

CARDIOPROTECTIVE FOOD AND NUTRITION EDUCATION FOR OLDER ADULTS: EFFECT ON DIET QUALITY

EDUCAÇÃO ALIMENTAR E NUTRICIONAL CARDIOPROTECTORA PARA PESSOAS IDOSAS: EFEITO NA QUALIDADE DA ALIMENTAÇÃO

EDUCACIÓN ALIMENTARIA Y NUTRICIONAL CARDIOPROTECTORA PARA ADULTOS MAYORES: EFECTO EN LA CALIDAD DE LA ALIMENTACIÓN

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ABSTRACT: In Brazil, chronic noncommunicable diseases (NCDs) are responsible for most deaths, especially cardiovascular diseases, particularly among older adults. It is known that health education interventions present a moderate benefit in reducing cardiovascular risk. However, there is still a lack of evidence regarding the impacts of specific approaches aimed at primary cardiovascular prevention. The aim of the present study was to evaluate the effects of a cardioprotective nutritional educational intervention on diet quality in older adults participating in a university extension project in a municipality in southwestern Minas Gerais, Brazil. This is an intervention, quasi-experimental study with a before-and-after design of the educational intervention, which consisted of three monthly meetings. The actions followed the proposal described in the material “Cardioprotective Nutrition: Guidance Manual for Primary Health Care Professionals.” To assess diet quality, the questionnaire “How is your diet?” was applied, consisting of 24 questions evaluating dietary patterns based on the principles of the Brazilian Food Guide (2014). Based on the obtained scores, participants were classified into groups: Above 41 points: Healthy; Between 31 and 41 points: Suboptimal; Up to 31 points: Inadequate. Statistical analysis was performed using IBM SPSS Statistics 29.0 software, adopting $p < 0.05$ and 95% confidence interval. The sample consisted of 20 older adults (72 ± 5.73 years), with a predominance of females ($n = 16$; 80%), intermediate educational level ($n = 8$; 40%), income between 1 and 5 minimum wages ($n = 14$; 70%), widowed individuals ($n = 9$; 45%), most participants reported not consuming alcohol ($n = 14$; 70%), and engaging in physical activity 2 to 4 times per week ($n = 8$; 40%). Regarding the overall classification of the questionnaire “How is your diet?” before the intervention, 63.9% of participants were identified

1

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with a “healthy dietary pattern (> 41 points)” and 36.1% with a “suboptimal dietary pattern (≤ 41 points).” After the intervention, this distribution remained similar (65.0% and 35.0%, respectively). The only item with a statistically significant difference in the before-and-after analysis was “I usually buy food at open-air or street markets,” which showed an increase of 0.45 points ($p = 0.033$). It was concluded that diet quality was considered healthy throughout the cardioprotective educational intervention, with an impact on food purchasing at open-air markets.

Keywords: Cardiovascular diseases. Health promotion. Food consumption.

RESUMO: No Brasil, as DCNTs são responsáveis pela maioria das mortes, com destaque para as doenças cardiovasculares, especificamente nos idosos. Sabe-se que intervenções de educação em saúde apresentam benefício moderado na redução do risco cardiovascular. Contudo, ainda há carência de evidências sobre os impactos de abordagens específicas voltadas à prevenção primária cardiovascular. O objetivo do presente estudo foi avaliar os efeitos de uma intervenção nutricional educativa cardioprotetora na qualidade da alimentação em idosos que participam de um projeto de extensão universitária em um município do sudoeste de Minas Gerais. Trata-se de um estudo de intervenção, quase-experimental, com delineamento do tipo antes e após a intervenção educativa que consistiu de três reuniões mensais. As ações seguiram o proposto no material “Alimentação Cardioprotetora: Manual de orientações para profissionais de saúde da Atenção Básica”. Para avaliar a qualidade da alimentação, foi aplicado o questionário “Como está a sua alimentação?” com 24 perguntas que avaliam os padrões alimentares a partir dos princípios do Guia Alimentar (2014) para a população brasileira. Com base nos escores obtidos, os participantes foram classificados em grupos: Acima de 41 pontos: Saudável; Entre 31 e 41 pontos: Subótima; Até 31 pontos: Inadequada. A análise estatística foi realizada no software IBM SPSS Statistics 29.0, adotando-se $p < 0,05$ e IC95%. A amostra foi composta por 20 pessoas idosas ($72 \pm 5,73$ anos), em que se observou predominância do público feminino ($n=16$; 80%), escolaridade média ($n=8$; 40%), renda de 1 a 5 salários mínimos ($n=14$; 70%), viúvos ($n=9$; 45%), a maioria declarou não ser etilista ($n=14$; 70%) e realiza atividade física de 2 a 4 vezes por semana ($n=8$; 40%). Em relação à classificação global do questionário “Como está a sua alimentação?” antes da intervenção, foram identificados 63,9% de participantes com padrão alimentar “saudável (> 41 pontos)” e 36,1% “subótima (≤ 41 pontos)”. Após a intervenção, essa distribuição foi semelhante (65,0% e 35,0%, respectivamente). O único item com diferença estatisticamente significativa na análise antes e depois da intervenção, foi o item “Costumo comprar alimentos em feiras livres ou feiras de rua”, que apresentou aumento de 0,45 pontos ($p = 0,033$). Conclui-se que alimentação foi considerada saudável ao longo da intervenção educativa cardioprotetora, com impacto na aquisição de alimentos em feiras livres.

Palavras-chave: Doenças cardiovasculares. Promoção da saúde. Consumo de alimentos.

RESUMEN: En Brasil, las ENCT são responsables de la mayoría de las muertes, destacando las enfermedades cardiovasculares en ancianos. El objetivo fue evaluar los efectos de una intervención nutricional educativa cardioprotectora en la calidad de la alimentación de ancianos de un proyecto de extensión universitaria en Minas Gerais. Se trata de un estudio casi experimental, de tipo antes y después, que consistió en tres reuniones mensuales basadas en el manual “Alimentación Cardioprotectora”. Se aplicó el cuestionario “¿Cómo está su alimentación?” con 24 preguntas basadas en la Guía Alimentaria (2014). La muestra incluyó 20 ancianos ($72 \pm 5,73$ años). Antes de la intervención, el 63,9% tenía un patrón alimentario

saludable y el 36,1% subóptimo. Después, la distribución fue de 65,0% y 35,0%, respectivamente. El único ítem con diferencia estadísticamente significativa fue "Suelo comprar alimentos en mercados libres", con un aumento de 0,45 puntos ($p = 0,033$). Se concluye que la alimentación se mantuvo saludable a lo largo de la intervención, con un impacto positivo en la adquisición de alimentos en mercados libres.

Palabras clave: Anciano. Enfermedades cardiovasculares. Promoción de la salud.

INTRODUCTION

In Brazil, chronic noncommunicable diseases (NCDs) account for 72% of all causes of death, with cardiovascular diseases standing out among them. These health problems affect vulnerable groups more intensely, especially older adults (MINISTRY OF HEALTH, 2022a). Factors such as age, smoking, excess body weight, diabetes, hypertension, dyslipidemia, physical inactivity, and inadequate diet contribute to cardiovascular diseases. On the other hand, healthy habits reduce complications and mortality in all individuals. In this context, health education interventions have shown a moderate benefit in reducing cardiovascular risk (KRIST et al., 2020).

In 2018, the concept of cardioprotective nutrition (Dica-Br) was created in Brazil, based on national guidelines aimed at the treatment and control of cardiovascular diseases (CVDs) (GUERRA, 2021; MINISTRY OF HEALTH, 2018). From this concept, the cardioprotective nutrition manual for primary health care professionals was developed with the objective of gathering and simplifying, in a playful and accessible way, the recommendations from guidelines focused on the prevention and treatment of cardiovascular risk factors (SILVA et al., 2024). Cardioprotective nutrition was primarily created for secondary cardiovascular prevention; however, even in the context of primary prevention, it has demonstrated positive effects on improving anthropometric indicators and metabolic parameters (PAGANO et al., 2022).

Considering that nutritional knowledge is an essential determinant of eating behavior, ensuring adequate nutritional information for older adults constitutes a fundamental step toward promoting quality of life and achieving better health outcomes in this population (CHIN et al., 2023).

Studies evaluating the impact of nutritional counseling based on cardioprotective nutrition have observed a significant reduction in the consumption of ultra-processed foods and culinary ingredients, increased water intake, as well as improvements in triglyceride levels

and anthropometric indices. These studies also demonstrated greater knowledge and consumption of cardioprotective foods (fresh and minimally processed foods), although still below the recommended levels (MORI et al., 2021; PAGANO et al., 2022; TAQUES et al., 2024).

Although the few cardioprotective educational interventions studied have shown positive results, there is still a lack of evidence regarding the impacts of specific approaches aimed at primary cardiovascular prevention in older adults on diet quality, in light of the current Brazilian Dietary Guidelines. Therefore, the present study evaluated the effects of a cardioprotective nutritional educational intervention for older adults on diet quality.

MATERIALS AND METHODS

EXPERIMENTAL DESIGN

This is a quasi-experimental study with a clinical design, in which participants were evaluated before the educational intervention (pre-test) and after its implementation (post-test).

The cardioprotective nutrition education intervention involved older adults participating in a university extension project in a municipality in southwestern Minas Gerais, Brazil. The project is dedicated to offering recreational and educational activities for individuals over 60 years of age. It is a multidisciplinary project involving students and professors from several academic programs, such as Nursing, Aesthetics, Fashion Design, History, Biology, and Biomedicine, among others. The program offers classes and educational activities twice a week, with interdisciplinary content under the supervision of the program coordination. In addition to classes, cultural events and extracurricular activities are also promoted.

The study was approved by the Research Ethics Committee under CAAE: 86322525.7.0000.5112, approval number: 7.423.879. Inclusion criteria were being 60 years of age or older and participating in the extension project. Exclusion criteria included missing two meetings and presenting self-reported cognitive impairment, as observed by the researchers, that could hinder the understanding and completion of the instruments. All participants signed the Free and Informed Consent Form to participate in the study.

DATA COLLECTION

Sociodemographic and clinical information was collected by the researchers through interviews with the participants, including open- and closed-ended questions regarding sex, age, educational level, income, marital status, and family composition. In addition, clinical and lifestyle data were collected, such as the presence of diseases, medication use, history of hospitalization in the previous year, physical activity practice, smoking, alcohol consumption, and self-perceived health status.

Regarding anthropometric data, body weight was measured using a portable digital scale with a maximum capacity of 150 kg and an accuracy of 100 g. Participants were instructed to stand barefoot in the center of the scale platform, wearing minimal clothing. Their arms were kept extended alongside the body, and their gaze was directed forward at a fixed point while remaining motionless until the measurement stabilized and the value was recorded. Height was measured using a portable stadiometer, with participants standing upright in the orthostatic position, barefoot, with their heels together and in contact with the measuring surface, following the recommendations of the Brazilian Ministry of Health for anthropometric data collection in healthcare settings (Brazil, 2023). Head position was standardized according to the Frankfurt Plane (parallel to the floor). Based on these measurements, nutritional status was assessed using the Body Mass Index (BMI), classified according to the criteria proposed by Lipschitz (1994).

Waist circumference was measured using a flexible, non-elastic measuring tape with a precision of 0.1 cm. The measurement was taken at the midpoint between the lowest rib and the iliac crest, following the recommendations of the Brazilian Ministry of Health (Brazil, 2024). The tape was placed directly on the skin, fitted snugly without compressing the underlying soft tissues. Measurements were recorded at the end of a normal expiration, with participants standing upright and their arms relaxed alongside the body. Waist circumference values were classified according to the criteria established by the World Health Organization (WHO, 2011).

To assess diet quality, the questionnaire developed by the General Coordination of Food and Nutrition of the Ministry of Health and the Center for Epidemiological Research in Nutrition and Health of the University of São Paulo (NUPENS/USP), entitled “*How is your diet?*”, was applied at two moments: before the cardioprotective nutritional educational intervention and after the intervention. The questionnaire contains 24 questions that evaluate

dietary patterns based on the principles of the Brazilian Dietary Guidelines (2014). Based on the obtained scores, participants were allocated into groups, with nomenclature adapted for formality purposes, as follows: Above 41 points: Healthy; Between 31 and 41 points: Suboptimal; Up to 31 points: Inadequate.

INTERVENTION

The research participants were organized into three groups in order to facilitate logistics, with one meeting held per month over a three-month period. The activities carried out at each meeting followed the recommendations proposed in the material “Cardioprotective Nutrition: Guidance Manual for Primary Health Care Professionals” (MINISTRY OF HEALTH, 2018) (Table 1). The educational activities were based on active methodologies and visual materials.

Table 1. Topics addressed in the cardioprotective nutritional interventions conducted with older adults.

Theme	
Meeting 1	Meet <u>Understanding Brazilian Cardioprotective Nutrition</u> 1) We introduced ourselves and asked the participants to introduce themselves. 2) We introduced the context of nutrition as a form of health care and asked the participants what they do to take care of themselves. 3) We asked what cardioprotective foods are and explained their importance. 4) We conducted the food cutout activity using the flag illustration. 5) We clarified the participants' questions and doubts.
Meeting 2	Meet <u>Cardioprotective Foods</u> 1) We asked the participants what they had learned so far about cardioprotective nutrition. 2) We reviewed the concept of cardioprotective foods. 3) We carried out the color game activity. 4) We shared motivational messages. 5) We clarified the participants' questions and doubts.
Meeting 3	Meet <u>Food Groups in Practice</u> 1) We asked the participants to evaluate the foods they consume: Are they the best choice for their health? Are they not the best choice? Why? 2) At the beginning of the meeting, we reviewed the food groups and the Brazilian flag illustration with the appropriate proportions. 3) We discussed the cost of following a cardioprotective diet and compared it with a diet rich in ultra-processed foods. We also carried out a menu-planning activity that included foods from the different food groups. 4) We clarified the participants' questions and doubts.

Source: Ministry of Health (2018).

The anthropometric assessments and diet quality questionnaire were conducted at two different time points: before the educational intervention (Time 1) and after the educational intervention (Time 2).

STATISTICAL ANALYSIS

Statistical analysis was performed using IBM SPSS Statistics 29.0 software, adopting $p < 0.05$. Data distribution was assessed using the Shapiro–Wilk test, which indicated a predominance of non-parametric data; therefore, the Wilcoxon test was applied. To analyze changes in the overall classification of the questionnaire between the two time points, the McNemar test was used, which demonstrated no significant change ($p \approx 0.50$), indicating stability in classification over time.

RESULTS

Initially, 36 individuals agreed to participate in the study; however, by the end of the study, 20 older adults (72 ± 5.73 years) had completed all stages. Sample loss was observed throughout the research stages and was related to decreased participant attendance during the follow-up period.

Regarding the socioeconomic and lifestyle profile of the studied population, as shown in Table 1, there was a predominance of females ($n = 16$; 80%), intermediate educational level ($n = 8$; 40%), income between 1 and 5 minimum wages ($n = 14$; 70%), widowed individuals ($n = 9$; 45%), most participants reported not consuming alcohol ($n = 14$; 70%), and engaging in physical activity 2 to 4 times per week ($n = 8$; 40%).

Table 1. Socioeconomic and lifestyle characteristics of the older adults participating in the study ($n = 20$).

Variables	n	%
Age (mean $\pm$ standard deviation)	$72 \pm 5,73$	
Sex		
Female	16	80
Male	4	20
Education Level		
Incomplete primary education	6	30
Complete primary education	1	5
Complete secondary education	8	40
Income		
< 1 minimum wage	2	10
1 a 5 minimum wage	14	70
> 5 minimum wage	4	20
Marital Status		
Married	5	25
Single	6	30
Widowed	9	45
Alcohol Consumption		
Yes	6	30

No	14	70
Physical Activity		
Never	7	35
2 a 4 times per week	8	40
Once daily	5	25

Source: MARQUES J.M., et al., 2026.

Regarding the clinical profile of the older adults, half of the study population was classified as eutrophic ($n = 10$; 50%). Most participants presented cardiovascular risk according to waist circumference measurements ($n = 15$; 75%), and the majority had some form of cardiovascular disease ($n = 14$; 70%). In addition, 35% ($n = 7$) reported having Diabetes Mellitus. Most participants were not classified as experiencing polypharmacy ($n = 12$; 60%) and had not been hospitalized during the previous year ($n = 17$; 85%). Furthermore, most rated their self-perceived health status as good ($n = 13$; 65%).

Table 2. Clinical characteristics of the older adults participating in the study ($n = 20$).

Variables	n	%
Body Mass Index (BMI)		
Underweight	2	10
Normal nutritional status	10	50
Overweight	8	40
Total	20	100
Waist Circumference		
Cardiovascular risk	15	75
No cardiovascular risk	5	25
Total	20	100
Cardiovascular Diseases		
Yes	14	70
No	6	30
Total	20	100
Diabetes Mellitus		
Yes	7	35
No	13	65
Total	20	100
Number of medications		
< 4	12	60
≥ 4	8	40
Total	20	100
Hospitalization in last year		
Yes	3	15
No	17	85
Total	20	100

Self-Perceived Health Status

Good	13	65
Fair	7	35
Poor	0	0
Total	20	100

Source: MARQUES J.M., et al., 2026.

Regarding the overall classification of the questionnaire “*How is your diet?*”, at Time 1, 63.9% of participants were classified as having a healthy dietary pattern (> 41 points), while 36.1% were classified as having a suboptimal dietary pattern (≤ 41 points). At Time 2, a similar distribution was observed (65.0% and 35.0%, respectively). Among the individuals who completed both dietary assessments (T₁ and T₂; $n = 20$), six participants showed a positive change in dietary pattern, whereas three demonstrated a deterioration. However, the McNemar test indicated no significant change between the two assessment periods ($p \approx 0.50$).

The only item that showed a statistically significant difference in the pre- and post-intervention analysis was Item 13 (“I usually buy food at open-air or street markets”), which increased by 0.45 points ($p = 0.033$). Additionally, Items 7 ($p = 0.071$) and 20 ($p = 0.058$) showed a trend toward improvement; however, these changes did not reach statistical significance (Table 3).

Table 3. Comparison of the “How Is Your Diet?” questionnaire item scores and total score between T₁ and T₂.

Items	Mean $\pm$ DP T ₁	Mean T ₂	$\pm$ DP	Δ (T ₂ -T ₁)	Wilcoxon (T)	p
1. When I have snacks throughout the day, I usually eat fruit or nuts.	2.15 $\pm$ 1.07	2.40 $\pm$ 0.89		+0.25	30.0	0.317
2. When choosing fruits and vegetables, I usually give preference to locally produced foods.	1.85 $\pm$ 1.15	1.70 $\pm$ 1.14		-0.15	22.0	0.227
3. When choosing fruits and vegetables, I usually give preference to organic produce.	1.40 $\pm$ 1.31	1.40 $\pm$ 1.23		0.00	8.0	1.000
4. I usually carry food with me in case I get hungry during the day.	1.35 $\pm$ 1.17	0.85 $\pm$ 1.21		-0.50	3.5	0.083
5. I usually plan the meals I will eat during the day.	2.20 $\pm$ 1.27	1.90 $\pm$ 1.19		-0.30	8.5	0.211
6. I usually replace beans with peas, lentils, or chickpeas.	0.50 $\pm$ 0.94	0.70 $\pm$ 0.79		+0.20	11.0	0.414

Items	Mean $\pm$ DP T ₁	Mean T ₂	$\pm$ DP	Δ (T ₂ -T ₁)	Wilcoxon (T)	p
7. Whole wheat flour is commonly used in my household.	0.60 $\pm$ 0.60	0.90 $\pm$ 1.07		+0.30	10.5	0.071
8. I usually eat fruit for breakfast.	0.75 $\pm$ 0.86	1.05 $\pm$ 1.09		+0.30	13.0	0.157
9. I usually eat my meals while sitting at the table.	2.65 $\pm$ 0.93	2.75 $\pm$ 0.82		+0.10	25.0	0.715
10. I try to eat my meals at a relaxed pace.	2.45 $\pm$ 0.95	2.60 $\pm$ 0.83		+0.15	16.5	0.445
11. I usually participate in food preparation at home.	2.35 $\pm$ 1.33	2.55 $\pm$ 1.11		+0.20	15.0	0.400
12. In my household, we share the tasks involved in preparing and eating meals.	0.55 $\pm$ 0.99	0.75 $\pm$ 0.83		+0.20	11.5	0.317
13. I usually buy food at open-air markets or street markets.	1.00 $\pm$ 1.08	1.45 $\pm$ 1.00		+0.45	11.0	0.033
14. I often use mealtimes to take care of other tasks and end up skipping meals.	2.55 $\pm$ 1.03	2.55 $\pm$ 0.83		0.00	7.0	1.000
15. I usually eat my meals at my work or study desk.	2.80 $\pm$ 0.31	2.85 $\pm$ 0.72		+0.05	9.0	0.705
16. I usually have my meals while sitting on the living room sofa or in bed.	2.30 $\pm$ 0.94	2.40 $\pm$ 0.76		+0.10	22.0	0.609
17. I usually skip at least one of the main meals (lunch and/or dinner).	1.20 $\pm$ 1.14	1.55 $\pm$ 1.14		+0.35	15.0	0.166
18. I usually consume candies, chocolates, and other sugary treats.	1.80 $\pm$ 1.07	1.85 $\pm$ 0.93		+0.05	21.0	0.949
19. I usually drink industrially processed fruit juices, such as boxed, powdered, bottled, or canned juices.	2.35 $\pm$ 0.76	2.45 $\pm$ 0.82		+0.10	26.0	0.559
20. I usually eat at fast-food restaurants or casual snack outlets.	2.05 $\pm$ 0.72	2.45 $\pm$ 0.51		+0.40	7.0	0.058
21. I have the habit of snacking between meals.	1.80 $\pm$ 1.12	1.85 $\pm$ 0.97		+0.05	23.0	0.705
22. I usually drink soft drinks.	2.20 $\pm$ 0.75	2.35 $\pm$ 0.85		+0.15	16.0	0.400
23. I usually replace lunch or dinner with sandwiches, savory snacks, or pizza.	2.25 $\pm$ 0.49	2.35 $\pm$ 0.69		+0.10	26.0	0.559
24. When I drink coffee or tea, I usually add sugar.	1.65 $\pm$ 1.33	1.85 $\pm$ 1.27		+0.20	12.0	0.295
Total score	42.55 $\pm$ 6.99	45.00 $\pm$ 7.18		+2.45	46.0	0.116

Source: MARQUES J.M., et al., 2026.

DISCUSSION

In the present study, the socioeconomic and lifestyle profile of the participants was predominantly characterized by women with an intermediate level of education, an income ranging from one to five minimum wages, and a higher prevalence of widowhood. In addition, most participants reported abstaining from alcohol consumption and engaging in regular physical activity two to four times per week. Regarding the clinical profile, half of the participants presented normal nutritional status, although the majority exhibited increased cardiovascular risk based on waist circumference measurements and the presence of cardiovascular diseases. Despite these findings, most participants were not classified as experiencing polypharmacy, had not been hospitalized in the previous year, and reported a good self-perceived health status.

With regard to diet quality before and after the cardioprotective educational intervention, a predominance of a healthy dietary classification was observed at both assessment time points, with only minor individual changes over time and no statistically significant differences between T₁ and T₂. Nevertheless, a significant increase in the purchase of foods at open-air markets was observed.

The growth of the older adult population, together with the epidemiological transition and changes in lifestyle patterns, has emerged as one of the main factors associated with the increasing prevalence of chronic noncommunicable diseases. This scenario highlights the importance of preparing for these demographic and health changes in order to advance the goals established by the 2030 Agenda for Sustainable Development. Therefore, the present study represents an initial step by proposing a targeted intervention for older adults aimed at promoting healthy food choices over the long term (Caso & Vecchio, 2022).

When considering the profile of the study participants, a tendency toward the adoption of healthier lifestyles was observed, particularly among women, as well as the presence of a more favorable socioeconomic and educational background. Similar findings were reported by Gomes et al. (2020), who observed greater adherence to healthy dietary patterns among older adults with higher educational attainment. Furthermore, the fact that the intervention was conducted in a group setting and integrated into a university extension program with continuous follow-up may have contributed to the positive effects of the proposed educational activities. The interventions based on participatory methodologies, such as group dynamics,

tend to promote greater adherence and behavioral changes when combined with continuous follow-up (Oliveira, 2025).

In this context, the adaptation of educational materials and the appreciation of food culture are considered key factors for the effectiveness of such interventions. Moreover, according to Silva et al. (2024), older adults present social representations of food that are closely associated with concerns about healthy eating, diet quality, health promotion, well-being, and disease management.

As a key finding of this study, we highlight the effectiveness of the cardioprotective educational intervention, which had a significant impact on the purchase of foods at open-air and street markets. According to the current Brazilian Dietary Guidelines, these markets represent important settings for access to healthy foods, where individuals can obtain fresh and minimally processed foods. They also serve as key components of food environments, influencing the overall quality of the population's diet (Brazil, 2014; Pereira et al., 2025).

According to Pereira et al. (2025), an analysis of the Brazilian Household Budget Survey (POF) data from 2002 to 2018 showed that the country's food retail environment has become increasingly dominated by supermarkets, accompanied by a decline in the diversity of traditional food outlets, such as open-air markets. This trend represents a concerning change in food environments, as it reinforces and intensifies the ongoing nutrition transition, characterized by a greater consumption of ultra-processed foods. Therefore, the findings of the present study suggest an important behavioral change, reflected in the increased purchase of foods at open-air markets.

According to the theoretical essay conducted by Pereira et al. (2022), open-air markets represent spaces of resistance and experiences of “Good Living”, where aspects such as social interaction, collectivity, personal relationships, informality, trust, connection to place, traditional knowledge, cultural appreciation, and diverse forms of production and consumption shape these markets as multifaceted environments. These spaces are permeated by both material and symbolic elements that reflect ethical principles and values extending beyond a purely market-oriented logic.

This study has some limitations, including its small, non-probabilistic sample and the absence of a control group, which limits the ability to establish temporal relationships between the observed associations. Nevertheless, our findings highlight an association that has been scarcely explored in previous studies, expanding the perspective on healthy eating promotion

based on the Brazilian Dietary Guidelines within the context of primary cardiovascular prevention, as advocated by the concept of cardioprotective nutrition. Future longitudinal studies with larger samples and the inclusion of health literacy assessments are warranted to further investigate these findings.

Regarding diet quality, a predominance of healthy dietary patterns was maintained throughout the cardioprotective educational intervention, with a significant increase in the purchase of foods at open-air markets. These findings reinforce the importance of collective nutrition education strategies aimed at promoting health and healthy eating among older adults. Such interventions may help strengthen existing healthy behaviors and contribute to the reduction of cardiovascular risk factors.

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