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Impact of a program of aerobic exercises on physiological variables and the shape and size of the fetus in pregnant female basketball players

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ABSTRACT

The aim of this study was to identify the impact of a program aerobic exercises on the shape and size of the fetus, and the percentage of the contribution of some of the studied physiological variables and their impact on the shape and size of the fetus among female basketball players. The researchers used the experimental method. The study population represented 10 pregnant married basketball players from the Al-Diwaniyah, Babil and Wasit Governorates. Their ages ranged from 25 to 26 years. The sample was randomly divided into two groups (experimental group = 5 members, control group = 5 members). The members of the experimental group received the training units of the program proposed by the researchers, while the members of the control group received the traditional training units. The Statistical Package for the Social Sciences (SPSS) was used for data analysis. The results of the study showed statistically significant differences between the two tests (the pre- and post-test) for the proposed aerobic exercises, in favor of the post-test for the experimental group ($p < 0.05$). There were no statistically significant differences ($p > 0.05$) of some studied physiological variables for the control group, but there were statistically significant differences between the responses of the research sample on a three-way estimate scale (less than normal, normal, above normal) ($p < 0.05$). There is a clear effect of the proposed aerobic exercises on the growth, shape, and size of the fetus in female basketball players.

KEYWORDS

Aerobic Exercises; Physiological Variables; Fetus; Pregnant Women; Basketball

1. INTRODUCTION

Physical and sports education is a necessary access to the health of the individual, as it is a vital requirement for everyone to prevent diseases. The acquisition of physical fitness for health

enables individuals to perform their duties in the fields of work and production. Scientists and specialized experts agree that the functional efficiency of the body's organs is one of the most important goals of fitness for individuals in society, and that the diseases of lack of movement and lack of physical activity may directly affect the health of the individual. Aerobic exercises are necessary and important for team sports players, because of their importance in raising the level of physical and physiological efficiency, in addition to the fact that they do not require a high degree of physical abilities and special skills or special capabilities or tools (Ismail, Abul-Magd & Shaalan, 1989).

The term aerobic exercises have become used in relation to the nature of the system on which the muscle depends to produce the energy needed for muscular work. It is part of the necessary physiological processes, so there are two main processes, namely, the process of oxygen transfer, where the respiratory and circulatory system carry out the task of transporting oxygen to the muscles, and the other process is for the muscles to consume up to oxygen to produce energy (Abdel-Fattah & Shaalan, 1997).

The importance of aerobic exercises for basketball players emerges from being an indicator of the players' condition during the training season, as their use during training leads to completely different physiological changes because of their continued performance for a long period. Aerobic exercises in which the workload falls on the respiratory circulatory system, and they require a longer period of time to perform (more than three minutes), are characterized by their effectiveness and adaptation of the heart muscle to pump a larger amount of blood, and adaptation of the respiratory system to work more efficiently. Aerobic exercises also depend on the circulatory system. The respiratory system supplies oxygen to the working muscles and getting rid of various chemical products (Hussein, 1990).

As we know, basketball is one of the sports in which training aims to benefit from the adequate amount of oxygen through physical exertion, as oxygen is an essential factor in energy production, and the body's efficiency in consuming oxygen is one of the basic necessities in the game of basketball. Given the importance of aerobic exercises in basketball training for young players and their impact on some physiological and physical variables, the researcher saw the need to conduct such a study to identify the effect of the proposed aerobic exercises on the shape and size of the fetus in young basketball players as an indicator of some physiological variables for female basketball players.

The importance of the current research lies on the attempt to identify the effect of the proposed aerobic physical exercise on the shape and size of the fetus as an indicator of some

physiological variables for female basketball players. Within the researcher's knowledge, there is no in-depth local scientific study that has analyzed these data and enriched it in its details, despite their vitality and the depth of their repercussions on the lives of basketball players and the fetus.

It is not believed that exercise has any negative effects on the shape and size of the fetus, nor is it believed that it negatively affects the growth of the fetus. However, some studies indicate that exercising in moderation from the early stages of pregnancy leads to the birth of heavier and larger children. Accordingly, the research problem is determined in the following question: Does the proposed aerobic exercises affect the shape and size of the fetus as an indicator of some physiological variables for women practicing basketball?

The research aims to identify the effect of the proposed aerobic exercises and their impact on the shape and size of the fetus, also the percentage of the contribution of some of the studied physiological variables and their impact on the shape and size of the fetus among female basketball players. Accordingly, the researcher formulated the three study hypotheses as follows:

H_1: There are statistically significant differences for the proposed aerobic exercises between the pre- and post-tests, in favor of the post-test for the experimental group.

H_2: There are statistically significant differences for some physiological variables under study and in favor of the post-test for the control group.

H_3: There are differences in the percentage of the contribution of some physiological variables under study and their effect on the shape and size of the fetus among female basketball players.

2. METHODS

2.1. Study Design and Participants

The researcher used the experimental method in the manner of the two experimental and control groups, due to its suitability to the nature of the research.

The study population represented 10 pregnant married basketball players, whose ages ranged from 25-26 years. They were chosen in a deliberate manner from three governorates (Al-Diwaniyah, Babil and Wasit). After making sure that their bodies are free from all chronic diseases, the main experiment was conducted after 30 days of pregnancy in order for the woman's body to be able to bear the burden. The sample was randomly divided into two groups (experimental group = 5 members, control group = 5 members). The members of the experimental group implemented the training units of the program proposed by the researcher, while the members of the control group

implemented the traditional training programmed units. Table 1 shows the results of the equivalence of the sample members in the tribal measurement.

Table 1. Equality of the sample members

Variables	Measuring unit	SMA	SD	df	t	*p*
Height	Poison	172.12	0.16	16	1.56	0.015
Weight	Kg	86.45	0.04	15	1.28	0.014
Age	Year	25.6	0.53	16	1.87	0.017
Training age	Year	4.2	0.24	16	1.12	0.018
Pregnancy duration	Day	32	0.00	16	1.95	0.087

Note: SMA (Simple moving average); significance level at 0.05

Next, Table 2 shows the homogeneity of the sample. The values of the skew coefficient for all variables ranged between 0.197-0.789, and were limited to (+3, -3), which indicates the homogeneity of the sample members in all the physiological variables under study.

Table 2. Homogeneity of the research sample

Physiological variables	Measuring unit	M	SD	Skew modulus	Mediator
pulse rate	n/ s	67,20	2,96	0,510	68,00
systolic blood pressure	mm g	122,50	9,66	0,559	120,00
diastolic blood pressure	mm g	79,65	2,71	0,202	79,50
vital capacity	mL	4650,50	63,12	0,462	4500.00

2.2. Study Tools

The study tools were: sources and the international information network, personal interviews for married female basketball players; a medical team equipped with imaging devices to examine the fetus inside the examination hall; analyzes and television scans of the size and shape of the fetus for the Baghdad Laboratory for Pathological Analysis located in Al-Diwaniyah Governorate, and devices for measuring blood sugar, pressure, and heart rate; basket balls for the proposed program; sports equipment for fitness and weight loss (center in Al-Diwaniyah Governorate, District, Al-Hamza, Al Sharqi).

2.3. Study Measurements

The study measurements were: Pulse rate (z/s); Systolic and diastolic blood pressure (mmHg); Vital capacity of the lungs (ml).

2.4. First Exploratory Experience

The exploratory experiment and the basic experiment for the research were conducted and consisted of 6 sessions for a period of 2 weeks for 3 days a week. Then, we took the average of the pre and post measurements for that period.

The exploratory experiment was conducted on 5 sample members of the research community. The experiment aimed to: 1) Ensure that the equipment and tools used are valid. 2) Ensure the validity of the place for training the sample members. 3) Ensure that the measurements and tests are appropriate for the sample members. 4) Recognize the organizational method during measurements and tests. 5) Identify the time distribution of measurements and each training unit.

2.5. Second Pilot Experiment

The second exploratory study was conducted on 5 players from the same research community, to extract the scientific coefficients of the tests used in the research.

2.6. Validity and Reliability of the Tests

The researcher calculated the test reliability coefficient by applying the tests under study, then re-applying the same tests to the same sample for a second time (retesting) using the simple correlation coefficient and extracting self-honesty (Table 3).

Table 3. The coefficient of reliability and validity of tests for female basketball players

Measurements and tests	The validity of the test	Test stability coefficient
Pulse rate	0,972	0.945
Systolic blood pressure	0,947	0,898
Diastolic blood pressure	0.967	0,936
The vital capacity of the lungs	0,956	0,914

NOTE: tabular value (t) = 0.878; significant level at 0.05

There is a statistically significant correlation between the first and second tests (t = 0.885 - 0.962), indicating the stability of the measurements and tests used in the research, and the self-validity of the measurements and tests was extracted. This confirms the validity and reliability of the measurements and tests used in the research.

The apparent honesty was calculated consulting with 10 arbitrators from universities and in the field of physical education and sports training. The proposed program was distributed to them to express their opinions about it and to retrieve opinions from the arbitrators (Table 4).

Table 4. Expert opinions on the proposed program

Unit components	Target	The explanation	Training time	Approval rate
Warm up	Preparing the various body systems for physical exertion.	Walking at a regular pace – light run – athletic walk – General activation movements of the arms, legs, and torso.	2NS	90%
Arm exercises	Strengthening the muscles of the arms, flexibility of the joints, lengthening the ligaments, and strengthening the shoulder girdle.	rotations – weights-	3NS	80%
Leg exercises	Strengthening the muscles of the legs, their flexibility, and the flexibility of the joints and related ligaments.	He walked- light run – partridge – Bounce in different places and directions – Rope jump and partridge.	3NS	100%
Trunk exercises	Strengthening the core muscles and flexibility of the column backbone.	bend the torso – rotations in an all directions.	3NS	80%
Abdominal exercises	The lumbar part of the spine, with attention to fixing the pelvic position and moderation.	(Arms resting aside) Raise the legs up, aside to touch the fingers. (Arms lying high) Lift the torso in front.With the knees bent and tightened, the legs should be raised and lowered alternately. The repetition of long sitting	4NS	80%

Unit components	Target	The explanation	Training time	Approval rate
		than lying alternately.		
Recreational games	Develop general endurance, develop team spirit. Activate the mind and attention.	Basketball passing and shooting and quiet recreational games with and without tools.	4 NS	90%
Conclusion	Restore blood circulation, respiration, and body organs to their normal state	General calming and relaxation exercises	1 NS	90%
Total	Variety in physical and promotional activities (Mediumload)		20Accurate	100%
	Activity			
The first	Physical and recreational activities (Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.		Tuesday	90%
	Physical and recreational activities (Table 3) 20NS Then walk and run in the place at a moderate intensity for a period 15th NS.		Friday	90%
	Physical and recreational activities (Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.		Sunday	90%
The second	Physical and recreational activities (Table 3) 20NS Then walk and run in the place at a moderate intensity for a period 15th NS.		Tuesday	90%
	Physical and recreational activities (Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.		Friday	90%
	Physical and recreational activities (Table 3) 20NS Then walk and run in the place at		Sunday	90%

Unit components	Target	The explanation	Training time	Approval rate
	a moderate intensity for a period 15th NS.			
Rationing	An average load of between 50% Even less from 75% By calculating the pulse, the maximum performance for each exercise, at a rate of 110 Even 150 a beat/ Accurate.			100%

Through the previous table, the experts' opinions were ratified so that the researcher would be satisfied with 70% or more, so that the program would be in its final form. The program included physical exercises for the muscle groups and joints of the body, in addition to a set of walking and running units (Tables 5 and 6).

Table 5. A model of the primary physical and recreational activities units

Unit components	Target	The explanation	Training time
Warm up	Preparing the various body systems for physical exertion.	Walking at a regular pace – light run – jogging – General activation movements of the arms, legs and torso.	2 NS
Arm exercises	Strengthening the muscles of the arms, flexibility of the joints, lengthening the ligaments, and strengthening the shoulder girdle.	rotations –weights-	3NS
Leg exercises	Strengthening the muscles of the legs, their flexibility, and the flexibility of the joints and related ligaments.	He walked- light run – partridge – Bounce in different places and directions – Rope jump and partridge.	3NS
Trunk exercises	Strengthening the core muscles and flexibility of the spine.	bend the torso – rotations in all directions.	3NS
Abdominal exercises	The lumbar part of the spine, with attention to fixing the pelvic position and moderation.	(Arms resting aside) Raise the legs up, aside to touch the fingers. (Arms lying high) Raise the torso forward with the knees bent and tightened Raising and lowering	4NS

Unit components	Target	The explanation	Training time
		the legs alternately Repeating long sitting from lying alternately.	
Recreational games	Develop general endurance, develop team spirit. Activate the mind and attention.	Basketball passing and shooting, and quiet recreational games with and without tools.	4 NS
Conclusion	Restore blood circulation, respiration and body organs to their normal state	General calming and relaxation exercises	1 NS
	Variety in physical and (Medium load)	promotional activities	20Accurate

Table 6. The proposed aerobic exercise program for application to the research sample

Activity	Weekdays	The week
Physical and recreational activities (Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.	Tuesday	The first
Physical and recreational activities (Table 3) 20NS Then walk and run in the place at a moderate intensity for a period20NS.	Friday	
Physical and recreational activities (Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.	Sunday	
Physical and recreational activities (Table 3) 20NS Then walk and run in the place at a moderate intensity for a period20NS.	Tuesday	The second
Physical and recreational activities(Table 3) 20NS Then the walking program in the place with moderate intensity 5 s and repeats 3 times after rest 2NS.	Friday	
Physical and recreational activities (Table 3) 20NS Then walk and run in the place at a moderate intensity for a period20NS.	Sunday	

Suggested cardio exercises: By pulse (experts judged on it).

- Training load: Average load intensity ranging from 50% to less than 75% by pulse calculations. Maximum performance for each exercise at a rate of 110 to 150 beats/min.
- Physical comfort: Positive rest in which the load intensity ranges from 10% - 20% of the

maximum exercise load and so that the pulse does not exceed 120 beats / minute.

- Performance speed: It is performed according to the target pulse level of each woman participating in the program. The pre-measurements were taken in the morning, 3 hours after breakfast, at 10 am, then the post-measurements were taken after performing the main tests prepared by the researcher and specified in the date of their performance.

2.7. The Main Experience

Tested and measured In Iraq, at the Center for Fitness and Weight Loss in the province of Diwaniyah, District, Hamza, Sharqi, from 12/1/2020 to 12/14/2020, the proposed aerobic exercises prepared by the researcher were applied.

2.8. Statistical Analysis

The research data was processed through the Statistical Package for the Social Sciences (SPSS). The following statistical analyses were performed: descriptive, correlation coefficients, t test, and coefficient of skewness. For all the statistical tests, a p-value of <0.05 was considered statistically significant.

3. RESULTS

We begin the presentation of the results by showing the differences between the two measurements (tribal and remote) of the experimental group in the studied physiological variables (Table 7).

Table 7. The differences between the two measurements (tribal and remote) of the experimental group in the studied physiological variables.

Research variables	Tribal Measurement		Telemetry		t	p
	P1	Q1	P2	Q2		
Pulse rate	0.88	67.87	1.00	66.09	12.25	p < 0.05
Systolic blood pressure	3.06	121.41	6.99	119.40	3.52	p < 0.05
Diastolic blood pressure	1.52	78.90	0.97	78.40	1.21	p > 0.05
Vital capacity	34.96	4800	39.44	5400	12.47	p < 0.05

Note: Tabular T-value = 2,262

It is evident from Table 7 that there are statistically significant differences between the two measurements (the tribal and remote measures), in the physiological variables in favor of the post measurement ($p < 0.05$), while the results showed that there were no statistically significant differences in the diastolic blood pressure ($p > 0.05$).

Regarding the differences between the tribal and remote measurements of the control group in the studied physiological variables, there are no statistically significant differences between the pre- and post-measurement in all the studied physiological variables ($p > 0.05$) (Table 8).

Table 8. The differences between the tribal and remote measurements of the control group in the studied physiological variables.

Research variables	**Tribal Measurement**		**Telemetry**		**t**	**p**
	P1	**Q1**	**P2**	**Q2**		
Pulse rate	0.96	67.92	0.95	67.90	1.177	p > 0.05
Systolic blood pressure	6.79	120.7	6.02	120.2	0.231	p > 0.05
Diastolic blood pressure	1.74	78.91	1.67	87.71	1.530	p > 0.05
Vital capacity	54.06	4750	34.96	4800	0.361	p > 0.05

Note: Tabular T-value = 2,562

Next, we present the results of the dimensional measurements of the experimental and control groups for the studied physiological variables.

Table 9. The difference between the experimental and control groups in the post-measurement of physiological variables and blood components.

Research variables	**Control group**		**Experimental group**		**t**	**p**
	P1	**Q1**	**P2**	**Q2**		
Pulse rate	0.96	67.82	1.08	66.09	7.324	p < 0.05
Systolic blood pressure	4.39	119.70	5.10	117.60	4.197	p < 0.05
Diastolic blood pressure	1.71	78.60	1.51	87.40	1.500	p > 0.05
Vital capacity	34.96	4800	34.44	5400	12.47	p < 0.05

Note:** Tabular T-value = **2,101

It is evident from Table 9 that there are statistically significant differences between the experimental and control groups in the physiological variables (pulse rate, systolic blood pressure, and vital capacity) in favor of the experimental group ($p < 0.05$), while the results showed no statistically significant differences in diastolic blood pressure ($p > 0.05$).

Regarding the differences in the order of the first axis's phases (the shape and size of the fetus) in light of the contribution of some physiological variables to the sample, there are significant differences between the responses of the research sample on a three-way estimate scale (;ess than normal, normal, above normal) ($p < 0.05$). There are also differences in the percentage of contribution and impact of some physiological variables under study in length and baby weight after birth (Table 10).

Table 10. The differences in the order of the first axis's phases (the shape and size of the fetus) in light of the contribution of some physiological variables to the sample

Direction of the significance of the statistical differences	**Calculated Ca value**	**Top Natural**		**Natural**		**Less natural**		**NS**
		%	**Repetition**	**%**	**Repetition**	**%**	**Repetition**	
Towards response higher than natural	279.44 *	70.00%	7	2.00%	2	10.00%	1	1
In the direction of the natural response	264.98 *	20.00%	2	6.00%	6	20.00%	2	2

Regarding the weight and height of the child after birth (fetal hemoglobin and blood pressure) in terms of the contribution of some physiological variables to the research sample, Table 11 presents the results.

Table 11. The weight and height of the child after birth (fetal hemoglobin and blood pressure) in terms of the contribution of some physiological variables to the research sample.

Labs skewness	**Mediator**	**SD**	**Mean**	**Measuring unit**	**Variables**
0.070	42.000	3.957	4100	Kg	Weight fetus
2.517	50,000	1.785	49.957	Poison	Length fetus
1.832	100,000	1.566	110	n / s	Pulse rate
1.639	110,000	1.751	115	mm g	Systolic blood pressure
2.112	70,000	1.315	75	mm g	Diastolic blood pressure
0.954	75,000	1.025	95	mL	Vital capacity (fetal hemoglobin)

All the convolution coefficients ranged from 0.070 to 2.517, indicating that is confined between (+3). This shows a moderate weight and length of the fetus under study.

4. DISCUSSION

The results of our study showed that there are statistically significant differences for the proposed aerobic exercises between the two tests (the pre- and post-tests), and in favor of the post test for the experimental group ($p < 0.05$). We refer to the statement of Abdel-Wahab (1995) that resting pulse is one of the most important indicators that show the extent of a person's general physical fitness, the larger the chambers of the heart and the greater the number and expansion of the arteries. The coronary arteries (which are responsible for supplying the heart with blood and thus with food and oxygen) are the better, the lower the resting pulse and the better the physical fitness.

This agrees with what Al-Basri (1987) mentioned, namely that the oxygen demand of the heart is lower at low pulse relative to effort than at high pulse. This is because the work of the heart is more economical at low pulse. Likewise, the period of diastole in the heart is relatively long in the heart of a trained athlete.

Regarding the comparison between the tribal and remote measurements of the experimental research group, there were statistically significant differences between the tribal and remote measurements in the physiological variables in favor of the post measurement ($p < 0.05$). Hussein (1990) mentions that the value of blood pressure drops during training from the normal limit. The heart responds to this decrease as a result of the increase in contraction, so the heartbeat speeds up from the normal limit that it was at the time of rest, as the blood pressure changes dramatically under the influence of sports training and this change is caused by the amount of blood paid per minute to cover the increased need for oxygen, because systolic pressure sometimes rises up to 200 mmHg.

As for diastolic blood pressure, there were no statistically significant differences in diastolic blood pressure ($p > 0.05$), and that diastolic blood pressure may rise or decrease slightly or remain unchanged during sports activity. These results agree with what Lamb (1987) stated that the changes accompanying physical activity do not cause high changes in diastolic pressure, but they tend to improve, so the value of diastolic pressure decreases after physical exertion in the pre and post measurements.

Regarding the differences between the pre and post-tests regarding the vital capacity of the lungs, there were statistically significant differences in the vital capacity of the lungs in favor of the post-test ($p < 0.05$). The researcher believes that this is due to the proposed aerobic exercises that the

research sample underwent, which led to an improvement in the respiratory system. This improvement is the result of an essential factor, which is an increase in the amount of blood expelled from the heart.

Relating the differences between some physiological variables under study in favor of the post-test for the control group, there were no statistically significant differences ($p > 0.05$).

As for the differences in the percentage of the contribution of some physiological variables under study and their effect on the shape and size of the fetus among female basketball players, there were statistically significant differences between the responses of the research sample on a three-way estimate scale (less than normal, normal, above normal) ($p < 0.05$). There were also differences in the percentage of contribution and impact of some physiological variables under study in length and baby weight after birth. Regarding the weight and height of the child after birth (fetal hemoglobin and blood pressure) in terms of the contribution of some physiological variables to the research sample, Table 11 showed a moderate weight and length of the fetus under study.

The researcher believes that the scientific explanation for the change in the shape and size of the fetus due to the proposed aerobic physical activity and the influence of some studied physiological variables, moderate intensity sports activity improves the overall health status and activates the metabolism process in the body, and regulates the secretion of insulin hormone in women and thus improves hormonal activity. The moderate intensity antenna increases the speed of blood flow to the fetus's body, thus increasing the delivery of oxygen and nutrients, which arrive through the placenta and then the umbilical vein or umbilical cord. The fetus flowing in the capillaries of the chorionic villi is poor in oxygen and nutrients, while the mother's blood entering the placenta is rich in nutrients and oxygen. The fetus in the chorionic villi, its spread from the mother's blood to the villi and from there to the fetus's blood, and aerobic exercises help to increase the amniotic fluid, which is a transparent fluid that tends to yellow in color that surrounds the fetus during pregnancy, and is located inside the amniotic sac, which allows the fetus to move within the uterus, helps the healthy growth of its bones, allows the lungs to grow properly, helps to stabilize the temperature around the fetus, prevent heat loss, and protects it from sudden external movements and shocks. In summary, researcher believes that the studied physiological variables unite in a common factor, which is flowing blood loaded with oxygen and food that meets the requirements for growth and cellular structure of the fetus. It spreads from the mother's blood to the villi and from there to the fetus's blood. Aerobic exercises also help to increase the amniotic fluid, which is a transparent liquid that tends to yellow in color that surrounds the fetus during pregnancy. It also helps in stabilizing the temperature around the fetus, preventing heat loss, and protecting it from sudden external movements

and shocks.

5. CONCLUSIONS

Within the limits of the research results and their interpretation, the following conclusions were reached:

- The medium intensity exercises of aerobic nature influence the shape and size of the fetus in women's basketball players.
- There is a clear effect of the proposed aerobic exercises on the growth, shape, and size of the fetus in female basketball players. This is what gives a clear impression of the role of pre-exercised and persevered physical effort, and its positive role as a catalyst in increasing the growth of the fetus and increasing its size by raising the efficiency of functional devices and some physiological variables and increasing the growth of the fetus among female basketball players.
- The proposed training program using aerobic exercises had a positive effect on some physiological variables (pulse rate, systolic blood pressure, vital capacity) for young basketball players.
- The effect of the proposed training program using aerobic exercises on some physiological variables for female basketball players, contributed to an increase in fetal growth for female basketball players.

6. RECOMMENDATIONS

Based on the results of our study, we recommend the following:

- Applying the proposed aerobic exercises to pregnant female athletes because of their positive effects on the physiological variables, which results in the effect on the shape and size of the fetus.
- Awareness of the importance of sports before and during pregnancy with moderate intensity for the benefit that accrues to her and the fetus.
- Preparing other sports programs to raise awareness and guidance for new mothers and fathers about the importance of exercise and the depth of its health, psychological and social benefits, whether on the fetus, mother, or family.
- Increasing attention to the role of the media in the process of raising awareness of the importance of sports activity for the mother during pregnancy and its effects on the shape and size of the fetus, and its role in the growth of the fetus.
- Encouraging researchers to conduct other studies dealing with physiological and chemical variables that affect the shape and size of the fetus, which were not covered by the current research.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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