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Effect of physical-kinesthetic intelligence exercises on developing motor abilities and basic skills of basketball in female students

Najat Baqir Mashkoor[1]*, Nagham Hateem Hameed[2]*

[1] College of Science for Women, University of Baghdad, Iraq

[2] College of Veterinary Medicine, University of Baghdad, Iraq

* Correspondence: Najat Baqir Mashkoor ; najatbm@csw.uobaghdad.edu.iq, Nagham Hateem Hameed; nagham.h@covm.uobaghdad.iq

ABSTRACT

The learning process needs an appropriate method and technique to be implemented among the players. The basketball game contains a set of skills that need a close relationship between actions, neurological, mental and muscular abilities and the control of bodily movement. One of the important factors in learning, improving and developing motor abilities and learning the skill as well as the planning performance is through learners' ability to analyze, plan and solve problems in learning processes. The physical intelligence created by the theory of intellectual development is one of the types of intelligence that must be taught to the learners to develop basic basketball skills, that need to be controlled, compatible and balanced during the performance of the skills, including shooting skills in basketball ring. The primary aim of the present study was to identify the levels of physical intelligence and to find out the significant difference between the pre and post-tests in the physical intelligence, motor abilities and basic skills between the experimental and control group. The present study had an experimental study design. The research "community" was determined from the students of the fourth school stage (grade 9) of Al-Amal High School for Girls in Baghdad for the academic year 2019-2020. A total of 20 students were recruited as sample participants for the study, who represented 11.29% of the total population. The participants were allocated into two groups, i.e. experimental group and the control group. The participants of the experimental group received training with physical intelligence exercises, whereas control group participants received training with the traditional method.

KEYWORDS

Physical-kinesthetic intelligence, Motor abilities, Basic skills

1. INTRODUCTION

Intelligence is one of the mental abilities that are considered as one of the important factors in learning, developing and improving performance through the ability of learners to analyze, plan and solve problems in the learning processes. In addition, it also enables the learners to be in the harmony with the external environment.

The learning process needs an appropriate method and technique to be implemented among the players. The basketball game contains a set of skills that need a close relationship between actions, neurological, mental and muscular abilities and the control of bodily movement. This interaction enables the player to perform the skills in a certain way to ensure improvement and accuracy of the performance (Ahcene, Mokrani, and Houcine, 2019).The physical intelligence created by the theory of intellectual development is one of the types of intelligence that must be taught to the learners to develop basic basketball skills, that need to be controlled, compatible and balanced during the performance of the skills, including shooting skills in basketball ring.

The importance of research is in preparing the exercises (physical intelligence) to develop motor abilities, and their impact on skill learning and accuracy in shooting toward the basketball ring for learners.

1.1. Research problem

To the best of researchers' knowledge and being one of the one of the basketball players and a teacher in the Sports Activity Unit of the University of Baghdad, it came into their notice that there is lack of use of exercises appropriately designed as per the abilities of the players. Since the basketball game is described by speed and narrow space, hence it requires a certain level of physical intelligence to learn skills along with the mental intelligence to reach the desired goal in the game. Working on these factors may help a player in improving the motor abilities such as balance, flexibility and agility. The lack of interest in the physical intelligence of some teachers and trainees in the process of teaching basketball skills has created a great impact on developing motor abilities and learning some skills and accuracy of basketball shooting. Hence, the primary aim of the present study was to identify the levels of physical intelligence and to find out the significant difference between the pre and post-tests in the physical intelligence, motor abilities and basic skills between the experimental and control group.

2.2. Research aims

The primary aim of the present study was to identify the levels of physical intelligence and to find out the significant difference between the pre and post-tests in the physical intelligence, motor abilities and basic skills between the experimental and control group.

Research Hypothesis

The researcher assumes that there will be statistically significant differences between the pre and post-tests in the level of physical intelligence, motor abilities and basic skills in basketball players between experimental and control group. Also there will be significant moral differences in the post-tests in the level of physical intelligence, motor abilities and basic skills in basketball between the experimental and control groups.

Research fields

The present study was conducted on the students of Al-Amal High School for Girls in Baghdad. The study was conducted within the time frame of November 20, 2019, to February 10, 2020.

2. METHODS

The present study was the experimental study design. The research "community" was determined from the students of the fourth school stage (grade 9) of Al-Amal High School for Girls in Baghdad for the academic year 2019-2020.A total of 177 students were present in the research community. Out of 177 students, 20 students were recruited as sample participants for the study, who represented 11.29% of the total population. The participants were allocated into two groups' i.e. experimental group and the control group. The participants of the experimental group received training with physical intelligence exercises, whereas control group participants received training with the traditional method.

Table 1 shows that the variation coefficient of the sample ranged from 1.95 to 8.29, which is less than 30%, which indicated that the sample was homogenous and was distributed normally.

Table 1. Sample characteristics

Variable	Mean (average)	Deviation	Variation Coefficient
Height (cm)	160.23	8.43	5.26
Weight (kg)	58.64	4.89	8.29
Age (year)	16.33	0.32	1.95

2.1. Tools, devices and means used in the research

Extensive review of literature was studied by the researcher using Arab and foreign references. In the present study, many tools and devices were used for the purpose of data collection with the aim to achieve the objectives of the research. Various Tools used in the present study included barriers, hand calculator, computer, basketball and stopwatch.

2.2. Kinesthetic Intelligence Scale

In the present study, physical kinesthetic intelligence scale was used (Al Ardha et al. 2018). Basketball basic skills tests (Best 2010). The tests were carried out in the sequence as; the frontal shooting test, the free-throw test, accuracy test of the push-pass (chest pass), the dribble test.

2.3. Motor abilities

The motor abilities were tested using test for agility which is the test of running between the poles for a distance of 20 meters (Cheatum and Hammond 2000), Kinetic balance test (Clark 1960), Flexibility test (El-Shafee and Kapouh 2016), and General compatibility test (Falk et al. 2004).

2.4. Preliminary tests

The researcher conducted the exploratory experiment for the selected tests in the month of November 2019 in the playground and hall of Al-Amal School, in presence of the assistant work team. Sample participants were selected for the exploratory experiment other than the sample selected for the main experiment. Bodily-kinesthetic intelligence was measured by using Skill tests and the motor abilities tests. On the next day, the same measurements and tests were carried out on the control sample, in the same sequence and previous mechanism, on the very next day in the playground and hall of Al-Amal School.

2.5. Experimental variable

After reviewing the scientific sources, references, studies and research regarding formulation of set of physical exercises, the researcher prepared a set of exercises taking into account the number of repetitions, abilities and characteristics of the players. The educational and training units were started in the month of November 2019 at a rate of (2) educational and training units per week for a

total of 10 weeks. Each training unit lasted for 30-45 minutes. The total number of training units reached 20, by the end of first month of January 2020. (Appendix 1 and Appendix 2).

2.6. Post-tests

After completing the main research experiment, final tests were accomplished by the researcher and his fellow teammates on two consecutive days in the month of January 2020 with the same mechanism, and under the same spatial and temporal conditions.

2.7. Data analysis

In the present study, statistical analysis was done using Statistical Package for the Social Sciences (SPSS) by computing arithmetic mean, standard deviation, t test, Percentage and coefficient of variation (Greco, Memmert, and Morales 2010).

3. RESULTS

In this section, the collected data will be listed presented, tests and measurements will be discussed, before and after for physical intelligence, motor abilities, and basic skills in basketball for the experimental and control groups.

Table 2. The mean, standard deviation, and t value of physical intelligence before and after for the experimental and control groups.

Groups	Test	Pre-test		Post-test		Calculated-T	Level of morality
		Mean	St. Deviation	Mean	St. Deviation		
Experimental	Intelligence	13.59	1.31	17.89	1.08	3.89	Moral
Control	Intelligence	13.43	2.08	14.08	1.23	2.88	Moral

Table 2 shows a significant difference between pre and post-test for the intelligence and this appears clearly in the calculated T between the experimental and control group.

Table 3. The arithmetic means and standard deviations of the basic skills between the pre and posttests for the control and experimental groups

Groups	Test	Pre Mean	Post Mean	Mean difference	Mean St. Div	Calculated-T	Level of significance
Control	Forward shooting	9.75	13.33	3.58	1.73	2.87	Moral
	Free throw	6.84	9.58	2.74	1.55	4.07	Moral
	Peaceful	4.05	5.12	1.07	1.16	1.97	Not moral
	Pass	11.12	15.03	4.92	1.17	6.40	Moral
	Dibble	16.11	13.33	3.78	0.74	2.11	Not moral
Experimental	Forward shooting	10.50	16.21	6.16	1.61	13.84	Moral

	Free throw	7.40	11.52	4.48	1.67	9.11	Moral
	Peaceful	3.33	8.14	4.81	1.17	10.85	Moral
	Pass	9.88	17.8	7.92	1.88	7.53	Moral
	Dibble	16.22	12.88	3.34	0.91	14.05	Moral

Table 3 shows that statistically significant differences were found between the post-test of the experimental group and control group in the basic skills of basketball which included forward shooting, free throw and passing.

Table 4. The arithmetic means and standard deviations of physical abilities between the pre and posttests in the experimental and control groups

Groups	**Tests**	**Pre**	**Post**	**Mean**	**Mean**	**Calculated-**	**Level of**
		Mean	**Mean**	**difference**	**deviation**	**T**	**significance**
Control	Flexibility	8.42	11.2	2.42	1.06	3.32	Moral
	Moving balance	4.88	3.17	1.17	0.11	1.12	Not moral
	Agility	5.93	4.78	1.15	0.33	1.73	Not moral
Experimental	Flexibility	8.11	15.42	7.31	2.21	2.88	Moral
	Moving balance	2.89	4.97	2.08	0.12	3.25	Moral
	Agility	4.53	5.98	1.45	0.31	3.08	Moral

Table 4 shows that shows that statistically significant differences were found in the post-test between the experimental and control groups in physical abilities i.e. flexibility. Statistically non-significant differences were found in the other abilities i.e. moving balance and agility, Table 4 also shows statistically significant differences in the post-test of the experimental group in physical abilities, i.e. flexibility, balance and agility, compared with the pre-test.

Table 5. The arithmetic means, standard deviations, the calculated and tabulated T-value in physical intelligence

Test	Experimental		Control		T	Level of significance
Intelligence	**Mean**	**Deviation**	**Mean**	**Deviation**	2.97	Moral
	17.89	1.08	14.08	1.23		

As it is clear from table 5, there are significant statistical differences in the experimental group compared with the control group.

Table 6. The arithmetic means and standard deviations of physical abilities in the post-tests

Test	Experimental		Control		T	Level of significance
	Mean	**Deviation**	**Mean**	**Deviation**		
Flexibility	15.42	1.31	11.2	1.25	3.19	Moral
Balance	2.89	0.12	3.17	0.14	2.79	Moral
Agility	4.53	0.12	4.78	0.88	1.02	Non

Table 6 shows that statistically significant differences were found within the experimental group in the physical abilities i.e. flexibility and balance. Statistically non-significant differences were found within the experimental group in the physical abilities i.e. agility.

Table 7. The arithmetic means and standard deviations of the basic skills of basketball in the post-tests

Skill test	Experimental		Control		Calculated T	Level of significance
	Mean	**Deviation**	**Mean**	**Deviation**		
Forward shooting	16.21	2.11	13.33	2.28	3.11	Moral
Free throw	11.52	1.80	9.58	1.09	2.08	Non
Peaceful	8.14	1.51	5.12	1.11	3.17	Moral
Passing	17.8	0.88	15.03	2.13	30.88	Moral
Dibble	12.88	1.99	13.33	1.89	1.52	None

Table 7 shows that statistically significant differences were found within the experimental group for the skill test i.e. group forward shooting, free throw and passing. Statistically non-significant differences were found within the experimental group for the skill tests of peaceful shooting and the ripple).

4. DISCUSSION

The researcher attributed the significant differences between the experimental and control group in the physical and kinesthetic intelligence to the set of exercises formulated by the researcher which were found to be consistent with the age group of the sample participants, the level of physical fitness and skill possessed by the sample participants (Maïano et al., 2007).

In addition to codifying the exercises after knowing their maximum level, appropriate rest period was given to the participants to restore their energy level which enabled the sample participants to perform other repetitions at the similar frequency and intensity. It helped in development of physical intelligence by emphasizing the physical and body senses during the skillful performance. Along with this many other factors contributed in development of physical intelligence which included, content of the exercises, their gradation in difficulty (Pamungkas, 2018).

The bodily-kinesthetic intelligence is one of the important types of intelligence in sports, and they define it as the ability of the sportsperson to use his natural senses to move his body effectively even in difficult circumstances. (Santos et al. 2017). The exercises based on the development of physical-kinesthetic intelligence. The significant differences were found between experimental group and control group in development of physical abilities. The difference was attributed to the exercises prepared by the researcher which contributed in the development of the physical individuality, appropriate with the type and characteristics of the basketball game in terms of performance,

distances, and its level of difficulty. In addition to this, the prepared exercises also contributed in developing the physical and kinetic intelligence among sample participants. The researcher believed that the scheduled exercises for (10) weeks, increased repetitions and feedback in learning contributed in improving and developing skills.

As described in the table 7, significant improvement was observed in basic skills of the participants of the experimental group. This difference was attributed in the form of development in physical intelligence and physical abilities, which contribute in improving skill performance as well as its accuracy. Shalal et al., 2021 in their study stated that, the nature of the experimental variables contributes in improving performance of the skills through exercises, that contribute to developing the skills of dribbling, shooting and passing. The set of exercises formulated by the researcher, contributed to the development in physical intelligence which thereby raised the performance of the skills. Hence the appropriate use of mental abilities was the key idea in preparing the motorial program and was considered as the main issue in facing the basketball players and coaches to learn the skills (Shapiro & Dummer, 1998)Body-kinesthetic intelligence is the ability to use the body or parts of the body, to solve a problem, and perform a movement or an exercise skill"(Tanir & Erkut, 2018). The researcher prepared a set of exercises according to the ability and capabilities of the sample participants in the experimental group. The exercises were prepared to develop physical intelligence, to develop the senses and mental processes, which eventually contributed in solving the situation in the educational and learning process, leading to better skills and performance in basketball (Trunić &Mladenović, 2014).

5. CONCLUSIONS

Based on the present findings, the researchers concluded that a significant difference was found in physical intelligence between the experimental group and the control group in the post-tests and in favour of the experimental group. A significant difference was found in basic skills of basketball game, i.e. forward shooting - free throw – passing, within experimental group and control group. Finally, significant differences were found in forward shooting, flexibility and agility between both groups.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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