



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 4.69
IJPESH 2015; 2(1): 33-36
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www.kheljournal.com
Received: 30-06-2015
Accepted: 01-08-2015

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Study of some physiological responses associated with performance on trampoline of Youth female Gymnasts in Aurangabad city

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Abstract

Purpose: To study of some physiological responses associated with performance on trampoline of youth female gymnastics in Aurangabad city through pre and post measurements in variables under study.

Methodology: The experimental method was used of achieve the study objectives. The study sample included 11 females, they play gymnastics in M.S.M. College of physical education at Aurangabad city.

Results: The study showed that there are differences between the pre and post measurements for some physiological responses associated with performance on trampoline, it showed marked increase in physiological variables in post measurement in pulse, systolic blood pressure, while there are marked decreases in physiological variables in post measurement in diastolic blood pressure, temperature and vital capacity after performance on trampoline.

Keywords: Physiological responses, Trampoline, Gymnasts.

1. Introduction

Gymnastics is one of the most popular sports of the Olympic Games. Athletes, with or without the accompaniment of music and only with their body or with the use of apparatus, perform a series of exercises where art and sport coexist, thereby attracting millions of fans. The program of the Olympic Games includes artistic gymnastics for men and women, rhythmic gymnastics and trampoline individual for men and women. (Mohammed, M., 1982) ^[11].

Each sports activity characterized by particular requirements differ from other sports activities, these requirements commensurate with sports activity skills practitioner, physiological variables are the most important indicators that are associated with much of facts relating with loads, periods and methods of training. (Thoraya, N. A., 2001) ^[18].

The success in the sport of gymnastics depends on the availability of high level of physical attributes and physiological, anthropometric characteristics that develop high growth rate, particularly in the selection of the gymnast, where it helps the player to master and achieve success in perform of gymnastics skills. (Hatem, A. H. and Ahmed, A. M., 1999) ^[5].

Determine physiological variables before, during and after the effort in the rest periods and during training is the basis for rationing of training load, so it must study organs vital function of the body such as respiratory system and circulatory system that in during and after the effort for recognize to physiological responses and variables that occur to athletes, which through it determine the physiological readiness for athletes and that enables him to exploit his energies and abilities to the fullest. (Mathews, D. K. and Fox, E. L., 1976) ^[9].

The coach must be know and understand the various functions of body organs, this is enable him to determine training load components to achieving high levels for athletes. (Thorlund, J. B. and *et al.*, 2008) (Zebis, M. and *et al.*, 2011) ^[20]

Continue to practice regular training leading to the occurrence of some physiological variables to body's systems that enable the player to adapt with specialist physical activity. Practice physical activity with Regularity in the sports training leads to the development of the work of circulatory and respiratory systems so that adapts to the requirements of physical effort and thus lead these physiological variables to significantly improve the level of performance and enables the player to perform his training duties and long time. (Farouk, A., 2007) ^[4] (Mohammad. H. A. and Abou Al-Alaa, A., 1987) ^[10]

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Trampoline gymnastics is a competitive sport with more than one million officially active Athletes worldwide and has been an Olympic discipline since 2000. It is also a popular leisure activity and is being employed as a training method in various other sport. (Kidgell, D. J. and *et al*, 2007) [8]

To date, research on competitive trampoline gymnastics is sparse and consists mainly of studies on injuries associated with trampoline jumping or the application of trampoline training as part of a rehabilitation strategy. (Sukeik, M. and Haddad, F. S., 2011) [17] (Aragao, F. A. and *et al*, 2011) [3]

Official trampoline competitions consist of preliminary round of two, approximately 40 s long, routines preceding a final routine. The routines are initiated by explosive start-jumps in order to achieve an optimal height, followed by the functional variables before, during and after exercise, it is valuable to determine functional fluctuations in during a trampoline gymnastics competition. (Mohr, M. and *et al*, 2004) [13]

Since all the jumps are maximal or near maximal dynamic explosive contractions, the metabolic load is expected to be high and potential neuromuscular fatigue may develop during the trampoline routines, which has been demonstrated in sports characterized by a high number of explosive jumps and landings. (Mohr, M., and Krustup, P., 2013) [14]

The high number of maximal jumps and landings in trampoline gymnastics include powerful eccentric contractions, and muscle damage may occur, which for example has been shown after drop-jumps, this may negatively affect performance in the last stage of the competition, and may also affect the recovery process after competition and training. (Kamandulis, S. and *et al*, 2011) [7]

Monitor the pulse, blood pressure and respiratory rate are benefit in making training effective and influential, there certain points are taken into consideration before using this rate as the level in the evaluation of training and that this rate index for the effort of athletes and can be used to evaluate the training, the pulse is most important measurements in built the training programs, there are factors effect on pulse such as sex, age, body position, temperature, agitation psychological, physical exertion. (Mowaffaq, A., 1990) [15] (Amira, A. M., 2007) [2]

Vital capacity is measure the ability of respiratory system to supply the body by oxygen during physical effort, they are one of the most important measurements which refers to incident physiological adaptation of result practice of regular physical activity. They are highly skilled performance that requires long periods of time. In addition to that they reflect the efficiency of the sports physiological the players who have vital capacity for become of athletes at a high level and are making significant progress in those activities. (Mohammed, S. H., 1984) [12]

There are some physiological variables such as pulse, blood pressure, respiratory rate and vital capacity on player efficiency physical according to training load reality on body organs, competition time, the speed of movement player, playground, number of players and other factors play a significant role in sports performance.

Through what mentioned above crystallized research problem in being scientific study to develop performance on trampoline of youth female gymnasts in Aurangabad city according to physiological variables under study.

1.1 Hypothesis

There are statistically significant differences between the pre and post measurements means in some physiological responses associated with performance on trampoline of youth female gymnasts in Aurangabad city.

1.2 Objective of study

The present study seeks to study of some physiological responses associated with performance on trampoline of youth female gymnasts in Aurangabad city, for the development of training level process and benefit in making training effective on trampoline and commensurate with the functional capacity of youth female gymnastics.

2. Methodology

The study used the experimental method because it is appropriate for achieving the objectives of study.

2.1 Experimental design

To examine activity patterns, physiological demands and fatigue patterns in trampoline gymnastics, a simulated 20 jumps on trampoline was conducted, then assessed performance on trampoline through pre and post measurements for some physiological responses under study.

2.2 Sample of Study

The study sample was selected purposely from the youth female gymnasts in Aurangabad city, It included 11 females, They play gymnastics in M.S.M. college of physical education at Aurangabad city.

Table 1: Homogeneity of study sample in some growth rates (Age, height, weight) (N =11)

Variables	Unit	Mean	S.D	Skewness
Age	Year	10.36	1.567	0.022
height	Cm	131.45	10.289	0.972
weight	Kg	26.18	6.030	1.168

The table no.(1) shows there are not statistically significant differences in mean and skewness between the sample of study in (age, height, weight) they were limited to the value of skewness between (-3,3+) which indicates the homogeneity of the sample of study.

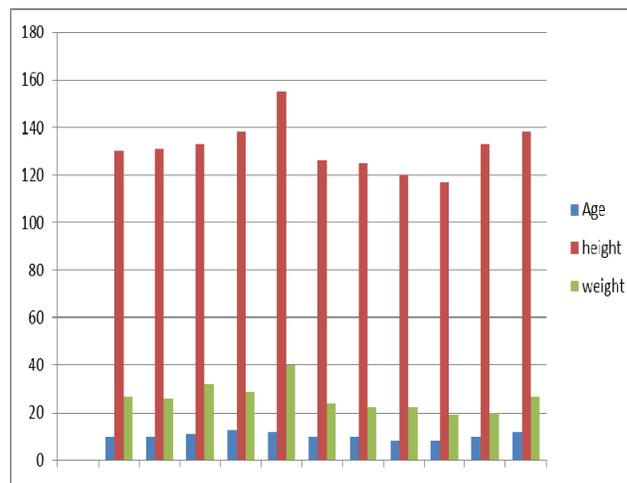


Fig 1: shows Homogeneity of study sample in some growth rates (Age, height, weight) (N =11)

2.3 Tools of Measurements for Data Collection:

1. Stadiometer apparatus to measure height (cm).
2. Electronic weighing machine to measure weight (kg).
3. Sphygmomanometer to measure blood pressure (mmHg).
4. Spirometer to measure vital capacity (ml).
5. Thermometer to measure body temperature (°C)

2.4 Statistical analysis

Used statistical package social science SPSS package:

1. Mean
2. Standard deviation

3. Skewness
4. T.test.

3. Results and Discussion

Table 2: mean, SD and T.test of Pre and Post measurements in physiological responses under study (N =11)

Variables	Pre		Post		Mean Difference	T.test	Significance
	Mean	S.D	Mean	S.D			
Pulse	85.82	9.358	104.18	8.220	-18.364	-9.197	0.000
Systolic blood pressure	97.18	6.853	106.36	7.201	-9.182	-7.769	0.000
Diastolic blood pressure	68.00	6.116	61.09	3.015	6.909	3.891	0.003
Temperature	37.35	.386	37.26	.301	.082	0.737	0.478
respiratory rate	26.73	2.867	38.27	3.438	-11.545	-17.714	0.000
vital capacity	1586.36	453.371	1209.09	417.024	377.273	9.688	0.000

The table no. (2) Shows that the level of significance at 0.05, this confirms the hypothesis of study there are differences between the Pre and Post measurement in physiological responses under study.

There are marked increase in mean of physiological variables in post measurement in pulse (104.18), systolic blood pressure (106.36), respiratory rate (38.27) after performance on trampoline. While there are a decrease in mean of physiological variables in post measurement in diastolic blood pressure (61.09) and vital capacity (1209.09) after Performance on Trampoline, also marked decreases occurred in temperature (37.26) in periods of the performance, which is likely to negatively affect jump performance during the trampoline routines.

This finding corroborates many studies such as that of Peter, J. and *et al* (2013) [16], Ahmed, A. M. (2001) [1] and Ikram, M. A. (1989) [6] that confirmed there are statistically significant differences in physiological variables in circulatory system and respiratory system between pre and post measurements in athletic performance, whether in competition or training.

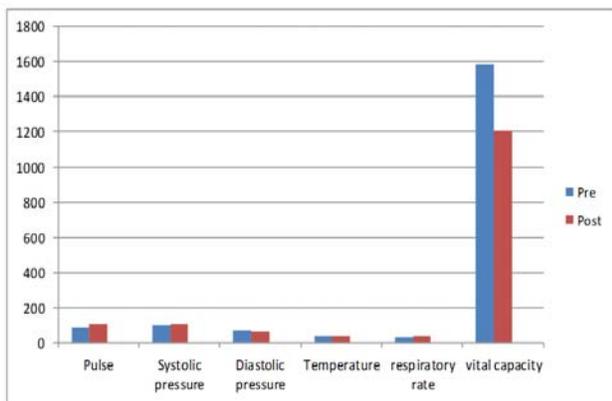


Fig 2: Mean difference between Pre and Post measurements in physiological responses under study (N =11)

4. Conclusions

1. Marked increase in mean of physiological variables in post measurement in pulse, systolic blood pressure, respiratory rate after performance on trampoline.
2. Marked decreases in mean of physiological variables in post measurement in diastolic blood pressure, temperature and vital capacity after performance on trampoline.
3. Reduction in jumping time in the first ten jumps and not the last ten, may reflect the fact that the initial jumps are the most demanding ones in which the gymnasts tries to achieve an optimal height prior to the functional sequences.

5. Recommendations

1. Recognize functional efficiency variables of performance on gymnastic trampoline in order to pursue the development of performance.
2. Necessity to recognize some physiological variables pre and postperformance to help the coaches in training rationing.
3. Inference by physiological measurements in selection process of youth players.
4. Due attention to studying of physiological variables associated with performance in other sports activities, whether in training or competition.
5. Disseminate sports awareness of all the people through the media to get to know what sports activities earns for the body of the health of the improvement in the functional efficiency of all the vital organs of the body.
6. Attention to design functionality efficiency card for all athletes in various sports activities in order to recording physiological measurements and periodic changes in it.

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