Industrial Society Ltd., 1977], pp.64-74.

<sup>4</sup> Benjamin Fruchter, Introduction to Factor Analysis. (New Jersey: D. Van Nostrand Company, Inc., 1967), pp.51-86.

*Item-sum correlation and split-half reliability* methods were applied to validate the existence of each item in the Test Battery and to determine the reliability. *Normality* of each of the existed item was then tested on the basis of the values of Skewness, Kurtosis, Standard error of skewness and Kurtosis, critical ratio of skewness and kurtosis. The items, which fall within the normal range of normal probability curve, were then processed for determining percentile norms including grading scale.

## RESULT AND DISCUSSION

**Table 1.**

**Test items to represent morphological dimension**

No.of dimensions	Name of test items & Measurement unit	Tools Used	Recommended measures
<b>PHYSIOLOGICAL (A)</b>	HR (beats/min)-A1 BP (mm. Hg.)- A2 RR (No./min)- A3 PEFR (pts)- A4	Feeling pulse Sphygmomanometer Chest movements Peak Flow Meter	Heart and Lungs functions

**Table 2**

**Mean and SD of physiological variables of the Floorball players**

Code of Items	Physiological Variables	Mean (M)	Standard Deviation (SD)
A1	Heart rate (beats/min.)	067	5.00
A2.1	Systolic Blood Pressure (mm.Hg.)	122	8.00
A2.2	Diastolic Blood Pressure (mm.Hg.)	069	5.00
A3	Respiratory Rate (times/min.)	016	2.00
A4	Peak Expiratory Flow Rate (units)	492	113

Since the data were processed for descriptive statistics, the measures of central tendency and dispersion of all the variables are as follows:

### A) Results of Descriptive Analysis

**Physiological Data:** The mean scores in Heart rate (A1), Systolic Blood Pressure (A2.1) Diastolic Blood Pressure (A2.2), Respiratory Rate (A3) and Peak Expiratory Flow Rate (a4). Were 67 beats/min. (SD=5.00), 122 mm.Hg. (SD=8.00), 69 mm.Hg. (SD=5.00), 16 times/ min. (SD=2.00), and 492 units (SD= 113) respectively.

### B) Results on Item Analysis

After completion of descriptive analysis, the item-analysis of each test-item representing Physiological dimension on the large sample (n=600) was done. The level of **item difficulty and discrimination** values of each item of the 'Physiology' was assessed. The item-difficulty index of each test-item lies in between the value 0.5 to 0.7 was accepted and included in the test. The values of index of item-discrimination (ULI i.e., Upper Lower Index) of each item lower than 0.33 were not included in the test. The related results have been presented in Table 3. The result revealed (Table 3) that the values of 'item-difficulty' and 'item-discrimination' of **1 item in Physiological dimension** (viz., Blood Pressure-C<sub>2</sub>), residing within the acceptable limit were **included** herewith, whereas total **3 items** (viz., A<sub>1</sub>-Heart Rate, A<sub>3</sub>-Respiratory Rate, and A<sub>4</sub>-Peak Exploratory Flow Rate) were **discarded** from the test battery.

Table 3.

Indices of Item-difficulty and Item-discrimination				
Dimension	Code No.	Name of Items	Item-Difficulty	Item-Discrimination
PHYSIOLOGICAL	A1	HR (Heart Rate)	0.26*	0.20*
	A2	<b>BP (Blood Pressure)</b>	<b>0.60</b>	<b>0.43</b>
	A3	RR (Respiratory Rate)	0.39*	0.25*
	A4	PEFR(Peak Exploratory Flow Rate)	0.46*	0.19*

\*Items were discarded due to insufficient value of item-difficulty and item-discrimination Table 4 represents the item-sum correlation, which indicates the 'validity index' of the Test Battery. The obtained *item-sum correlations* were accepted as the 'validity coefficient' (Guilford & Fruchter, 1973), because no parallel-standardized test on '**Selection Criteria of Floorball Players**' is available till-date. It was, therefore, decided to discard items that have low 'validity index' to purify and homogenize the Test Battery. The items with 'validity index' value of **0.30 and above** were included in the Battery as suggested by Guilford and Fruchter (1973).

The result as presented in Table 4.8 has revealed that 1 test-items *viz.* **A<sub>2</sub>-Blood Pressure** were finally discarded from the test because they had validity indices below 0.30. It is also surprising to note that the **Physiological Dimension** has been fully discarded from the Test Battery for Selection of Hand Ball Players.

Table 4.

Item-total correlation coefficients (Validity Index)			
Dimension	Code	Name of Items	Item-Total Correlation No.
PHYSIOLOGICAL	A2	BP (Blood Pressure)	0.20*

### C) Results on Factor Analysis

The analysis of residual correlation matrix and centroid factor matrix have revealed that the items determining the 'r' common factors are *Heart rate, Respiratory rate, Peak Exploratory Flow rate, Blood pressure*

In fact, analysis of *items, residual correlation matrix, 'r' common factors, and centroid factor matrix* have revealed that the items *Heart rate, Respiratory rate, Peak Exploratory Flow rate, Blood pressure*, showed poor status in the Test Battery. It was, therefore, decided to discard these variables from the Test Battery.

### MAJOR FINDINGS

- **Initially**, the Test Battery was composed of **4 major test items** (viz., *heart rate, blood pressure, respiratory rate, and peak exploratory flow rate*).
- After **Item Analysis** (i.e., on the basis of the values of *item-difficulty and item-discrimination*), **1 major test item** (viz., *blood pressure*) were retained in the Test Battery.
- **A2-Blood Pressure** was finally discarded from the test because they had validity indices below 0.30. It is also surprising to note that the **Physiological Dimension** has been fully discarded from the Test Battery for Selection of Hand Ball Players.

### References

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