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Evaluation of some anthropometric and cardiovascular variables in women working in the fields and sedentary women in Ziguinchor

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ABSTRACT: *Context:* The growing sedentary lifestyle, combined with an increase in cardiovascular disease and overweight, prompted this study of women in the commune of Ziguinchor, where rural work is the dominant activity.
The aim of this study was to assess the impact of rural work on women's health.
Methods: We compared several parameters between two groups: those doing field work and those who were sedentary. The variables studied included weight, height, resting heart rate, resting blood pressure and body mass index (BMI).
Results: The results showed that women who worked in the fields had lower weights and BMIs than sedentary women. However, no significant differences were observed in terms of heart rate and blood pressure.
Conclusion: This study shows that working in the fields helps to reduce the weight of Diola women in Ziguinchor.

KEYWORDS: fieldwork, heart rate, blood pressure, body mass index.

1 INTRODUCTION

Every continent is witnessing a gradual reduction in people's daily activities, leading to a significant reduction in energy expenditure. Today, no country is immune to the substitution of people by machines and to the use of vehicles to the detriment of walking. As a result, people are using less and less of their physical capacities (upper and lower limbs) to carry out the arduous work needed to earn a living.

This drop in daily physical activity, combined with a high-calorie diet, is the main cause of obesity and cardiovascular disease: the latter being the second leading cause of death among women in Senegal, after malaria and cancer.

In Senegal, and particularly in Ziguinchor, there are women who work in the fields in addition to their daily domestic chores, and others who only do domestic work in the family compound. This raises the question of the impact of these activities on their health. Do body mass index (BMI), heart rate (HR), resting systolic blood pressure (SBP) and resting diastolic blood pressure (DBP) vary between these two groups of women?

The aim of this study was to compare the mean values of weight, body mass index, heart rate, and systolic and diastolic blood pressure at rest between a group of women doing field work, in addition to domestic chores, and another group of women confining themselves solely to domestic chores in their homes.

2 METHODOLOGY

2.1 STUDY SAMPLE

The sample studied consisted of 84 married women living in the commune of Ziguinchor, divided into two groups (G1 and G2).

G1: This group, with an average age of 45, comprises 43 women in good health who work in the fields throughout the rainy season (June to October).

G2: This group, with an average age of 39, is made up of 41 women in good health who only carry out simple domestic tasks in the home or activities that do not require a great deal of energy.

2.2 MEASURING INSTRUMENTS

We used the following instruments for the measurements:

- A height gauge to measure the standing height of the participants,
- A bathroom scale accurate to 50g to measure your weight,
- A heart rate monitor to measure heart rate (HR),
- A blood pressure monitor to measure systolic blood pressure (SBP) and diastolic blood pressure (DBP).

2.3 WEIGHT MEASUREMENT

The weight was measured by a nurse working in a health center in the commune of Ziguinchor. The women weighed themselves standing on the scales, wearing a loincloth. Before weighing, the nurse asked each participant to remove her earrings and bracelets to avoid unnecessary overload. The women stood still, with their arms at their sides, their gaze horizontal and their feet firmly planted on the surface of the scale. After a minute, the nurse noted and communicated the value displayed on the dial.

2.4 WAIST MEASUREMENT

Height was measured using a measuring tape. The women stood barefoot with their backs against the wall, arms at their sides and their gaze horizontal. Before the measurement, the nurse asked them to breathe in. After taking the measurement, the nurse told us the height of each participant.

2.5 HEART RATE RECORDING

Heart rate was measured using a heart rate monitor, consisting of a transmitter (belt) and a receiver (wristwatch). The nurse fitted each woman with the device and left her to rest for 15 minutes. After this period, the heart rate value displayed on the receiver was taken.

2.6 BLOOD PRESSURE

The participants' systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured using an electronic cuff blood pressure monitor. The nurse placed the cuff around the woman's arm and activated the device by pressing the button to inflate it. A few minutes later, she reported the SBP and DBP values to us.

2.7 STATISTICAL PROCESSING

The individual data collected, together with the body mass index (BMI) determined for each woman, were used to calculate the mean values for the two groups (G1 and G2).

We then formulated the following null hypothesis:

Ho: There is a statistically significant difference between the mean values of the variables in G1 and G2.

To test this hypothesis, we compared the mean values of the two groups using Student's t- test, without checking the equality of variances or the normality of the distributions, since each group had more than 30 participants. The probability of error was set at $\alpha = 0.05$ (5%), which corresponds to the maximum error accepted for rejecting or not rejecting the null hypothesis.

- If the probability of error obtained in the Student test is less than 5%, the null hypothesis (Ho) is confirmed, indicating that there is a statistically significant difference between the means of the two groups.
- If the probability of error is greater than 5%, the null hypothesis (Ho) is invalidated, meaning that there is no statistically significant difference between the averages compared.

3 RESULTS

Table 1. Comparison of mean weight values (kg) for the two groups of women

VARIABLES	WEIGHT (Kg)
G1	55.65±3.06
G2	62.61±16.58
α (significance level)	0.05
P de Student (probability of error)	0.02
Decision	Significant difference

COMMENTS ON TABLE 1

The probability of error found in the Student's t-test comparing the mean weights of the two groups (G1 and G2) is 0.02, which is lower than the 0.05 probability of error that we are willing to accept. Therefore, there is a significant difference in weight between women who perform field work during the rainy season (G1) and those who do not (G2).

The average weight of G2 (62.61 kg) is significantly higher than that of G1 (55.65 kg).

Table 2. Comparison of average height values (cm) for the two groups of women

VARIABLES	SIZE (cm)
G1	162.2±7.02
G2	162,07±7.07
α (significance level)	0.05
P de Student (probability of error)	0.93
Decision	Non-significant difference

COMMENTS ON TABLE 2

The probability of error found in the Student's t-test comparing the mean values of the two groups (G1 and G2) is 0.93, which is higher than the probability of error (0.05) that we are willing to accept. Therefore, there is no significant difference in height between women who perform field work during the rainy season (G1 = 162.2 cm) and those who do not (G2 = 162.07 cm).

Table 3. Comparison of mean Body Weigth Index values (Kg/m^2) for the two groups of women

VARIABLES	BODY WEIGHT INDEX (kg/m^2)
G1	19.49±3.06
G2	23.32±5.8
α (significance level)	0.05
P de Student (probability of error)	0.00026
Decision	Significant difference

COMMENTS ON TABLE 3

The probability of error found in the Student's t-test comparing the mean body mass index (BMI) values of the two groups (G1 and G2) is 0.00026, which is lower than the probability of error (0.05) that we are willing to accept. Therefore, there is a significant difference in body mass index (BMI) between women who perform field work during the rainy season (BMI of G1 = 19.49 kg/m^2) and those who do not (BMI of G2 = 23.32 kg/m^2).

Table 4. Comparison of average Heart Rate values (bmp) for the two groups

VARIABLES	HEART RATE (bmp)
G1	80.88±5.92
G2	81.49±6.8
α (significance level)	0.05
P de Student (probability of error)	0.66
Decision	Non-significant difference

COMMENTS ON TABLE 4

The probability of error found in the Student's t-test comparing the mean resting heart rates of the two groups (G1 and G2) is 0.66, which is higher than the probability of error (0.05) that we are willing to accept when deciding on the difference. Therefore, there is no significant difference in resting heart rate between women who perform field work during the rainy season (heart rate of G1 = 80.88 bmp) and those who do not (heart rate of G2 = 81.49 bmp).

Table 5. Comparison of mean Systolic aterial Pressure values (cmHg) for the two groups

VARIABLES	SYSTOLIC ARTERIAL PRESSURE (CmHg)
G1	12.70±2.07
G2	12.22±1.77
α (significance level)	0.05
P de Student (probability of error)	0.27
Decision	Non-significant difference

COMMENTS ON TABLE 5

The probability of error found in the Student's t-test comparing the mean resting systolic blood pressure values of the two groups (G1 and G2) is 0.27, which is higher than the probability of error (0.05) that we are willing to accept when deciding on the difference. Therefore, there is no significant difference in resting systolic blood pressure between women who perform field work during the rainy season (systolic blood pressure of G1 = 12.70 CmHg) and those who do not (systolic blood pressure of G2 = 12.22 CmHg).

Table 6. Comparison of average Diastolic arterial pressure values (cmHg) for the two groups

VARIABLES	DIASTOLIC ARTERIAL PRESSURE (CmHg)
G1	7.23±1.34
G2	7.66±1.15
α (significance level)	0.05
P de Student (probability of error)	0.12
Decision	Non-significant difference

COMMENTS ON TABLE 6

The probability of error found in the Student's t-test comparing the mean values of mean diastolic blood pressure at rest for the two groups (G1 and G2) is 0.12, which is higher than the probability of error (0.05) that we are willing to accept when deciding on the difference. Therefore, there is no significant difference in resting diastolic blood pressure between women who perform field work during the rainy season (diastolic blood pressure of G1 = 7.23 CmHg) and those who do not (diastolic blood pressure of G2 = 7.66 CmHg).

4 DISCUSSION

4.1 WEIGHT AND BMI

The mean weight of G1 (55.65 kg) was significantly lower (P = 0.02) than that of G2 (62.61 kg). A similar difference was observed when comparing the BMI of G1 (19.49 kg/m^2) with that of G2 (23.32 kg/m^2), with this difference also being significant (P = 0.00026). According to the WHO classification, these values qualify G1 as "normal build" and G2 as "overweight".

The normal weight of G1 could be attributed to the regular physical activity associated with the rural work carried out by these women. On the other hand, the excess weight observed in G2 could be explained by the low energy expenditure of this group, which confines itself to daily domestic tasks without any other physical activity. In fact, the physical activity generated by rural work raises the general metabolism, optimizing the distribution of the energy absorbed. This optimization prevents the storage of fat and helps maintain a normal weight. What's more, field work significantly reduces the size of fat cells by breaking down triglycerides and simultaneously inhibiting the synthesis of new fats.

Physical activity is therefore an effective way of increasing energy expenditure, maintaining energy balance (between intake and expenditure) and, combined with a suitable diet, reducing excess body fat. This not only reduces weight, but also replaces some of the fat mass with lean mass. By burning the fat circulating in the blood, physical activity helps to lower levels of bad cholesterol (LDL and triglycerides) and increase levels of good cholesterol (HDL), which protects the arteries. It also improves lipid metabolism, reducing the concentration of bad cholesterol (LDL-cholesterol) in the blood, promotes a better balance between lean body mass (muscle) and fat mass, and helps to control weight better.

4.2 HEART RATE AND BLOOD PRESSURE

Cardiovascular disease is a major public health issue in Senegal, as it is in most countries, including the most developed. According to the World Health Organization **[1],** the main causes of death from cardiovascular disease are coronary heart disease and stroke. Factors such as heart rate, systolic blood pressure (SBP) and diastolic blood pressure (DBP) can play a role in the onset or worsening of these conditions.

Regular physical activity is beneficial in strengthening the vagus nerve, which moderates cardiac activity, and also allows the fat stored on the artery walls to be used up. It also plays a crucial role in the prevention and management of cardiovascular disease. Regular physical activity helps to control high blood pressure and heart rate, because it is well established that physical exercise reduces the risk of cardiovascular disease, the intensity of exercise being a key factor **[2].**

In our study, the mean resting heart rate of G1 (80bpm) was slightly lower than that of G2 (81bpm), but this difference was not statistically significant (P = 0.66). This suggests that the intensity of the field work performed by the G1 women may not be sufficient to induce a significant reduction in resting heart rate.

It is important to emphasize that lower heart rate leads to a considerable reduction in the daily workload of the myocardium, which in turn reduces the risk of cardiovascular disease. A lower resting heart rate also reduces the risk of fatal coronary disease **[3],** because it shows that the heart no longer needs to perform as many contractions as before to meet the body's needs (oxygen and nutrient supply, and transport of waste products to recycling or evacuation organs). It also shows that there is no formation of plaque or fatty deposits on the inner wall of the coronary arteries **[4].** The effect of physical activity is a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP). This reduction is particularly significant in hypertensive subjects and depends on the intensity and regularity of the physical exercise. The more intense and regular the exercise, the greater the reduction in blood pressure.

In our study, there was no statistically significant difference between the systolic (12.7 cmHg vs. 12.22 cmHg) and diastolic (7.23 cmHg vs. 7.66 cmHg) blood pressures of the two groups. These blood pressure values indicate that both groups have normal mean blood pressure, as they are below the WHO limit values (SBP = 140 mmHg and DBP = 90 mmHg), above which a subject is considered to be hypertensive. This non-significant difference in blood pressure between the two groups could be explained by the intensity of the work carried out in the fields by the women of Ziguinchor.

Previous studies have shown that the more active the subjects, the weaker the SBP and DBP **[5],** and as such, the risk of developing hypertension is higher in subjects with a low level of physical fitness **[6].**

5 CONCLUSION

The aim of this study was to investigate the effects of field work on women in the commune of Ziguinchor. To do this, we compared weight, body mass index, heart rate and systolic and diastolic blood pressure between a group of women doing field work and another group doing only domestic work in the family plot.

The results of our study show that the weight and BMI of the women who did not perform fieldwork were significantly higher than those of the women who did. However, no statistically significant difference was observed between the two groups in terms of heart rate and blood pressure measured at rest. Thus, the rural work performed by our sample of Ziguinchor women does not appear to strengthen the cardio-modulating vagus nerve or reduce peripheral resistance to blood flow.

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