A NORM STUDY ON PHYSICAL AND MOTOR DEVELOPMENTS IN BASKETBALL SCHOOL CHILDREN

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ABSTRACT

The aim of this study is to define a norm on physical development and motor performances of children who attend basketball school, aged 7 to 14. This norm study matters because it will be a reference to other researchers who will be researching the relevant area. 638 children (387 boys and 251 girls) participated in the study in the province of Istanbul, who participated in the summer sports schools of the Istanbul Metropolitan Municipality and written consent form was taken from parents of the children. The study is a cross-sectional study in which the status determination was done by using quantitative data. Body lengths, body weights, height while seating, flexibilities, hand and foot lengths, claw strength, shoulder widths, and fathom lengths were measured for physical development after the birth dates of the children and their dominant hand and feet were recorded. The data of the study was formed by measuring the balance skills, vertical jump skills, quickness and speed parameters in order to determine the motor performances. The norm study was completed by conducting frequency analysis on the obtained data. As a result of the study, it was determined that children aged between 7 - 14 years who attended basketball school used predominantly right hand and right leg, physical development and motor performances were similar to international standards.

***Keywords:** Sport, Basketball, School Children, Norm Study, Physical Developments, Motor Developments*

INTRODUCTION

One of the fundamental characteristics of childhood is the process of growth and development experienced in this period. Independent analysis of the child athletes' physiological characteristics from the process of growth and development may lead to misleading results. Growth and developmental characteristics that vary in childhood and adolescence should be taken into account in establishing the physiological standards of child athletes, interpreting performance test results, and talent selection (Kosar and Demirel, 2004).

Physical development involves the growth and maturation of all subsystems forming the body as well as the body's getting longer and fatter. Physical development concerns the individual's bodily structure, changes in neuro-motor functions, and balancing process (Gokmen et. al., 1995).

Motor development; the acquisition, balancing and deceleration of motor skills. Growth, maturation, readiness and learning also play an important role in this process. Motor development shows itself through changes in behavioral changes. Therefore, the main purpose of the motor development analysis is to examine the gradual progress of the motor skills. Movement can be viewed as form (process) or performance (product) (Sarac, 2012).

In the pre-school period, the effects of socialization begin to be seen in the development of motor skills. In this process, we see that gender difference in terms of jumping, vertical jump and sprint are in favor of men. On the other hand, as girls play more hopscotch and skip rope in their games, they are superior to men in skills which require balance and coordination. The tests conducted in later years reveal that men are faster than girls, able to make stronger throws and jumps, and better in some balance skills. However, these differences are insignificant when compared to puberty values (Muratli, 1997).

METHOD

638 children (387 boys and 251 girls) participated in the study in the province of Istanbul, who participated in the summer sports schools of the Istanbul Metropolitan Municipality and written consent form was taken from parents of the children. The study is a cross-sectional study in which the status determination was done by using quantitative data. Body lengths, body weights, height while seating, flexibilities, hand and foot lengths, claw strength, shoulder widths, and fathom lengths were measured for physical development after the birth dates of the children and their dominant hand, and feet were recorded. The data of the study was formed by measuring the balance skills, vertical jump skills, quickness, and speed parameters in order to determine the motor performances. The dominant hand was confirmed with writing; the dominant foot of the participants was confirmed by observing their foot preference in flamingo balance test. The measurements taken within the scope of the research were made with the methods stated in the sources of Tamer (2000) and Zorba (1999), which are mentioned in the following paragraphs.

Height, Height while Sitting, Hand, Foot and Fathom Length Measurements: The heights of the subjects were measured by measuring the distance between the vertex and the foot of the head following a deep inspiration while the head was in the Frankfort line. Similar procedures were applied to the subjects while sitting, and height lengths were confirmed. Measurements of foot lengths were done by placing on the surface of a pre-prepared ruler with the bare feet of the subjects the placement of the final part of the heel corresponding to the zero point and marking it on the ruler point on the front of the finger. Hand length measurement was performed by fully opening the palm in the upward direction and measuring the distance between the fingertip and the little finger with the help of a ruler. Measurements of both hands and feet of subjects were taken and the mean of these measurements was used as data. The fathom length was found by

measuring the distance between index fingers with the help of a tape in a completely open position, while the subjects' arms would be parallel to the ground.

Body Weight Measurement: Body weight measurements were done according to standard techniques with sports outfit (shorts, t-shirt) and without shoes. The measurements were done with Tanita BC-418 brand body composition analysis device.

Flexibility Test: Flexibility values of the participants were measured with the help of Lafayette brand test table which has 35cm length, 45 cm width, and 32 cm height. Stretching was applied from the body to the forward, without bending the knees and the farthest point was tried to be reached. By two repetitions, the best results were recorded in cm.

Hand Grip Strength Measurement: The measurements were done with Takkei handgrip dynamometer. After 5 minutes of warmup, the values were measured without bending the arm and no touching to the body while the subject is standing. This test was conducted twice for the dominant hand. The best value was recorded.

Flamingo Balance Test: This test was applied for subjects' static balance measurements. A 50cm length, 4cm height, and 3 cm width metal beam was used. Retries were calculated in 1 minutes (except falls) and recorded as scores (Sipal, 1989).

Vertical Jump Test: The measurements were done on a jumping platform (Fusion Sport, Smart jump, UK). The best of three tries was recorded.

Quickness: This test was conducted with Pro Agility test. Photoelectric chronometer (Newtest Powertimer 300) was used in the measurement. In the test where a single photocell door was used, a child went to the right, then to the left and back to the starting point from the midpoint of the 10-meter area, and ended the test. The same procedure was repeated by starting to the left first, the best value was recorded in seconds (Harman and Garhammer, 2008).

Sprint: The aim of the study is to define how fast a child can run 10 and 20-meter distance. A zero line is drawn on the ground with a tape. The child's first 10 and 20-meter total sprint durations were measured with a photoelectric chronometer (Newtest Powertimer 300). The student is allowed to start 50cm back. A model student is applied Sprint test in front of the student taken into the gymnasium. Meanwhile, the student watches the model. Then the student is tested three times in the Sprint Test. The average of the best two durations after omitting the worst one (Yarimkaya and Ulucan, 2015).

With SPSS 20.0 program, findings of norm determination study were formed by conducting frequency analysis to the obtained data from the measurements.

FINDINGS

Table 1. *Participants' Frequency Status according to Gender and Dominant Hand and Foot*

Variable	Group	n	%
Gender	Male	387	60,658
	Female	251	39,342
Dominance	Right Hand	587	91,006
	Left Hand	51	7,994
	Right Foot	541	84,796
	Left Foot	97	15,204

638 children (387 boys and 251 girls) participated in the study in the province of Istanbul, who participated in the summer sports schools of the Istanbul Metropolitan Municipality and written consent form was taken from parents of the children. While the dominant hand used by the participants was the right hand (91,006%), it was determined that the dominant foot was the right foot (84,796).

Table 2. *Participants' Physical Development Parameters according to Gender*

Age	Group	n	Height (cm)	Height while Sitting (cm)	Weight (kg)	Hand Length (cm)	Foot Length (cm)	Shoulder Width (cm)	Fathom Length (cm)
7	Male	45	136,3517	66,62459	34,98417	12,33999	18,69176	28,72092	135,6041
	Female	32	140,8229	69,8481	35,28429	12,51571	18,23095	29,54762	132,8802
8	Male	51	137,9952	69,08095	36,41746	13,23492	19,48095	29,4127	137,8968
	Female	30	141,54	71,26333	37,16	13,44	19,53333	30,16667	137,2633
9	Male	46	139,6388	71,53731	37,85075	14,12985	20,27015	30,10448	140,1896
	Female	33	142,2571	72,67857	39,03571	14,36429	20,83571	30,78571	141,6464
10	Male	50	144,084	72,938	41,714	14,554	21,058	31,32	144,626
	Female	29	145,4083	73,17083	42,05	14,36667	21,20417	29,66667	142,125
11	Male	48	146,1694	73,46935	43,98548	15,28548	21,81935	31,90323	147,9016
	Female	32	147,95	74,82	43,57	14,86	22,5	31,568	142,6
12	Male	47	147,0968	75,3871	46,55806	15,42903	22,09677	32,06452	152,23
	Female	31	149,9444	75,81111	44,52222	15,51111	22,77778	32,256	146,5
13	Male	47	149,6548	75,8871	48,9	15,69355	22,33548	32,87419	156,5584
	Female	31	152,3	76,11429	45,68571	15,78571	22,98571	32,64286	148,7
14	Male	51	156,1406	76,49063	48,47813	16,8125	23,2	34,71875	160,6031
	Female	33	153,1667	77,75	47,4	16,09167	23,18333	33,41667	150,9

Participants' physical development parameters according to gender are presented in Table 2. According to the table; as the age increases, developmental parameters also increase.

Table 3. *Participants' Physical and Motor Development Parameters according to Gender*

Age	Group	n	Right Hand Grip Strength (kg)	Left Hand Grip Strength (kg)	Flexibility (cm)	Right Foot Static Balance	Left Foot Static Balance	Vertical Jump Hand (cm)
7	Male	45	9,444871	11,37053	15,62189	12,65	13,24	18,6158
	Female	32	11,92429	11,89905	17,952	11,365	14,218	18,3654
8	Male	51	11,65079	12,20317	15,83333	11,96667	12,846	18,16667
	Female	30	13,63	13,30667	18,26	11,518	13,2658	18,63667
9	Male	46	13,85672	13,03582	16,04478	11,40299	12,985	19,20448
	Female	33	15,33571	14,71429	18,19643	11,965	12,01548	20,21429
10	Male	50	16,472	15,352	16,91	10,2	11,3258	22,502
	Female	29	16,14167	14,80833	18,5625	12,33333	11,58333	22,4125
11	Male	48	17,21129	16,60484	17,54032	9,677419	10,3254	24,62903
	Female	32	17,86	15,13	18,92857	11,6571	11,6852	23,67
12	Male	47	18,25806	17,40968	18,18065	9,516129	10,1547	26,75606
	Female	31	18,34444	16,07778	19,29464	10,51111	11,66667	24,48889
13	Male	47	19,56774	18,35806	18,75806	9,354839	10,25687	28,8831
	Female	31	19,17143	17,45714	21,64286	10,28571	10,84656	25,91429
14	Male	51	24,69688	23,45313	18,40625	9,193548	10,02548	31,49375
	Female	33	20,96667	19,44167	22,45833	10,33333	10,16667	26,96527

In Table 3, participants' physical and motor development parameters according to gender are presented. While the participants' balancing skills decrease in a positive way according to their ages; other skills increase in a positive way.

Table 4. *Participants' Motor Development Parameters according to Gender*

Age	Group	n	Quickness (05m) (sec)	Quickness (10m) (sec)	Sprint (10m) (sec)	Sprint(20m) (sec)
7	Male	45	4,985	7,215	2,422644	4,421459
	Female	32	4,984	7,21547	2,611119	4,812071
8	Male	51	4,608254	6,968095	2,397143	4,352222
	Female	30	4,671333	7,135333	2,499667	4,573
9	Male	46	4,578955	6,911493	2,371642	4,282985
	Female	33	4,525357	6,825714	2,388214	4,333929
10	Male	50	4,5758	6,862	2,3712	4,2714
	Female	29	4,527083	6,817083	2,364167	4,292917
11	Male	48	4,402742	6,579677	2,285645	4,117581
	Female	32	4,527	6,736	2,334	4,236
12	Male	47	4,446129	6,61871	2,240645	4,012258
	Female	31	4,447778	6,582222	2,234444	4,117778
13	Male	47	4,386452	6,51	2,220323	3,977097
	Female	31	4,371429	6,494286	2,123571	4,084286
14	Male	51	4,133438	6,063125	2,128438	3,770313
	Female	33	4,253333	6,268333	2,111667	3,991667

The participants' quickness and sprint values of motor development parameters according to gender are presented in Table 4. Accordingly, related values decrease in a positive way as the ages increase.

DISCUSSION

When the obtained findings in the study are evaluated with national and international studies, similar results have been come up to with our findings in the direction of the data obtained in the study. When dominant hand use is examined in the literature, it is seen that right hand and right foot have been dominantly used since the first years of the development of science (Gundogan, 2005).

When physical development parameters of participants according to gender; it is seen that boys and girls' height, weight, hand length, fathom length and shoulder width values have been increasing when compared to approximately 30 years ago (Neyzi et. al., 1978); but it shows resemblance with today's values (Ziyagil et. al., 1999; Grummer-Strawn et. al., 2002; Kuzcmarski et. al., 2000; Neyzi et. al, 2008; Uzun et. al., 1999; Duyar, 1999; Sahin et. al., 2011; Abali et. al., 2012).

Vertical jump values show resemblance with studies conducted by Karagoz et. al., (2015), Ziyagil et. al., (1999), Polat et. al., (2011); quickness and sprint values with (Yarimkaya and Ulucan (2015), Karagoz et. al., (2015), Ziyagil et. al., (1999), Baglar et. al., (2017), Guler et. al., (2010).

Agility values show resemblance with studies conducted by Altinkok and Olcucu (2012); static balance values with Ozsaydi et. al., (2015), and Karagoz et. al., (2015).

Flexibility values show parallelism with studies conducted by Guler et. al., (2010); hand grip strength values with Bilgic et. al. (2015), and Karagoz et. al. (2015).

CONCULSION

As a result of the study, a norm was formed on the physical development and motor performances of children between the ages of 7 and 14 who attend primary and secondary schools. In this norm determination study, the dominant hand and foot, height, body weight, height while sitting, flexibility, hand and foot lengths, claw strength, shoulder widths and fathom lengths, balance skills, vertical jump skills are expected to be a reference to other researchers who will carry out research in the relevant field.

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