

The effect of physical activities on physiological health in older women (60-65 years)

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Abstract :

The aim of this research is to study the effect of physical activities on health related to physiological parameters in older women, whose age is 63.25 ± 2.24 . To achieve this objective, the researcher has used the experimental method. The sample was chosen randomly and was composite from 25 women who made the proposed program of training for period of three months and were tested in 02 occasions before and after a program of training. The results obtained showed a significant difference between the first and second test relative to physiological elements such as the systolic blood pressure, diastolic blood pressure and cardiac frequency but regarding to blood sugar level there was no significant difference between the two tests. We concluded that the physical activity has beneficial effects on health of elderly women.

Article info

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1. Introduction

Aging is a development process in which man must evolve and adapt. To evolve, to continue to invest life in a changing body and adapt, to take this necessary step back to accept the outcome of a lifetime (Dejardin & Convolte, 2017, pp. 27-32).

Aging refers to all physiological and psychological processes that alter the structure and functions of the body over time. It is accompanied by a decrease in the functional capacity of the body, leading to a reduction in its ability to adapt to situations of aggression. This functional reduction varies greatly from one organ to another and, at the same age, the impairment of a given function varies greatly from one elderly individual to another (Rivière, 2015, p. 547).

Well-being and quality of life are the primary concerns of seniors. In general, quality of life is a function of autonomy and functional ability. It is therefore important to promote both to ensure a good quality of life (Palazzolo & Quaderie, 2015, pp. 115-120).

Indeed, autonomy is the ability to carry out activities of daily life without outside help. Without this autonomy, the elderly experience a significant loss of quality of life (Duclos, 2017, pp. 9-15). Functional capacity is therefore a major factor in maintaining the autonomy of the elderly and thus contributes to quality of life (Gill, Dorothy, & Gottschalk, 2002).

However, to cope with these changes, physical activity is recognized as a non-drug therapy by the High Health Authority (HAS) following the decrease seen delaying the effects of aging and increasing life expectancy without disability (Carre & Thillaye, 2017, p. 74).

Physical activity therefore plays an important role. They are either part of a primary prevention axis to accompany aging «Successful Aging», or in a tertiary prevention axis and therapeutic management or in an axis to maintain the autonomy of fragile people (Bouaziz W. , 2017, p. 214).

Several studies have shown that regular and moderate physical activity, at least 3 hours a week, significantly improves health-related fitness by reducing the risk of death by 46%. The same applies to the prevention and control of certain diseases and the reduction of the impacts of their symptoms (Borsa, 2019, pp. 25-35).

It is with this in mind that the present study intends to test the effects of physical exercise on certain parameters of physiological health in the elderly and to check whether regular physical activity can constitute a natural and less expensive solution to old age disorders. As such, the main question of this research is summarized as follows:

What is the effect of physical activity on physiological health in older women (60-65 years)?

From the main question derive three sub-questions which are the following:

- How the physical activities impact the blood pressure in older women?
- Did physical activities regulate Heart Rate (HR) in aging women?
- Does level of blood sugar change when older women practice sport?

Title The effect of physical activities on physiological health in older women (60-65 years)

So many questions that deserve to be fully addressed in order to answer them, because the scarcity of research and the lack of knowledge of this physiological phenomenon leaves the subject topical and deserves to be discussed at every opportunity.

The hypothesis is a provisional answer to the research problem; it predicts the relationship between two or more phenomena. It is an assumed answer to the original question. It is defined as "a provisional explanation of the nature of the relationship between two or more phenomena. The scientific hypothesis must be confirmed or invalidated by the facts" (Grawitz, 2000, p. 211).

Our research aims to address the following hypotheses:

- The physical activities reduce and stabilize the index of blood pressure in older women.
- The physical activities regulate the heart rate in aging women.
- The level of blood sugar can improve with sports practice in older women.

According to Grawitz Madeleine, "the starting point of a science lies in man's willingness to use his reason to understand" (Grawitz, 1990, p. 17).

So our main objective of the present research is to know the impact of the physical activity on physiological parameters health in older women. The purpose is to provide more clarity to adults and specialists, specifying the different physiological changes that accompany the aging and how to protect their health by practicing sports.

To achieve this objective, we use the experimental approach to verify the validity of the hypotheses that have been formulated.

2. Procedural definition of the concepts mentioned in the research:

Physical activity: it is defined like any body movement produced by the contraction of skeletal muscles resulting in an increase in energy expenditure above the rest expenditure. It includes both professional and everyday activities and structured (particularly sports) and informal leisure activities (Rivière, 2014, pp. 25-33).

The researcher concludes that the physical activity is therefore the set of movements performed by the human body using muscle contraction.

Physiological parameters: It is the set of elements that allows us to measure the physiological capacities of an individual, namely: Heart Rate, Systolic blood pressure, Diastolic blood pressure and blood sugar level.

Elder women: the World Health Organization (WHO) considers age 65 and over as a criterion for defining an elderly person. While another social definition uses the age of retirement (the retirement age), which amounts to entering old age at age 55-60 (Duquense, 2011, p. 278).

The researcher concludes that seniors are individuals who undergo physiological and psychological changes that affect their physical, mental and psychological needs.

Health: it is defined by the WHO as a complete state of physical, mental and social well-being, and does not consist only in the absence of disease or infirmity (Yankhoba, 2019, p. 280).

The researcher concludes that health can be defined as the smooth functioning of the body over a period of time.

Aging: it refers to all physiological and psychological processes that alter the structure and functions of the body over time. It is accompanied by a decrease in the functional capacity of the body, leading to a reduction in its ability to adapt to situations of aggression (especially acute pathologies) (Belmin & al, 2016). This functional reduction varies greatly from one organ to another and, at the same age, the impairment of a given function varies greatly from one elderly individual to another (Paillard, 2009, p. 189).

The researcher deduces that aging is any functional change that progressively impairs a person's ability.

3. The methodological procedures used in the study:

3.1- Method and tools:

Method and tools: it is the road leading to the desired goal or the invisible thread that pulls the research from its beginning to the end in order to reach certain results.

3.2- Study variable:

The independent variable: Physical activity.

The dependent variable: Physiological parameters on older women.

3.3- Approach used:

In our study, we relied on the experimental approach of one group in two occasions (pre/post test) and this is to suit the nature of the subject as it allows us to verify the validity of the hypotheses that have been formulated, and is defined as an objective observation of a particular phenomenon in the field of sports that occurs in a particular situation and includes one or more variables while proving other variables.

The researcher used a group of women who were tested twice time:

First time, before the experience, this means before applying the training program. Second time, after applying the training program for three months.

3.4- Sample:

The sample was chosen from a group of 25 older women who practice sport on stadium of Zeralda who were 63.25 ± 2.24 years old. This group of women practiced sports twice a week with an hourly volume of three hours. These women followed a program for three months. The characteristics of the sample are shown in Table 1. The subjects assured us that they were not taking any medication, exogenous supplements or other substances that could affect the balance of the body during this study. The subjects were informed about the experimental procedures and that the data from the study will be collected in a confidential and anonymous manner. Each woman was informed about the purpose of the study and gave her consent.

Table 1: Sample characteristics (mean: (M) $\pm$ standard deviation (SD))

Number of subject	Age (year)	Weight (kg)	Size (m)	IMC(kg/m ²)
25	$62,24 \pm 1,96$	$78,72 \pm 9,08$	$1,62 \pm 0,06$	$29.77 \pm 2,93$

Source: Table made by author's

3.5- Limitations of the study:

Title The effect of physical activities on physiological health in older women (60-65 years)

The research was carried out within the following areas:

- Study community: in our study, the study community represents twenty five aerobics women of the stadium of Zeralda.
- Spatial domain: Experimental research was carried in the basketball hall of the Omni-sport of zeralda in the Wilaya of Algiers.
- Time scope: The research was carried out from December 2021 to March 2022.

3.6- Materials:

In our study, the practicing underwent physiological testing on two separate occasion's before and after program, using blood pressure meter, glucometer, stopwatch and assistants.

3.7- Scientific foundations of the tool:

To verify the usability of the tools, we proceeded to ensure the reliability and validity of the tests proposed in our research.

3.7.1- Reliability:

To check the reliability of our tests (Table 02), we proceeded to calculate the correlation between the pre and post tests.

Table 2: Correlation results between pre/post tests

Designation	Number (N)	Degree of sig	Pearson's Correlation	Sig	Signification
Cardiac Frequency	10	0,05	0.997	,000	Significant
Systolic blood pressure	10	0,05	0,996	,000	Significant
Diastolic blood pressure	10	0,05	0,999	,000	Significant
Blood sugar level	10	0,05	0,970	,000	Significant

Source : Table made by author's

The analysis of the table above shows a Pearson correlation coefficient that varies between 97% and 99%. This means that there is a strong correlation between the pre and post tests, so we conclude that our tests are reliable and can be applied in our study.

3.7.2- Validity:

To check the validity of our tests, we will proceed to calculate the root of the correlation coefficient between the pre and post tests.

Table 3: Presentation of the validity results of the pre/post tests

Designation	Sig	Reliability	Validity	Signification
Cardiac Frequency	0,05	0.997	0,998	Significant
Systolic blood pressure	0,05	0,996	0,997	Significant
Diastolic blood pressure	0,05	0,999	0,999	Significant
Blood sugar level	0,05	0,970	0,984	Significant

Source : Table made by author's

The analysis of the table above shows a validity coefficient that varies between 98% and 99%. This means that our tests are valid and can be applied in our study.

3.8- Statistics tools:

For descriptive statistics, we calculated the mean and standard deviation. For the analytical statistics, we used the Student's "T" test for two dependents samples. The calculations were made using the SPSS "24" and Excel 2013 software. The significance level used was $p < 0.05$.

4. Presentation and Analysis of Results:

The different results of the physical tests are reported in Table N°04 and the descriptive parameters are elaborated in mean values $\pm$ standard deviation.

Table 4: Descriptive and analytical statistical data of physiological tests

Physiological parameters	Descriptive parameters		T- Student's test
	Pre-Testing	Post-Testing	Post/Pre Testing
Cardiac Frequency	84,32 $\pm$ 5,15	78,88 $\pm$ 4,36	Significant difference (sig > 0,05)
Systolic blood pressure	119,64 $\pm$ 6,36	115,76 $\pm$ 3,70	Significant difference (sig > 0,05)
Diastolic blood pressure	77,80 $\pm$ 4,86	74,96 $\pm$ 3,23	Significant difference (sig > 0,05)
Blood sugar level	0,98 $\pm$ 0,16	0,93 $\pm$ 0,11	Insignificant difference (sig < 0,05)

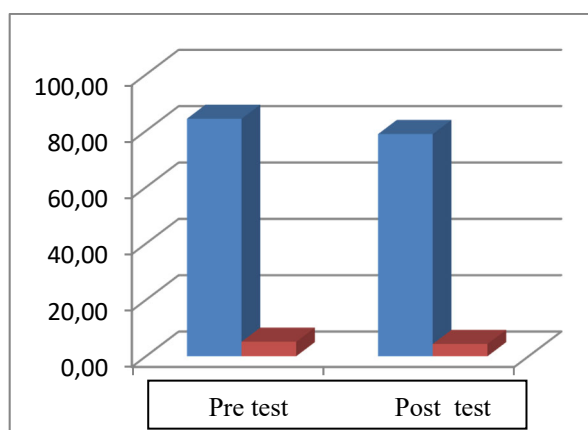
Source: Values made by author's

4.1- The heart rate test:

The analysis of Cardiac Frequency results (table 4) reveals a significant decline in the mean from 84,32 to 78,88, as well as a decrease in the standard deviation from 5,15 to 4,36.

The improvement in heart rate is in favor of the post test which means that physical activity has a positive effect on health of elderly women.

Fig.1. Variations of cardiac frequency on pre/post testing



Source: histogram made by author's

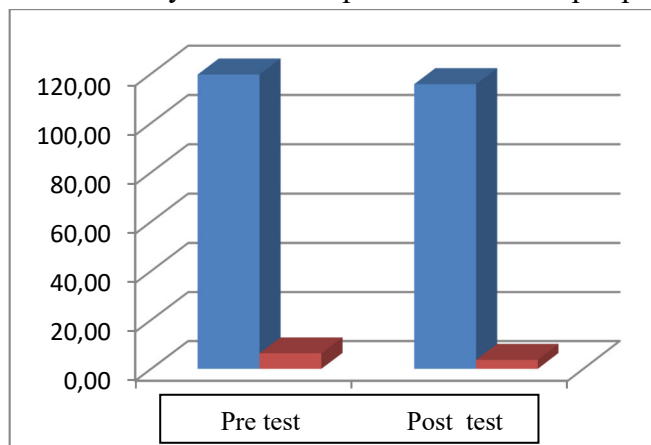
Title The effect of physical activities on physiological health in older women (60-65 years)

4.2- Systolic blood pressure:

Through table 4, we notice that Systolic blood pressure decreased from 119,64 to 115,76 with a standard deviation of 6,36 and 3,70. This means that there is a significant difference in favor of post-test.

This difference can be relative to the training program which improved the systolic tension of our group.

Fig.2. Variation of Systolic blood pressure between pre/post testing

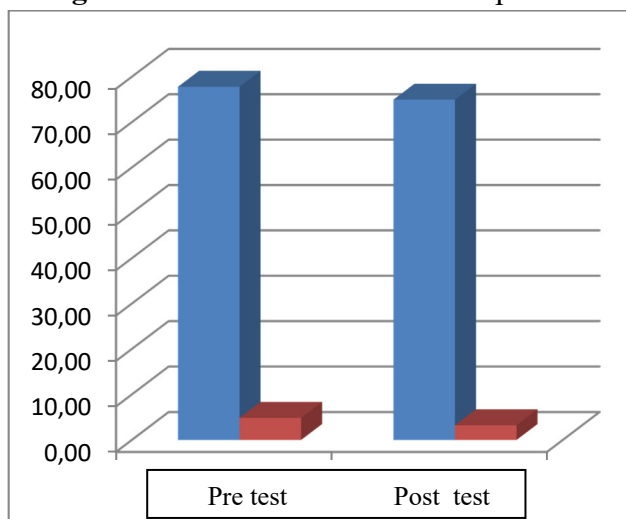


Source: histogram made by author's

4.3- Diastolic blood pressure:

The results of the T-test comparison show that exist a significant differences were observed for this test in favor of post test which means that the program of entrainment has a benefic effect on health of aged women.

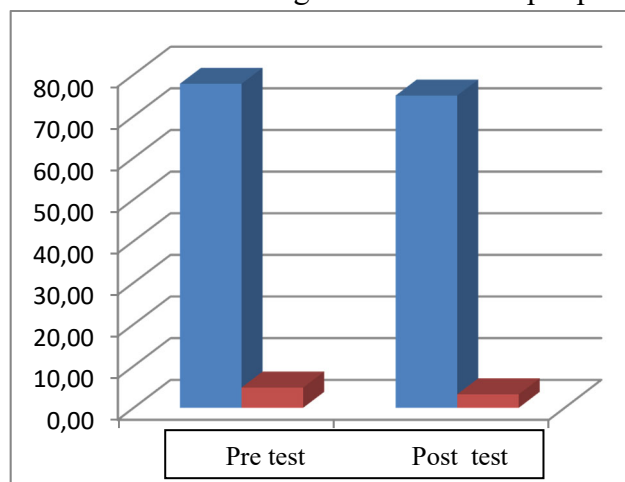
Fig.3. Variation of Diastolic blood pressure



Source: histogram made by author's

4.4- Blood sugar level:

Through table 4, we notice that blood sugar level decreased from 0,98 to 0,93 with a standard deviation of 0,16 and 0,11. This change is insignificant, which means that our program of entrainment hasn't an impact on blood sugar level in women older.

Fig.4. Variation of Blood Sugar level between pre/post testing

Source: Histogram made by author's

5. Discussion and interpretation of the results:

The question the researcher initially asked was: What is the impact of physical activity on physiological parameters health in older women (60-65 years)? To answer this question, the researcher implemented an experimental protocol using physiological tests to identify this impact.

The results of this study showed that the improvements recorded in the systolic blood pressure are in favor of the post test related of physical activity. However, this decrease of these parameters can be explained by the fluctuation of more effective baroreceptor sensitization, resulting in decreased cardiac output (QC) and improved systolic blood pressure (Garrido, 2017, pp. 17-33). Our results are consistent with those of (Bouaziz et al, 2017; Lee et al, 2007) and are inconsistent with studies of (Kitzman et al, 2013; Cononie et al, 1991; Madden et al, 2009) which explain the stability of blood pressure by the nature of the exercises used.

The results of diastolic blood pressure are positive and show that regular activity improves diastolic blood pressure. This is due to the increased release of vasodilators from the arteries and the ability of the blood to carry more O₂ to organs and muscles. The results of our research are consistent with (Cox J 2006; Bouaziz et al, 2017; Cononie et al, 1991) and different studies of (Kitzman et al, 2013; Lee et al, 2007; Madden et al, 2009) that explain this increase by the phase of heart relaxation. Physical activity reduces blood pressure through sensitization of baroreceptors, release of vasodilators and attenuation of the nervous system.

Heart rate results have changed between the twice tests. The practice of physical activity increases plasma volume, therefore venous return and stroke volume. Heart rate decreases with each level of exercise in the practitioner (Depiesse, 2016). The results of our research are consistent with those of (Grossen, 2002; Garrido, 2017; Kleman and Neiman, 1983; Martin, 2017).

The blood glucose level shows no variation as a result of physical activity because blood glucose fluctuations are considered to be an invariable biological constant. This is due to glycoregulation and glycogen reserves (muscles and liver) (Bernadette and Nilson 1973). The results of our research are consistent with those of (Finucane et al, 2010; Belmin, 2016) and are inconsistent with the study of

(Hersey et al, 1994) that explain the decrease in blood sugar through depletion of energy reserves.

6. CONCLUSION

“For your health, move!” this is the slogan launched by the World Health Organization (WHO) on its World Day of Promoting the Health and Well-being Benefits of Physical Exercise. Regular physical activity at any age has undeniable health benefits, based on scientific evidence (OMS, 2015).

The aim of this research was to contribute to a better vision of the impact of physical activity on physiological elements, linked to health, given its importance in the lives of the elderly. For this study, our work was based on four physiological parameters (Heart Rate, Systolic blood pressure, Diastolic blood pressure and blood sugar level) whose objective is to highlight the impact of physical activity on physiological parameters in older women.

Of the overall physiological parameters, only blood glucose level did not experience a significant change related to the physical activity. However, systolic blood pressure, diastolic blood and heart rate experienced a significant improvement in performance in favor of the post test relating to physical activity which is consistent with the results of those Garrido, (2017); Bouaziz et al, (2017); Lee et al, (2007); Cox J (2006); Cononie et al. (1991); Grossen. (2002); Garrido. (2017); Kleman and Neiman.(1983); Martin. (2017); Finucane et al. (2010) and Joel Belmin. (2016).

Other investigations on physical, psychological and anthropometric parameters would allow us to have more information on the experience on health of the older women. Dietary surveys over several days would allow objective planning of the women diet, taking into account the alterations caused by the aging. The use of a larger sample size and if possible with older athletes and sedentary people would help to clarify certain metabolic variations.

Our study can claim a more in-depth reflection of specialists on this age group and also opens new doors to clarify age-related impairments and cope with them through physical activity.

Finally, it would seem more appropriate to repeat this research, with a more comprehensive analysis of physiological parameters, a larger sample of older women and a well thought out choice of research tools for a better assessment and for more credible and generalisable results.

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