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Predictive analysis of anthropometric physical, physiological and performance related variables among school basketball players

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Abstract

Basketball is the second most popular international sport in the world. Research in the field of sports and games had proved that variables such as anthropometrical variable, Physical fitness variables, Physiological variables, and Performance variables decide the playing ability of an individual.

The purpose of the study was to form the predictive factors associated with basketball performance related variables among school players. To achieve the purpose of this study, school senior 28 basketball players (boys) were selected from 04 best schools of Bangalore district. The subjects were representing school tournament. Their age ranged from 14 to 17 years with mean age of 15.5 years. The research scholar reviewed the available scientific literature pertaining to the problem understanding from books, journals, magazines, research papers and also falling into consideration the feasibility of criteria and availability of Anthropometric, Physical & Physiological variables and also Performance related variables.

The results of the study revealed that,

1. The anthropometric characteristics had contributed significantly towards the skills of the players.
2. Speed played a significant role in performing performance related skills in the game.

Keywords: Basketball, anthropometric, physical, physiological, performance, variables

Introduction

In prediction results are anticipated beforehand. Usually the anticipated results are not chance to guesses but they are based upon some knowledge, factor relationship or carefully conceived beliefs. There are different types of prediction in our daily life that we come across such as Wealth forecast, Market forecast, and Astronomical forecast namely eclipses and geological forecast, such as earthquake and so on. These are based upon some known facts and so they are reliable prediction.

Even in the field of Physical Education prediction prevails. A coach, who coaches his team, predicts the outcome of a match. His predictions are not chance to guesses but they are carefully conceived beliefs.

Today's world is a world of competition. The rivalry to reach the top and excel each other is so much that every aspect and world contributes for the excellence is carefully looked in it. One of such aspects is the selection of the right person for the right event in sports. Normally a choice of selection is given to the athletes or the players. The players without knowing their inherent potential made wrong choices, because of his wrong selection. The Individual concern is not able to reach the top of the ladder. Had that been the right choice his inherent potential would have let him to reach the optimum performance. Hence inherent talent identification as become important and inevitable. Such identification could be made possible only through an analysis of the potentials that is inborn in an individual. Such types of analysis and Identification of Inherent potential is made through prediction. Predictions are made through scientific applications of existing principles by using the knowledge gathered through experience and forming a pattern for particular event or game. Studies approved that certain variables which would contribute for the total playing ability are inherent and can be identified through certain tests. Based on these studies, it has been conceived that prediction of the variables that would contribute for the player's ability in Basketball among men would also be possible.

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Statement of the problem

The purpose of the study was to form the Predictive Factors associated with basketball performance related variables among school players.

Hypotheses

Null Hypothesis (H₀): There would be no significant relationship among the selected Anthropometrical, Physical, and Physiological variables with Basketball performance related variables.

Alternative Hypothesis (H_a): There would be positive relationship among the selected Anthropometrical, Physical and Physiological variables with performance related variables.

Null Hypothesis (H₀): All the selected variables would have equal weightage in the respective Regression Equation.

Alternative Hypothesis (H_a): Among the selected variables, Anthropometric would be the contributing factor for the Basketball performance than the Physical and Physiological

variables.

Methodology

Distribution of sample

For the study a total of 28 samples were selected from 4 best school teams of Bangalore district.

Distribution of Sample is as below;

Table 1: School wise distribution of samples

Sl. No	School Teams	Samples	Percentage
1	Vidyashilpi Academy	07	25.00
2	Jain International School	07	25.00
3	Delhi Public School	07	25.00
4	National Public School	07	25.00
Total		28	100.00

The school wise distribution of the samples has been depicted in Table 1. It may be seen from the table that, 07 samples are from Vidyashilpi Academy (25.00%) followed by 07 samples from Jain International School (25.00%), 07 samples belong to Delhi Public School (25.00%), while 07 samples were from National Public School (25.00%)

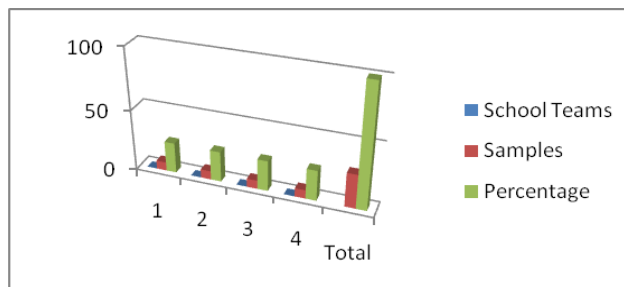


Fig 1: Graphical representation of distribution of samples

Selection of variables

The investigator reviewed the available scientific literature from Books, Journals, Periodicals, Magazines and Research

Papers. Resulting from the review of literatures, the discussion with the experts and considering the feasibility criteria of the study, the following variables were selected.

Table 2: Independent and dependent variables with test items and unit of measurement

Testing variables				
S. No	Independent Variables		Test Items	Unit of Measurement
1	Anthropometric Variables	Height	Stadio Meter	In centimeters
		Weight	Weighing Machine	In kilograms
		Arm length	Lufkin Tape	In centimeters
		Arm span	Lufkin Tape	In centimeters
		Leg length	Lufkin Tape	In centimeters
2	Physical Fitness Variables	Agility	Illinois Shuttle run	In seconds
		Speed	30 mts run	In seconds
		Vertical Jump	Sargent Jump Board Test	In centimeters
3	Physiological Variables	Systolic Blood Pressure	Blood Pressure Monitor	Millimeters of Mercury
		Diastolic Blood Pressure		In numbers
		Heart rate	Peak Flow Meter	In liters per minute
		Maximal Expiratory Rate		
S. No	Dependent Variables		Test Item	Unit of Measurement
1	Performance Variables	Dribbling	Johnson Basketball Test	In numbers
		Passing		In numbers
		Shooting		In numbers

Test of significance

This is the crucial portion of the thesis in arriving at the conclusion by examining the statistical hypotheses and either by accepting the null hypotheses or rejecting the same in accordance with the result obtained in relation to the level of significance fixed by the investigator.

Level of significance

The probability level below which we reject the hypothesis is termed as level of Significance. Pearson Product Moment Correlation and Regression Analysis were computed at 0.05 level of significance. The level of significance was set at 0.05 level of confidence which was considered to be the appropriate one for this study.

Table 3: Descriptive statistics of selected anthropometric, physical, physiological and performance related variables among school basketball players

Variables	Acronyms	Mean	Std. Deviation
Height	HIT	158.6964	16.50552
Weight	WET	57.1857	28.78240
Arm length	ARL	70.5179	5.83330
Arm span	ARS	164.7143	23.26077
Leg length	LGL	85.2429	6.45029
Speed	SPD	5.1711	.41191
Agility	AGT	86.9175	355.52780
Vertical jump	VJP	39.4286	5.95308
Systolic	SYS	116.7143	17.37997
Diastolic	DIS	61.1786	8.68397
Heart rate	HRT	73.3214	11.53434
Maximal Respiratory Rate	MRR	335.0000	67.63190
Dribbling	DRL	31.1786	3.06780
Passing	PAS	9.3571	2.40700
Shooting	SHT	12.0714	2.44841

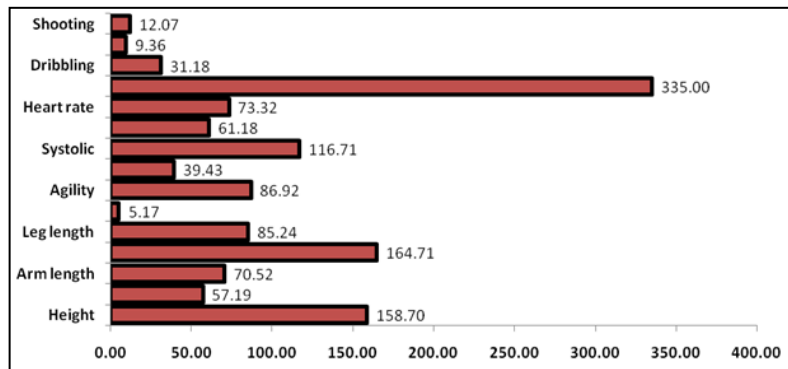


Fig 2: Xiii mean Values of Anthropometric Physical Physiological and Performance Related Variables among School Basketball Players

Descriptive statistics for the anthropometric, physical, physiological and performance related variables were shown in the Table – III. The relationship between the dependent and

independent variables in this study was analyzed by Pearson Product Moment Correlation and the results were presented in the table-4.

Table 4: Relationship between Anthropometric, physical, physiological and performance related variables among school basketball players

V	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	1	.122	.493**	.266	.456*	-.248	.122	-.061	-.009	-.153	-.084	.277	.278	.303	.408*
X2		1	.327	.245	.425*	-.184	-.022	-.012	.197	.120	-.136	.299	.050	.008	.242
X3			1	.575**	.878**	-.354	.150	.234	.467*	.314	.160	.599**	-.044	.013	.254
X4				1	.630**	-.133	.128	-.128	.326	.274	-.085	.513**	.023	-.065	.391*
X5					1	-.342	.175	.158	.369	.426*	.131	.628**	.087	.231	.415*
X6						1	.296	-.546**	-.147	-.084	.124	-.396*	-.113	-.306	-.357
X7							1	.052	.128	.357	.115	.072	-.076	.052	-.006
X8								1	.198	.087	-.013	.021	.052	.271	-.101
X9									1	.359	.306	.292	-.250	-.278	.089
X10										1	.240	.356	-.288	.087	.022
X11											1	.239	-.118	.000	-.095
X12												1	-.176	.259	.420*
X13													1	.352	.274
X14														1	.303
X15															1

Height CM	X1	Speed SECONDS	X6	Heart Rate	X11
Weight KG	X2	Agility SECONDS	X7	Maximum Respiratory	X12
Arm Length CM	X3	Vertical Jump CM	X8	Dribbling	X13
Arm Span CM	X4	Systolic mmHg	X9	Passing	X14
Leg Length CM	X5	Diastolic mmHg	X10	Shooting	X15

Table – IV showed that there was a strong correlation ($r \geq 0.9$) exists between the arm length and leg length. Among the anthropometrical variables, arm length showed moderate positive correlation ($r \geq 0.5$) with height and arms span. And arm length had significant positive correlation with physiological variable namely maximal respiratory rate. Next

to that, arm span had significant moderate positive correlation with leg length and maximal respiratory rate. Leg length was found positive relationship with maximal reparatory rate moderately. But speed had negative significant correlation with vertical jump ($r = -0.546$).

Table 5: Stepwise regression analysis of dribbling for anthropometric physical and physiological characteristics of school basketball players

Variables	R ²	Unstandardized Coefficients Std. Error		Standardized Coefficients Beta
		b	SE b	B
Constant		30.580	24.481	
Height cm		.045	.057	.244
Weight Kg		.006	.026	.054
Arm length cm		-.331	.266	-.630
Arm span cm		.026	.042	.194
Leg length cm		.339	.256	.714
Speed seconds		-1.254	2.640	-.168
Agility seconds		.000	.002	.018
Vertical Jump cm		.054	.165	.104
Systolic		-.031	.047	-.174
Diastolic		-.101	.103	-.286
Heart Rate		.045	.069	.168
Maximum Respiratory		-.018	.014	-.387
Arm length cm	.362	.006	.026	.054

(n=29):(R² = .362: ΔR² = 149 for final equation) Significant at *** p<0.001, ** p<0.01, * p<0.5.
 Dribbling = 30.580 -1.254 (SPD) + .339 (LGL) + .331 (ARL)

Table-5 showed that the regression analyses for dribbling ability of basketball players in the sample. Among all the selected variables, the physical variable - speed contributes (-

1.25) with higher value, followed by anthropometric variables namely leg length (.339) and arm length (.331), out of which the other variables were contributing merely.

Table 6: Stepwise regression analysis of passing for anthropometric physical and physiological characteristics of school basketball players

Variables	R ²	Unstandardized Coefficients Std. Error		Standardized Coefficients Beta
		b	SE b	B
(Constant)		-7.882	14.769	
Height cm		.068	.034	.468
Weight Kg		-.006	.016	-.076
Arm length cm		-.452	.161	-1.095
Arm span cm		-.015	.025	-.149
Leg length cm		.321	.154	.861
Speed seconds		.561	1.593	.096
Agility seconds		.000	.001	-.069
Vertical Jump cm		.198	.100	.489
Systolic		-.036	.029	-.263
Diastolic		.033	.062	.118
Heart rate		.008	.042	.037
Maximum respiratory	.623	.014	.009	.402

(n=29):(R² = .623: ΔR² = -.321 for final equation) Significant at *** p<0.001, ** p<0.01, * p<0.5.
 Passing = -7.882 - .452 (ARL) + .321 (LGL) + .561 (SPD)

Table-6 Showed that the regression analyses for passing ability of basketball players in the sample. Among all the selected variables, the physical variable - speed contributes

(.561) with higher value, followed by anthropometric variables namely arm length (.452) and leg length (.321), out of which the other variables were contributing merely.

Table 7: Stepwise regression analysis of shooting for anthropometric physical and physiological characteristics of school basketball players

Variables	R ²	Unstandardized Coefficients Std. Error		Standardized Coefficients Beta
		B	SE b	β
(Constant)		20.449	17.389	
Height cm		.031	.041	.207
Weight Kg		.000	.019	-.009
Arm length cm		-.312	.189	-.743
Arm span cm		.015	.030	.138
Leg length cm		.264	.182	.696
Speed seconds		-2.408	1.875	-.405
Agility seconds		.001	.002	.121
Vertical jump cm		-.103	.117	-.250
Systolic		.021	.034	.148
Diastolic		-.059	.073	-.209
Heart rate		-.010	.049	-.045
Maximum respiratory	.703	.007	.010	.181

(n=29):(R² = .703: ΔR² = 495 for final equation) Significant at *** p<0.001, ** p<0.01, * p<0.5.
 Passing = 20.449 - .312 (ARL) + .264 (LGL) - 2.408 (SPD)

Table-7 showed that the regression analyses for shooting ability of basketball players in the sample. Among all the selected variables, the physical variable - speed contributes (2.408) with higher value, followed by anthropometric variables namely arm length (.312) and leg length (.264), out of which the other variables were contributing merely.

Discussion on hypotheses

The hypotheses framed in this study were two. One is regarding relationship among the dependent and independent variables. Other one is regarding contributing factor for Basketball performance related variables. In the hypothesis, the null and alternative form was adopted to interpret the findings.

The first hypothesis stated as followed.

Null Hypothesis (H_0)

There would be no significant relationship among the selected Anthropometrical, Physical, and Physiological variables with Basketball performance related variables.

Alternative Hypothesis (H_a)

There would be positive relationship among the selected Anthropometrical, Physical and Physiological variables with performance related variables.

As the obtained results, showed that there was a positive significant relationship exists among the anthropometrical, physical, physiological variables. Only one variable namely speed had negative significant correlation with vertical jump revealed that the null hypothesis was rejected and alternative hypothesis was accepted.

The second hypothesis stated as followed.

Null Hypothesis (H_0)

All the selected variables would have equal weightage in the respective Regression Equation.

Alternative Hypothesis (H_a)

Among the selected variables, Anthropometric would be the contributing factor for the Basketball performance than the Physical and Physiological variables.

As the obtained results, showed that arm length, leg length and speed, were the contributing variables for the prediction of dribbling, passing and shooting as the performance related variables in the game Basketball. Among the anthropometrical, physical, physiological variables, only these three variables were dominating the other in which two variables as anthropometric and one as physical variable. Hence in the second hypothesis, the null hypothesis was rejected and alternative hypothesis was accepted.

Conclusions

1. Anthropometric characteristics had contributed significantly towards basketball dribbling, passing and shooting than the physical and physiological characteristics among the school level basketball players.
2. Speed had played a significant role in performing performance related skills in the game basketball among the school level players.

References

1. Barry L Johnson, Jack K Nelson. Practical Measurement for Evaluation in Physical Education, New Delhi: Surjeet Publication, 1988.
2. David C Watt. Sports Management and Administration,

London & New York: EGFNSPON, 1988.

3. Donald K Mathews. Measurement in Physical Education, Philadelphis: W.B Sarunders company, 1973, 144.
4. Andziulis A, Jaszczanin N, Jaszczanin J, Boychenko S. 'Cardiopulmonary function of the high trained basketball players', 2005.
5. Angyan L, Tézely T, Zalay Z, Karsai I. Relationship of anthropometrical, physiological and motor attributes to sport-specific skills', Acta Physiol. Hung. 2003; 90(3):225-231.