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The Contribution of Body Measurements to the Skill Performance of Female Students in Basketball at the College of Physical Education and Sports Sciences, University of Hamdaniya

Kontribusi Pengukuran Tubuh terhadap Kinerja Keterampilan Mahasiswi dalam Bola Basket di Fakultas Pendidikan Jasmani dan Ilmu Olahraga, Universitas Hamdaniya

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ABSTRACT

The aim of the research was to identify the relationship between body measurements and skill performance in basketball and to identify the contribution of body measurements to skill performance in basketball among female students in the College of Physical Education and Sports Sciences, University of Hamdaniya. A descriptive approach was used with a correlational approach due to its suitability to the nature of the research. The research community was defined as the students of the College of Physical Education and Sports Sciences, University of Hamdaniya (2024-2025), numbering (197) male and female students. The research sample was selected using a stratified approach from the first, second, third, and fourth stages, totaling (52) female students. To achieve the research objectives, the following measurements were used (standing height, leg length, arm length, palm length, abdominal circumference, hip circumference, upper arm circumference, chest circumference, thigh circumference, and leg circumference). To arrive at the results, statistical methods were used (arithmetic mean, standard deviation, simple correlation coefficient (Pearson), multiple correlation coefficient, and percentage). The research reached the following conclusions: Generally, body measurements contributed insignificantly to the skill performance of female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, Al-Hamdaniya University. Body weight represented an influential contributor to the skill performance of female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, Al-Hamdaniya University. A prediction equation for body weight of (9%) was obtained. In light of this, the researchers made a number of recommendations.

Keyword: Body Measurements, Skill Performance, Basketball

ABSTRAK

Tujuan penelitian adalah untuk mengidentifikasi hubungan antara ukuran tubuh dengan performa keterampilan dalam bola basket dan untuk mengetahui kontribusi pengukuran tubuh terhadap performa keterampilan dalam bola basket pada mahasiswi di Sekolah Tinggi Pendidikan Jasmani dan Ilmu Olah Raga Universitas Hamdaniya. Pendekatan yang

digunakan adalah pendekatan deskriptif dengan pendekatan korelasional karena kesesuaiannya dengan sifat penelitian. Komunitas penelitian ditetapkan sebagai mahasiswa Sekolah Tinggi Pendidikan Jasmani dan Ilmu Olah Raga Universitas Hamdaniya (2024-2025) yang berjumlah (197) mahasiswa laki-laki dan perempuan. Sampel penelitian dipilih dengan pendekatan stratified dari tahap pertama, kedua, ketiga, dan keempat yang berjumlah (52) siswi. Untuk mencapai tujuan penelitian maka digunakan pengukuran sebagai berikut (tinggi berdiri, panjang tungkai, panjang lengan, panjang telapak tangan, lingkar perut, lingkar pinggul, lingkar lengan atas, lingkar dada, lingkar paha, dan lingkar tungkai). Untuk mencapai hasil tersebut digunakan metode statistik (rata-rata aritmatika, simpangan baku, koefisien korelasi sederhana (Pearson), koefisien korelasi berganda, dan persentase). Penelitian ini mencapai kesimpulan sebagai berikut: Secara umum, pengukuran tubuh memberikan kontribusi yang tidak signifikan terhadap kinerja keterampilan mahasiswi di Jurusan Pendidikan Jasmani dan Ilmu Olah Raga di Sekolah Tinggi Pendidikan Ilmu Pengetahuan Murni, Universitas Al-Hamdaniya. Berat badan merupakan kontributor yang berpengaruh terhadap kinerja keterampilan mahasiswi di Departemen Pendidikan Jasmani dan Ilmu Olah Raga di Sekolah Tinggi Pendidikan Ilmu Pengetahuan Murni, Universitas Al-Hamdaniya. Persamaan prediksi berat badan (9%) diperoleh. Sehubungan dengan hal tersebut, para peneliti memberikan beberapa rekomendasi.

Kata Kunci: Pengukuran Tubuh, Skill Performance, Bola Basket

INTRODUCTION

Body measurements are important indicators in assessing individual growth and have strong relationships with many vital areas. They are related to health, social, and emotional adjustment, in addition to being essential requirements for various sports activities, including basketball. It is certain that the availability of these requirements among practitioners of this activity enables them to grasp the skills and art of the game, facilitating the achievement of a high athletic level (Hassanin, 2003, 38).

Body measurements are of great interest to coaches and stakeholders in the sports field today, given their importance in making the necessary decisions, developing appropriate strategies, developing plans, and building training curricula. Basketball is one of the sports whose level has significantly improved due to the use of technologies and scientific and cognitive research. These include the physical specifications of each player. For example, body weight and height provide the coach with an important indicator in determining the player's position on the team. Based on this, appropriate plans are developed that enable the team to penetrate the opposing team's defenses and score points. Furthermore, coordination between body parts is essential. Others, it is certain that practicing any sport on a regular and consistent basis provides its practitioners with physical attributes. This attribute is considered one of the basic requirements for achieving success. "Accordingly, investigating the specific requirements of all sports, including basketball, seems extremely important at first glance. However, these requirements can grow and develop as a result of the conditioning imposed by systematic training over many years" (Al-Taie, 2004, p. 7). It is important for those working in the sports field to be aware that every human body has specific capabilities in terms of physical specifications. These specifications may play a significant role in a particular type of sport while being less so in other activities. Accordingly, the correct

selection of the appropriate physical specifications for the activity is made at the beginning of training so that the efforts of the coach and the player are not wasted without achieving the desired sporting benefit. (Cureton, 1995, 20).

Numerous studies have addressed body measurements and their role in various sporting events and activities, and have identified the relationship between them and other characteristics, including physical, motor, tactical, and psychological attributes of female players. These studies have demonstrated a correlation between body measurements, these attributes, and excellence in various sports (Hassanin, 1996, 36).

Since basketball is characterized by contact between players on competing teams, the player must possess appropriate body specifications, which play a significant role in skill performance. This leads us to focus on selecting individuals with body specifications that are compatible with the requirements of basketball, which, in turn, positively impact skill performance. Hence, the importance of this research is evident.

METHODE

The descriptive approach was used with the correlational method due to its suitability to the nature of the research. The research community is determined by the students of the College of Physical Education and Sports Sciences, University of Al-Hamdaniya (2024-2025), numbering (197) male and female students. The research sample was selected using a stratified method from the first, second, third, and fourth stages, totaling (197) male and female students. Their number is (52) female students, and the students of the pilot experiment, numbering (7) female students, were excluded. Thus, the number of individuals in the main experiment sample became (45) female students, at a rate of (86.5%). Table (1) represents the distribution of sample individuals over the four stages.

Table No. (1) Number of members of the research community and its sample distributed over the three stages

NO.	Stage	Number	Exploration Sample	Main Experiment Sample
1	Stage One	13	2	11
2	Stage Two	19	3	16
3	Stage Three	7	-	7
4	Stage Four	13	2	11
	Total	52	7	45

Data Collection Methods:

- To obtain data and information for the research, a number of data collection methods were used, as follows:

Body Measurements

- To obtain these measurements, the researchers relied on the theoretical framework and previous studies, most of which agreed on the following measurements:

(Standing height, leg length, arm length, palm length, abdominal circumference, hip circumference, upper arm circumference, chest circumference, thigh circumference, calf

circumference). Measurements were conducted on the sample using the same methods as described in scientific sources (Khater and Al-Baik, 1996, 88), (Hassanin, 1996, 44-71), (Radwan, 1997, 40), (Hussein and Youssef, 1999, 255), and (Abdel-Fattah and Hassanin, 1997, 330-331). When conducting body measurements, the following conditions were observed: Measurements were conducted at the same time each day. Measurements were conducted in a standardized manner in terms of measurement sequence. Measurements were used using the same measuring tools. Measurements were conducted on the right side of the body.

Selection of tests for skill performance**:** To obtain appropriate tests for basketball skills, numerous sources and scientific research were surveyed, including (Abdul Hamid and Hassanein, 1980), (Al-Samarrai, 1987), (Ibrahim, 1990), (Awda, 2004), and (Dhaher and Ismail, 1989). From these, the researchers extracted a number of tests suitable for measuring the offensive skills under study, based on a 75% disagreement rate, as shown in Table (2). These tests were presented in a questionnaire attached to Appendix (1) to the experts and specialists (Appendix (2), and were approved.

Table NO. (2)Showing basketball skill tests

Basic skills	Tests	Acceptable
Dribbling	Straight zigzag dribbling test	100%
	10m straight line dribbling tesT	88%
Passing	Push-through pass accuracy test	100%
	Coordination and passing speed test	100%
Shooting	Free throw test	100%
	Scoring speed test	100%

Equipment and Tools Used:

Measuring Tape, Medical Scale, Legal Basketballs, Test and Measurement Results Recording Form.

Exploratory Experiment and Field Training.

This experiment was conducted on December 12, 2024, on a sample of (7) female students from the research community, selected using a simple random method. The objectives were:

- Training on how to perform the measurement process and its conditions.
- Measuring the efficiency of the equipment and tools.
- Measuring the response and interaction of the laboratories.

Main (Final) Experiment

After ensuring the validity of the tests, their fulfillment of scientific requirements, and their suitability for the sample, the researchers conducted the final implementation of the tests and measurements on the sample for the period from February 23, 2025 to February 27, 2025.

Statistical Methods:

(SPSS) The data were statistically processed by entering them into a computer and using the statistical package.

The following statistical methods were used:

- Arithmetic mean.
- Standard deviation.

- Simple correlation coefficient (Pearson).
- Multiple correlation coefficient.
- Percentage.

RESULT AND DISCUSSION

The results will be discussed in this chapter, beginning with the statistical description of the anthropometric measurements and basketball skills, as follows.

Table NO.(3) Statistical Description of Body Structure Variables (Body Measurements)

NO.	Body Measurements	Unit of Measurement	Lowest Value	Highest Value	Arithmetic Mean	Standard Deviation
1	Body Height	Cm	148	169	160.49	4.96
2	Weight	Kg	45	78	58.20	7.93
3	Seated Height	cm	57	94	82.69	7.88
4	Leg Length	Cm	67	97	86.78	7.34
5	Arm Length	Cm	48	76	64.11	7.82
6	Hand Length	Cm	15	20.5	17.94	1.42
7	Abdominal Circumference	Cm	62	94	77.67	7.03
8	Hip Circumference	Cm	72	113	95.64	9.38
9	Upper Arm Circumference	Cm	23	35	28.51	2.83
10	Chest Circumference	Cm	56	100	87.11	7.62
11	Thigh Circumference	Cm	30	65	50.16	8.98
12	Leg Circumference	Cm	27	73	34.53	6.64

Table NO. (4) Statistical Description of Basketball Skills Tests

NO	Basic Skills Tests	Unit of Measurement	Lowest Value	Highest Value	Arithmetic Mean	Standard Deviation
1	Free Throw	Score	1	10	5.222	2.548
2	Fast Passing	Score	6	18	9.444	2.713
3	Scoring Speed	Score	2	12	5.333	2.445
4	Dashing Change of Direction	Sec	6.7	22	14.945	3.507

5	Straight Dash	Sec	6.52	17.72	9.662	2.033	
6	Passing Accuracy	Score	16	30	23.244	3.031	

Table NO. (5) Correlation Coefficients Between Anthropometric Measurements and Basketball Skill Performance

NO.	Anthropometric Measurements	Skill Performance
1	Body Height	0.203
2	Weight	0.315
3	Seated Height	0.093
4	Leg Length	0.255
5	Arm Length	0.101
6	Hand Length	0.201
7	Abdominal Circumference	0.087
8	Hip Circumference	0.198
9	Upper Arm Circumference	0.106
10	Chest Circumference	0.068
11	Thigh Circumference	0.186
12	Legging Circumference	0.209

* Significant at a p-value of ≤ 0.05, a degree of freedom of 44, and a tabular value of r = 0.288.

From Table (5), we note the following: There is no significant correlation at a p-value of ≤ 0.05 (body height, sitting height, leg length, arm length, palm length, abdominal circumference, hip circumference, upper arm circumference, chest circumference, thigh circumference, and calf circumference) and offensive skill performance in basketball:
- There is a significant correlation at a p-value of ≤ 0.05 between body weight and offensive skill performance in basketball.

Table (6) Percentages of Contribution of Anthropometric Measurements to Basketball

Variables	Constant	Coefficient	Degrees of Freedom	Calculated F	Probability	Multiple Correlation Coefficient	Percentages of Contribution
Body Height		0.0249					
Weight		0.0937					
Seated Height		-0.0236					
Leg Length		0.1393					
Arm Length		-0.0186					
Hand Length		0.3419					

	-22.391	Dec-32	0.485	0.909	0.392	0.154
Abdominal Circumference	-0.0631					
Hip Circumference	0.0143					
Upper Arm Circumference	0.1377					
Chest Circumference	0.0018					
Thigh Circumference	-0.0720					
Legs Circumference	0.0267					

From the table (6) which represents the total contribution ratios of the body measurements to the skill performance using the method of all regressions, we note that the multiple correlation coefficient reached (0.392), while the contribution ratios reached (0.154), which is an insignificant value because the calculated (F) value is smaller than the tabular value at an error rate of (≤ 0.01).

Table (7) The most important body measurements contributing to skill performance in basketball

Variables	Constant	Coefficient	Degrees of freedom	Calculated κ	Probability	Multiple correlation coefficient	Contribution ratios
Body weight	-8.016	0.138	1-43	4.744	0.035	0.315	0.099

From Table (7) which represents the most important body measurements contributing to skill performance in basketball (using the stepwise regression method), the body weight variable came out as the most important variable, as the contribution rate reached (0.099), which is the highest contribution rate, and the calculated (F) value reached (4.744), which is a significant value because it is greater than the tabular (F) value at an error rate of ($\leq 5...$), which is (4.84). The increase in the student's weight while throwing the ball has two benefits, one of which is that muscle strength is directly proportional to the anatomical section of the muscle and to the size of the muscle, and the second is the ability of the heavy body to invest the ground's reaction better than the light body in pushing the ball in the required direction (Hussein and Al-Talib, 1987, 281). Body weight is one of the factors that play a major role in achieving good completion of the throw (Hussein, 1977, 341). Weight is related to motor ability in many movements that require neuromuscular coordination (Al-Yasiri, 2002, 58) .

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The results showed the following:

1. Overall, body measurements contributed insignificantly to the skill performance of female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, University of Hamdaniya.
2. Body weight was an influential contributor to the skill performance of female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, University of Hamdaniya.
3. A prediction equation for body weight of (9%) was obtained.

Recommendations :

1. Adopt the weight-specific equation as a relative indicator of skill performance in basketball for female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, University of Hamdaniya.
2. Research into variables other than body measurements that may have the greatest impact on the skill performance of female students in the Department of Physical Education and Sports Sciences at the College of Education for Pure Sciences, University of Hamdaniya.

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