



Body Composition and Dietary Intake Changes in Postmenopausal Spanish Women before and after the COVID-19 Lockdown [†]

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Abstract: The current study examined changes in body composition and dietary intake of healthy Spanish postmenopausal before and after the COVID-19-related lockdown. Sixty-six women participated in the study (58.7 ± 5.4 years). Participants had a full bioelectrical impedance study (BIA) before (between July–October 2019) and after (August–October 2020) the lockdown, which occurred because of the COVID-19 pandemic in Spain. No statistically significant differences were observed in the body composition of the participants. The assessment of dietary intake of protein, fat and carbohydrates before and after the confinement period also showed no significant changes. It does not appear that there have been changes in the body composition of the postmenopausal women studied or in their dietary habits in the studied period.

Keywords: bioelectrical impedance; body composition; dietary intake; women; postmenopausal; COVID-19; lockdown

1. Introduction

The aging process is characterized by sarcopenia (the age-related decline in skeletal muscle mass) and an accompanying rise in body fat mass. Sarcopenia has been closely linked to strength decline and also to functional decay, impairment and decreased independence as age increases [1]. Menopausal transition accelerates general and abdominal obesity and sarcopenia, where lifestyle changes and insufficient levels of sexual hormones are playing a pivotal role [2]. This negative shift in the balance between fat and lean mass could be linked to a decrease in energy output and a decline in muscle strength [3,4].

According to current knowledge, keeping physically active throughout the years is essential to avoid negative age-related detrimental variations in body composition. Poor physical performance could be a sign of health problems related to aging [5]. Aerobic training with incremental aerobic workouts or resistance exercise represents an appealing choice for the elderly to improve and maintain their health [6,7]. The World Health Organization (WHO) officially classified coronavirus disease 2019 (COVID-19) as a pandemic on 11 March 2020, considering the rapid spread of the disease around the world [8].

Lacking effective treatments and vaccines, more than a hundred nations adopted restrictive policies in an effort to limit the spread and dissemination of the virus, consequently, by April 2020, over one third of the global population was estimated to have

been subjected to some form of mobility restriction [9]. During COVID-19 lockdown [10], a high rate of physical inactivity and dietary imbalances were reported in both adults and adolescents [11]. Recent meta-analyses have shown that in a considerable majority of the participants, there was an increase in body weight during lockdown [12]. Aging is associated with loss of muscle mass, decreased muscle strength, and decreased functional activity [13], which due to confinement might be exacerbated by a decrease in physical activity, aggravating it and even increasing mortality [14] and decreasing quality of life [15]. Maintaining regular physical exercise during a period of enforced rest, such as the ongoing coronavirus outbreak, is an essential preventive approach to physical and mental health [16].

Physical separation and isolation not only have a significant impact on the performance of physical activity, but also affects people's lives, particularly their dietary habits [17]. Hearing or reading about COVID-19 permanently in the media can be annoying and generate anxiety and stress. It causes people a strong desire to consume a specific food called food "craving". In Western societies, these foods are often highly palatable and energetic, which means that they include a lot of sugar and/or fat [18]. Even when people are bored, they eat more to distract themselves from the situation, especially if they have a high level of objective self-consciousness [19]. Consequently, maintaining a healthy and varied diet and regular physical activity may have been hindered by the lockdown.

Given that changes in body composition could have a negative impact on health, investigating the impact of COVID-19 lockdown could provide a better knowledge of the body composition metrics mostly affected during a period of enforced inactivity in postmenopausal women. Therefore, the present study aimed to examine whether bioelectrical impedance-derived body composition parameters and dietary habits were affected during the pandemic-associated lockdown in postmenopausal Spanish women. We hypothesized that the lockdown had an impact on bioelectrical impedance-derived body composition parameters as well as in the intake of macronutrients.

2. Materials and Methods

2.1. Sample Characteristics

Sixty-six women participated in the study (58.7 ± 5.4 years) before (between July–October 2019) and after (August–October 2020) the lockdown, which occurred as a consequence of the COVID-19 pandemic in Spain. The women were part of a larger cohort study in which they are being followed for 3 years. The study was performed in accordance with the Declaration of Helsinki and was approved by the Research Ethics Committee of the University of Extremadura. Written informed consent was obtained from all the subjects.

2.2. Nutrients Intake

Total dietary carbohydrates, fats, proteins and energy intakes were assessed via validated frequency questionnaires. Food was quantified using a dietetic scale, measuring cups, cans, small bottles, and spoons, on the basis of current 7-day dietary records. The questionnaire used was self-reported, and the person completing the interview was blinded to the research question and hypothesis.

2.3. Body Composition

Body composition was studied by means of bioelectrical impedance analysis (BIA) using a body composition analyzer (BC-418MA, TANITA, Tokyo, Japan).

2.4. Statistical Analysis

The statistical analysis of the results was performed with SPSS 20 for Windows. All values are expressed as the median $\pm$ IQR. We compared the parameters between and after the COVID-19 lockdown by the Wilcoxon Signed Rank Test. Statistical significance was set at $p \leq 0.05$.

3. Results and Discussion

No statistically significant differences were observed during the study period in either weight ($p = 0.243$) or BMI ($p = 0.338$). Other anthropometric measures such as waist–hip index also showed no differences ($p = 0.256$). Regarding body composition, no differences were observed in fat mass in % ($p = 0.567$), fat mass in kg ($p = 0.356$) or lean mass in kg ($p = 0.636$) (Table 1).

Table 1. Subjects' characteristics at baseline and follow-up.

	Baseline Median (IQR) <i>n</i> = 66	Follow-Up Median (IQR) <i>n</i> = 66	<i>p</i> -Value
Weight (kg)	66.45 (15.9)	66.5 (15.2)	0.243
BMI	26.7 (6.4)	26.5 (6.2)	0.338
Waist (cm)	85 (14)	104 (12.75)	0.356
Hip (cm)	104 (12.7)	104 (13.5)	0.458
Waist/hip ratio	0.82 (0.07)	0.83 (0.09)	0.256
Fat mass (%)	38.3 (8.9)	39.0 (8.9)	0.567
Fat mass (kg)	25.15 (11.15)	27.10 (12)	0.356
Lean mass (kg)	40.4 (4.5)	40.2 (5.4)	0.636
Protein intake (g/day)	88.09 (36.7)	92.04 (50.37)	
Fat intake (g/day)	80.61 (44)	82.9 (43.6)	
Carbohydrates (g/day)	282.9 (138.3)	235.7 (97.1)	

Comparison using the Wilcoxon test.

Overall, no differences were observed in the sample between pre-confinement and post-confinement measurements in relation to dietary intake of protein ($p = 0.657$), fat ($p = 0.505$) or carbohydrates ($p = 0.590$) (Table 1).

In total, $n = 14$ (21.1%) of the women were obese, $n = 28$ overweighted (42.4%) and 24 normal (36.4%) at the beginning of the study and 15 (22.7%) were obese, 26 overweight (39.4%) and 25 normal (37.9%). After stratifying the participants according to their BMI prior to confinement, no differences were observed in the evolution of weight ($p = 0.098$), BMI ($p = 0.080$), fat mass in % ($p = 1$), fat mass in kg ($p = 0.875$) and lean mass in the group of women with normal BMI. In the group of overweight women, no differences were observed in any of the aforementioned parameters ($p > 0.05$ in all cases). Finally, no statistically significant differences in the previously studied parameters were observed in the obese women ($p > 0.05$ in all cases).

There were also no statistically significant differences in protein ($p = 0.622$), fat ($p = 0.677$) or carbohydrate ($p = 1$) intake in the group of women with normal BMI. Nor were they observed as a function of whether the women were overweight (protein, $p = 0.451$; overweight, $p = 0.530$; carbohydrate, $p = 0.903$) or obese (protein, $p = 0.383$; overweight, $p = 0.945$; carbohydrate, $p = 0.250$) at the start of the confinement period.

The COVID-19 did not result in any change in FM%, FM (kg) or lean mass (kg). Similar results have been reported in professional athletes who had to suspend their regular training season due to confinement [20]. However, in another study conducted with soccer players, the study of body composition did report an increase in FM% during the lockdown period; however, in this study, fat mass was studied by skinfolds and not by electrical bioimpedance, which could explain the difference in the results [21]. In Spanish children, a considerable impact on parameters such as BMI has also been reported, but no differences were reported in waist measurements during the period [22]. It has also been reported that overweight and obese subjects gained body mass, while underweight subjects lost body mass during the lockdown [23], which was not observed in our study.

Our results are consistent with those published in healthy adults and are associated with no change in body composition (even in a context of low physical activity due to lockdown) [24].

In the rural population of Italy, and specifically in women belonging demographically to a group more similar to our sample, statistically significant differences were observed in the dietary intakes of the main groups of macronutrients during the quarantine [25], data that come from a significantly larger sample than ours and that could explain the greater precision in detecting changes in dietary patterns during the study period. In adults from Slovenia, significant differences in protein intake (decrease) and increase in saturated fat intake have been reported for a research period like the one we have reported [24]. We recognize that the method used to measure food intake determines the quality of the estimate of nutrient intake of populations. A 7-day record that adequately indicates portion sizes, as well as the inclusion of sufficient recording days over a period long enough, allows for accurate and detailed recording of foods and ultimately to be able to estimate individual daily mean intakes of most food types without significant bias. However, we recognize that the use of a FFQ may be unreliable and inadequate for assessing absolute and relative nutrient intakes.

4. Conclusions

This is the first study investigating the impact of COVID-19 lockdown on changes in body composition and nutrition in healthy Spanish adult women. The COVID-19-related quarantine did not affect either the body composition or dietary habits of the women studied.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of University of Extremadura.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The authors declare that all the data related to this study are available within the paper or can be obtained from the authors upon reasonable request.

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