ORIGINAL ARTICLE

Impact of a public physical activity program on the physical profile of older adults in Cali-Colombia

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ABSTRACT

Physical activity in older adults, depending on its frequency, intensity, and structure, yields favourable outcomes in mobility, mental agility, and overall quality of life. The aim of this study was to evaluate the impact of structured physical activity programs on the physical profile of older adults. Methods: A longitudinal repeated-measures design was conducted with 236 female participants aged 60 to 94, divided into two groups: short-term follow-up (6 weeks) and long-term follow-up (47 and 48 weeks). Results: Anthropometric evaluation revealed significant differences in weight and abdominal circumference among the short-term group, with moderate to high reductions ($r = 0.766$ for abdominal circumference; $d = –0.311$ for weight). In contrast, 50% of the participants in the long-term group showed moderate increases in these variables, in both frequency and upward trend. Functional capacity assessment using the Senior Fitness Test (SFT) showed small to moderate improvements in five of the six tests for the short-term group. However, in the second measurement, the walking time test revealed a deterioration in agility and functional speed. In the long-term group, lower-body flexibility improved, but a significant decline was observed in walking distance by the end of the evaluation ($d = –0.687$). While the program demonstrated positive potential, its overall impact was moderate in the short term and mild in the long term. Therefore, a structural redesign is recommended to promote sustained benefits, particularly by enhancing muscular strength as a key factor in functional autonomy during aging.

Keywords: Physical education, Physical activity, Older adults, Functional autonomy, Public program.

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INTRODUCTION

Physical activity offers well-documented benefits for both physical and mental health, making it an essential tool throughout the human life cycle—from early childhood to old age. It stimulates development and plays a vital role in the prevention of disease. Among older adults, a rapidly growing segment of the global population, well-structured programs and services have been shown to significantly contribute to overall well-being and alleviate the burden on public health systems (World Health Organization [WHO], 2024).

Globally, the older adult population is one of the fastest-growing demographic groups. According to projections by the United Nations (2023), by the year 2050 there will be more than 2.1 billion people over the age of sixty, driven by increasing life expectancy. This trend highlights the pressing need to promote healthy aging through the prevention of falls and the management of chronic disease, conditions often linked to sedentary lifestyles and poor health behaviours. The WHO (2023) estimates that regular physical activity among older adults could prevent approximately five million deaths annually and result in over twenty-seven billion dollars in savings on healthcare expenditures. Nevertheless, nearly 40% of adults over the age of seventy do not engage in sufficient physical activity to maintain or improve their physical and mental condition, thus negatively affecting their quality of life.

Sedentarism and physical inactivity, common in aging due to the natural decline in physiological reserve, are associated with a fragile health status characterized by the progressive deterioration of multiple bodily systems. This decline leads to the loss of functional capacity in terms of strength, aerobic endurance, agility, balance, flexibility, and reaction time (Castillo-Daza et al., 2024; Treacy et al., 2022). This functional loss is frequently accompanied by non-communicable diseases such as hypertension, diabetes, obesity, anxiety disorders, and depression, which are exacerbated in the absence of appropriate physiological stimuli (Al Nayf Mantas et al., 2022). Additionally, as noted by Dent et al. (2023), malnutrition—both undernutrition and overnutrition—is increasingly prevalent among older adults. This condition arises from multiple factors including age-related reductions in food intake and homeostatic mechanisms (Iglesias et al., 2020), and from food insecurity. Indeed, the WHO (2024) identifies poverty as a major risk factor for poor nutritional status and its associated consequences.

According to Martínez-De Haro et al. (2022), it is essential to understand the beneficial relationship between physical activity and individual health through a comprehensive assessment of well-being, particularly during stages of life in which morphological characteristics—such as those found in older adults—lead to identifiable strengths and limitations in carrying out daily activities (Barreto-De Lima et al., 2023). The benefits of structured physical activity programs for older adults have been extensively documented by Pacheco-Godoy et al. (2024), Fuertes-Paredes (2023), Pinheiro et al. (2022), and Mosqueda-Fernández (2021), among others. Through systematic reviews and effectiveness analyses, these researchers concluded that factors such as the type of activity, frequency, intensity, practice environment, intervention modalities, and participant motivation (Glejberman, 2023) are intrinsic elements that significantly contribute to favourable outcomes. These outcomes include improved mobility, reduced fatigue and waist circumference, enhanced mental agility, better sleep quality, and overall improvements in quality of life.

Given this broad spectrum of benefits—which transcend mere recreational participation—longitudinal research led by scholars such as Lisón-Loriente et al. (2025), Forero-Muñoz (2024), Varela-Gutiérrez & Rojas-Quirós (2021), Carvajal-Villanueva (2021), and Rodríguez-Calderón et al. (2021), among others, has highlighted the potential of long-term exercise interventions to improve physical fitness and thereby enhance the quality of life among older adults. These studies underscore the long-term sustainability of such benefits.

Consequently, and in light of the global context where lifestyle transformations have substantially altered patterns of physical activity, nutrition, and daily interactions (Flores-Olivares et al., 2021), the present study aimed to evaluate the impact of a publicly funded physical activity program on the physical health profile of older adults in Cali, Colombia.

MATERIALS AND METHODS

This study employed a longitudinal repeated-measures design to evaluate changes in physical capacities among older adults participating in public physical activity programs in the city of Cali, during the 2023–2024 period. These programs followed a systematic structure and were implemented under the names of *Cali en Forma* (2023) and *Activamente* (2024). On average, participants attended three sessions per week, each lasting approximately 60 minutes.

Each session began with basic flexibility and general joint mobility exercises, followed by a central phase consisting of music-based strength and endurance activities—with and without equipment—including dance routines, walking exercises, and various adaptations of these formats. The program was designed to promote exercise adherence through accessible, enjoyable, and functionally adapted routines, encouraging regular physical activity in safe, socially engaging, and motivational community environments.

Participants

The study involved 236 female participants, all selected from various groups across the city enrolled in public physical activity programs. Inclusion criteria required participants to be aged 60 years or older; to pass a medical fitness evaluation authorizing them to engage in physical activity; to be cognitively able to comprehend and follow instructions during both physical assessments and questionnaires; to sign the informed consent form; and to commit to completing both pre- and post-intervention evaluations to ensure the validity of the study. The intervention protocol was approved by the Ethics Committee of the *Institución Universitaria Escuela Nacional del Deporte* (IUEND).

The main researcher provided a detailed explanation of the study's objectives, potential benefits and risks, the confidential handling of participant data, and the nature of the assessments. Participants were given the opportunity to ask questions and express concerns before signing the informed consent form. Initial demographic data were collected, including full name, age, gender, and date of birth. To ensure data confidentiality, each participant was assigned a unique identification code, which they wore on a specially designed wristband. This research adhered to the ethical standards outlined in the Declaration of Helsinki (World Medical Association, 2024).

Procedure

Initially, participants underwent a medical screening using the Spanish version of the *Physical Activity Readiness Questionnaire Plus* (PAR-Q+), which is designed to identify potential health risks prior to engaging in physical activities or assessments. This instrument consists of seven health-related questions and serves to detect pre-existing medical conditions that may require further evaluation by healthcare professionals (Schwartz et al., 2019). To ensure data confidentiality and participant anonymity, each individual was assigned a unique identification code, which replaced all personal identifiers in subsequent data records and analyses.

In addition to physical performance, basic anthropometric measurements were obtained to complement the evaluation. Body weight was measured using a BC-585F FitScan® Tanita Body Composition Monitor, and standing height was recorded using a Seca 213® stadiometer. Waist circumference (cm) was assessed with a non-elastic measuring tape at the midpoint between the lower rib margin and the iliac crest.

Following the initial screening, participants' physical fitness was assessed using the *Senior Fitness Test* (SFT), Spanish version (Ochoa-González et al., 2014), which has been validated in the Colombian older adult population (Cobo-Mejía et al., 2016). This battery evaluates various dimensions of functional fitness in older adults, including: a) lower- and upper-body strength; b) hamstring and lower-back flexibility; c) shoulder mobility and upper-body flexibility; d) dynamic agility and balance through the time taken to stand from a chair, walk eight feet, turn, and return to the chair; and e) aerobic endurance measured via the total distance walked in six minutes. The test includes normative tables that provide reference values based on age and sex-specific performance trends, which are recorded on a standardized data sheet (Rikli & Jones, 2013).

Two evaluation visits were scheduled for each of the five groups assessed, with varying time intervals between them to allow for short- and long-term change analysis. The instruments employed in this study have been previously validated in multiple investigations (Bonilla-Barrera et al., 2024; Rodríguez-Calderón et al., 2021; Carreres-Rey, 2021, among others). Assessments were conducted at each group's designated meeting location between 6:00 and 8:00 a.m., according to the following schedule:

- Group 1: November 23, 2023, and October 24, 2024
- Group 2: December 2, 2023, and October 30, 2024
- Group 3: September 24, 2024, and November 8, 2024
- Group 4: October 16, 2024, and November 29, 2024
- Group 5: October 22, 2024, and December 5, 2024

The evaluation process was directed and coordinated by the lead investigator. Administration of the PAR-Q+ was supported by resident physicians in Sports Medicine affiliated with the Health Services Institution (IPS) of the IUEND. For the application of the SFT, support was provided by physiotherapists, sports professionals, and nutritionists also affiliated with the IPS of the same institution.

Statistical analysis

Statistical analyses were conducted using R software, version 4.4.3 (2025-02-28), on a 64-bit Windows platform. The analysis followed a reproducible workflow, primarily using packages from the tidy verse ecosystem —including dplyr, tidyr, ggplot2, readxl, writexl, and broom— alongside specialized libraries such as rstatix and effect size for inferential testing and effect size estimation. Data were imported from Excel files and underwent a rigorous cleaning process, which included variable name standardization, data type conversion, and the replacement of erroneous values. Each individual observation was identified through a unique participant code, allowing for precise matching of pre- and post-intervention data.

Two matched groups were established for longitudinal analysis:

- Groups 1 and 2, composed of 76 participants, assessed at two points separated by 47 and 48 weeks, respectively.
- Groups 3, 4, and 5, comprising 160 participants, evaluated over a six-week follow-up period.

For all quantitative variables, descriptive statistics were calculated, including mean, median, standard deviation, minimum and maximum values, and interquartile ranges, disaggregated by group and time point. The normality of pre-post differences was assessed using the Kolmogorov-Smirnov test and Q–Q plots, which informed the choice of the appropriate statistical test. Specifically:

- If the differences followed a normal distribution, a paired Student's T-test was applied.
- If the distribution was non-normal, a Wilcoxon signed-rank test was used instead.

In all cases, the test statistic (t or W), p-value, statistical decision (with significance level α = .05), and effect size were reported. Effect sizes were expressed as r for non-parametric tests and Cohen's d for parametric tests, calculated using functions from the effect size package. For variables showing statistically significant differences, individual change plots were generated, connecting pre- and post-values for each participant. Colour schemes were used to indicate the direction of change (i.e., improvement, decline, or stability).

Finally, the association between average participant age and functional changes was assessed using Spearman's rank correlation, due to the non-normal distribution of the data.

RESULTS

No participants were excluded from the study based on the PAR-Q+ questionnaire, as they all met the minimum safety criteria required to take part in the physical assessment sessions of this research. The demographic characteristics of the adults in the two long-term follow-up groups —47 and 48 weeks, respectively— indicated, first and foremost, a 100% female representation at both baseline and follow-up. The anthropometric characteristics, detailed in Table 1, provide insight into the participants' initial conditions and reveal notable changes over the observed periods. These data also help identify potential trends or outliers within each evaluated group.

Table 1. Anthropometric characteristics of the long-term follow-up group (47 and 48 weeks, respectively).

Statistic	**Group 1–2 Baseline (22 Nov 2023 / 4 Dic 2023) (n = 76)**	**Group 1–2 Final (24 Oct 2024 / 30 Oct 2024) (n = 76)**
	Age (years)	
Mean ± SD	70.2 ± 7.3	71.1 ± 7.3
Median (IQR)	69 (12)	70 (11.25)
Min / max	60 – 88	61 – 89
	Weight (kg)	
Mean ± SD	61.4 ± 5.05	62.4 ± 5.26
Median (IQR)	62.6 (7.9)	63.3 (7.85)
Min / max	49.5 – 69.6	50.8 – 69.9
	Height (cm)	
Mean ± SD	154.4 ± 6.73	154.8 ± 6.89
Median (IQR)	154.4 (8.65)	155.0 (9.45)
Min / max	140.6 – 171.6	140.2 – 172.0
	Abdominal circumference (cm)	
Mean ± SD	80.5 ± 5.09	82.9 ± 5.70
Median (IQR)	80.6 (7.28)	83.0 (6.25)
Min / max	69.0 – 91.2	66.5 – 98.0

Note: SD = standard deviation; IQR = interquartile range; Min = minimum; Max = maximum; cm = centimetres; kg = kilograms.

Regarding the results of the normality test, findings suggest that all variables should be analysed using the non-parametric Wilcoxon test (Table 2). The comparison tests, as shown in Table 3, revealed that age, weight, and waist circumference exhibited statistically significant changes, indicating relevant differences between the baseline and final assessments. In contrast, height (p = .3643) did not show statistically significant variation.

Table 2. Normality test results for anthropometric variables – Long-term follow-up groups (47 and 48 Weeks, respectively).

Variable	**Kolmogorov-Smirnov *p*-value**	**Normality**
	Group 1–2. (22 Nov 2023 / 4 Dic 2023). (24 Oct 2024 / 30 Oct 2024). (n = 76)	
Age	1.14E-19	Non-normal
Weight	.03552	Non-normal
Height	8.01E-05	Non-normal
Abdominal circumference	.03264	Non-normal

Table 3. Comparison test results for anthropometric variables – Long-term follow-up groups (47 and 48 Weeks, respectively).

Group	**Variable**	**Test**	**Statistic w**	***p*-value**	**Decision**	**Effect size**
Group 1–2 (22 Nov 2023/4 Dic 2023) (24 Oct 2024/30 Oct 2024) (n = 76)	Age	Wilcoxon	0	2.213E-17	Significant difference	0.973
	Weight		960	.009248	Significant difference	0.299
	Height		752	.05377	No difference	0.221
	Abdominal circumference		752	.0002317	Significant difference	0.422

Regarding the waist circumference variable, Figure 1 illustrates the individual changes from the beginning to the end of the study. The blue lines represent cases in which an increase was observed, which predominate both in number and in positive slope. This indicates that more than 50% of the participants experienced moderate increases in waist circumference. The red lines represent decreases, which were fewer in number and relatively smaller in magnitude.

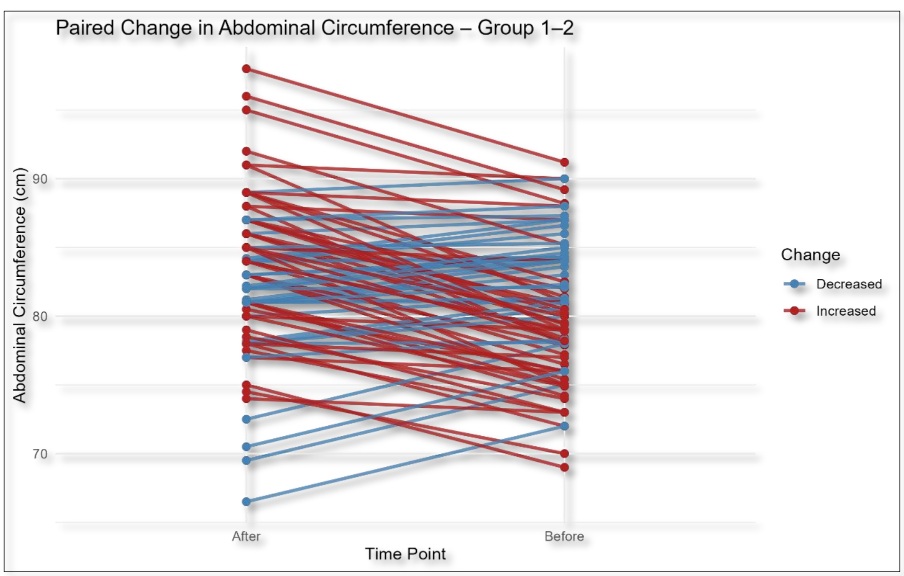

Figure 1. Individual changes in abdominal circumference in long follow-up groups, 47 and 48 weeks respectively.

In turn, the demographic and anthropometric results in Groups 3, 4, and 5, which were followed over a short-term six-week period, showed that the sex variable also revealed a female predominance at both time points, with 100% of participants being women. The age variable ranged between 74 and 75 years (Table 4).

Table 4. Anthropometric characteristics in short follow-up groups, six weeks.

Statistic	Group 3-4-5 Baseline (Sep 24/ 2024; Oct 16/ 2024 and Oct 22/ 2024) n = 160	Group 3-4-5 Final (Nov 8/2024, Nov 29/ 2024 and Dic 5/2024) n = 160
Age (years)		
Mean ± SD	76.3 ± 7.96	76.5 ± 7.97
Median (IQR)	75 (14)	76 (13.25)
Min / max	60 – 94	60 – 94
Weight (kg)		
Mean ± SD	69.4 ± 13.93	69.1 ± 13.95
Median (IQR)	67.4 (21.0)	67.3 (21.0)
Min / max	45.6 – 106.2	45.9 – 105.6
Height (cm)		
Mean ± SD	154.2 ± 4.81	153.7 ± 4.92
Median (IQR)	154.2 (6.6)	153.9 (7.0)
Min / max	142.6 – 168	142 – 168
Abdominal circumference (cm)		
Mean ± SD	88.9 ± 12.82	85.5 ± 12.11
Median (IQR)	88.4 (16.1)	85.2 (15.2)
Min / max	57 – 117.5	57 – 115

Note: SD = standard deviation; IQR = interquartile range; Min = minimum; Max = maximum; cm = centimetres; kg = kilograms.

The results of the normality test for the short-term follow-up groups (Table 5) indicate that the variables age, height, and waist circumference did not follow a normal distribution (*p*-values < .05 in the Kolmogorov–Smirnov test), whereas weight was normally distributed (*p* > .05). This information was critical for selecting the appropriate statistical tests in the comparative analysis. Accordingly, non-parametric Wilcoxon tests were applied for age and waist circumference, while a parametric t-test was used for weight (Table 6).

Table 5. Results of normality test for anthropometric variables in short follow-up groups, six weeks.

Variable	Kolmogorov-Smirnov *p*-value	Normality
Group 3-4-5. (Sep 24/ 2024; Oct 16/ 2024 and Oct 22/ 2024) (Nov 8/2024, Nov 29/ 2024 and Dic 5/2024) (n = 160)		
Age	6.44E-34	Non-normal
Weight	.1918	Normal
Height	.002792	Non-normal
Abdominal circumference	.002858	Non-normal

Table 6. Comparison test results for anthropometric variables in short follow-up groups, six weeks.

Group	Variable	Test	Statistic w / t	*p*-value	Decision	Effect size
Group 3-4-5 (Sep 24/ 2024; Oct 16/ 2024 and Oct 22/ 2024) (Nov 8/2024, Nov 29/ 2024 and Dic 5/2024) n = 160	Age	Wilcoxon	0	1.64E-08	Significant difference	0.446
	Weight	*t* test	8720	.000102	Significant difference	-0.311
	Height	Wilcoxon	9180	1.88E-12	Significant difference	0.557
	Abdominal circumference	Wilcoxon	10576	3.22E-22	Significant difference	0.766

Statistically significant changes were observed in age—attributed to the natural passage of time rather than data errors—as well as in waist circumference, weight, and height at the end of the evaluation period (all with *p* < .05). The effect sizes ranged from small to moderate. For example, r = 0.766 for waist circumference, suggesting a meaningful change, and Cohen's d = –0.311 for weight, indicating a slight to moderate decrease in the average value of this variable. It is important to clarify that the negative sign in the effect size indicates the direction of the change—namely, that mean weight decreased following the intervention.

With respect to the changes in waist circumference, Figure 2 shows a clear downward trend in this measure among most participants. The visual pattern supports the statistical comparison results, which revealed a significant difference with a moderate effect size, thereby strengthening the validity of the finding.

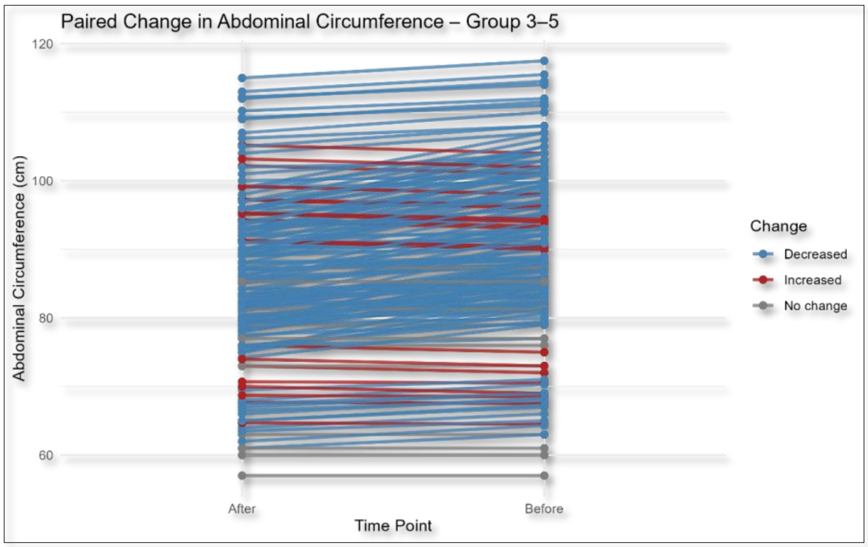

Figure 2. Paired change in abdominal circumference in short follow-up group, six weeks.

The physical performance outcomes, assessed using the Senior Fitness Test (SFT), validate the effectiveness and impact of the public physical activity programs. The results for Groups 1 and 2, followed over a long-term period of 47–48 weeks, are presented first and pertain to specific aspects such as flexibility, upper and lower limb muscle strength, joint mobility, and aerobic endurance, as measured by the components of the SFT (Table 7).

The normality tests, summarized in Table 8, show that most variables do not follow a normal distribution, based on the Kolmogorov–Smirnov test. The only exceptions were 6-minute walking distance (p = .05887) and chair stand test (p = .09173), which were normally distributed. This divergence in distribution justified the application of the Wilcoxon test for non-normal variables and the paired t-test for normally distributed variables.

About the comparison tests, two out of the six variables analysed did not show statistically significant differences between the baseline and follow-up measurements: back scratch (upper-body flexibility) and chair stand (lower-body strength). The 6-minute walk distance variable, however, showed a statistically significant difference, as assessed by a paired t-test (p = 6.69E–08), with a substantial effect size (Cohen's d = –0.687). The negative sign in the effect size indicates a reduction in the distance covered during the post-test, suggesting a deterioration in aerobic capacity and functional endurance among the participants. Other variables such as timed 8-foot walk, back scratch, bicep curls, and chair stand also exhibited improvements in mean scores (Table 9).

Table 7. SFT results in long follow-up groups, 47 and 48 weeks respectively.

Statistic	**Group 1-2 Baseline (Nov 22/ 2023/Dic 4/ 2023) (n = 160)**	**Group 1-2 Final (Oct 24/ 2024 / Oct 30/ 2024) (n = 160)**
	Chair Sit-and-Reach (cm)	
Mean ± SD	–7.7 ± 11.2	–4.2 ± 7.1
Median (IQR)	–10 (12.25)	–2 (4.25)
Min / max	–23 / 31	–27 / 3
	8-Foot Up-and-Go (s)	
Mean ± SD	8.38 ± 2.27	8.21 ± 2.90
Median (IQR)	8.49 (3.05)	7.77 (3.32)
Min / max	3.36 / 14.57	3.31 / 15.58
	Back Scratch Test (cm)	
Mean ± SD	–5.5 ± 9.2	–8.1 ± 12.8
Median (IQR)	–2 (16.25)	–4 (23.25)
Min / max	–24 / 7	–40 / 7
	6-Minute Walk Test (m)	
Mean ± SD	499.7 ± 72.0	454.8 ± 91.2
Median (IQR)	514 (117)	483 (111)
Min / max	342 / 613	249 / 615
	Arm Curl (reps)	
Mean ± SD	17.1 ± 4.3	18.8 ± 4.1
Median (IQR)	17 (5.0)	19 (6.0)
Min / max	10 / 31	9 / 29
	Chair Stand (reps)	
Mean ± SD	11.3 ± 4.2	12.3 ± 4.4
Median (IQR)	11 (5.25)	13 (5.25)
Min / max	2 / 23	1 / 22

Note: SD = Standard deviation; IQR = Interquartile range; Min = Minimum; Max = Maximum; cm = centimetres; kg = kilograms.

Table 8. Normality test results for sft variables in long follow-up groups, 47 and 48 weeks respectively.

Variable	**Kolmogorov-Smirnov *p*-value**	**Normality**
	Group 1-2. (Nov 22/2023/Dic 4/2023) (Oct 24/2024/Oct 30/ 2024) (n = 19)	
Chair Sit-and-Reach	.0113	Non-normal
8-Foot Up-and-Go	2.81E-05	Non-normal
Back Scratch Test	.000727	Non-normal
6-Minute Walk Test	.05887	Normal
Arm Curl	.01569	Non-normal
Chair Stand	.09173	Normal

Table 9. Comparison test results for sft variables in long follow-up groups, 47 and 48 weeks respectively.

Group	**Variable**	**Test**	**Statistic w / t**	***p*-value**	**Decision**	**Effect size**
Group 1–2 (Nov 22/2023/Dic 4/ 2023) (Oct 24/ 2024/Oct 30/2024) (n = 19)	Chair Sit-and-Reach	Wilcoxon	616	.0000891	Significant difference	0.449
	8-Foot Up-and-Go	Wilcoxon	2060	.002009	Significant difference	0.354
	Back Scratch Test	Wilcoxon	710	.2096	No difference	0.152
	6-Minute Walk Test	*t* test	5.9923	6.69E-08	Significant difference	-0.687
	Arm Curl	Wilcoxon	536	.000699	Significant difference	0.411
	Chair Stand	*t* test	-1.9483	.05533	No difference	0.23

In Groups 1 and 2, the correlation analyses did not reveal any statistically significant associations between age and any of the physical or anthropometric variables. All correlation tests yielded *p*-values greater than .05, indicating that age had no linear effect on these measures. These findings suggest that the detected changes in the variables were not influenced by age variability within this group.

The Senior Fitness Test (SFT) results for Groups 3, 4, and 5, who underwent short-term follow-up (six weeks), demonstrate evident changes between the initial and final assessments during this brief period (Table 10).

Table 10. SFT results in short follow-up groups, six weeks.

Statistic	**Group 3-4-5 – Baseline (Sep 24/2024, Oct 16/2024 and Oct 22/2024) n = 160**	**Group 3, 4 y 5 – Final (Nov 8/2024, Nov 29/2024 and Dic 5/2024) n = 160**
	Chair Sit-and-Reach (cm)	
Mean ± SD	–9.1 ± 9.13	–0.29 ± 17.83
Median (IQR)	–9.0 (14.25)	–0.5 (30.0)
Min / max	–39 / 3	–39 / 31
	8-Foot Up-and-Go (s)	
Mean ± SD	8.56 ± 2.98	8.75 ± 2.61
Median (IQR)	8.28 (2.83)	8.58 (2.96)
Min / max	3.19 / 22.51	3.20 / 17.78
	Back Scratch Test (cm)	
Mean ± SD	–15.5 ± 12.51	–12.8 ± 10.90
Median (IQR)	–16.0 (17.0)	–13.0 (12.0)
Min / max	–46 / 14	–45 / 7
	6-Minute Walk Test (m)	
Mean ± SD	314.6 ± 112.06	392.3 ± 97.15
Median (IQR)	322.0 (99.0)	410.0 (93.25)
Min / max	7 / 563	85 / 582
	Arm Curl (reps)	
Mean ± SD	17.42 ± 4.39	17.75 ± 7.26
Median (IQR)	18.0 (5.0)	16.0 (6.0)
Min / max	2 / 28	5 / 42
	Chair Stand (reps)	
Mean ± SD	11.35 ± 3.32	11.83 ± 3.10
Median (IQR)	12.0 (5.0)	12.0 (4.0)
Min / max	2 / 18	2 / 18

Note: SD = Standard deviation; IQR = Interquartile range; Min = Minimum; Max = Maximum; cm = centimetres; kg = kilograms.

The Kolmogorov–Smirnov normality tests (Table 11) determined that none of the variables followed a normal distribution; all *p*-values were below .05. Consequently, non-parametric Wilcoxon signed-rank tests were used for comparisons across all variables. Statistically significant differences were found in five of the six variables evaluated.

Lastly, in Groups 3, 4, and 5, statistically significant correlations were identified between participant age and the magnitude of individual change (pre/post) in certain physical and anthropometric variables. The strongest correlation was found for improvement in the chair sit-and-reach flexibility test (r = 0.30; $p < .001$), indicating a moderate positive association—older participants showed greater gains in this physical capacity. Similarly, a low positive correlation was observed in the back scratch test (r = 0.20; $p = .011$), suggesting that older adults also tended to experience more improvement in upper-body flexibility.

Conversely, body weight showed a weak negative correlation with age (r = –0.18; *p* = .022), indicating that younger participants were more likely to experience reductions or smaller increases in weight. Additionally, a low positive correlation was found between age and change in height (r = 0.21; *p* = .006). Together, these findings suggest that age had a mild to moderate influence on some of the observed changes, particularly those related to flexibility (Table 12).

Table 11. Normality test results for sft variables in short follow-up groups, six weeks.

Variable	Kolmogorov-Smirnov p-value	Normality
Group 3-4-5. (Sep 24/2024, Oct 16/2024 and Oct 22/2024) (Nov 8/2024, Nov 29/2024 and Dic 5/2024) n = 40		
Chair Sit-and-Reach	1.1E-06	Non-normal
8-Foot Up-and-Go	.000904	Non-normal
Back Scratch Test	.008677	Non-normal
6-Minute Walk Test	.003442	Non-normal
Arm Curl	4.74E-08	Non-normal
Chair Stand	2.63E-05	Non-normal

Table 12. Comparison test results for sft variables in short follow-up groups, six weeks.

Group	Variable	Test	Statistic w	*p*-value	Decision	Effect size
Group 3-4-5 (Sep 24/2024, Oct 16/ 2024 and Oct 22/ 2024) (Nov 8/2024, Nov 29/2024 and Dic 5/2024) n = 40	Chair Sit-and-Reach	Wilcoxon	2422	.00000118	Significant difference	0.384
	8-Foot Up-and-Go	Wilcoxon	2738	1.535E-08	Significant difference	0.459
	Back Scratch Test	Wilcoxon	2374	9.179E-08	Significant difference	0.422
	6-Minute Walk Test	Wilcoxon	2086	9.113E-13	Significant difference	0.572
	Arm Curl	Wilcoxon	4722	.1568	No difference	0.113
	Chair Stand	Wilcoxon	1706	.000663	Significant difference	0.269

DISCUSSION

Based on the general objective of assessing the impact of structured physical activity programs in older adults, the initial demographic data indicated that participants ranged in age from 60 to 94 years. This finding aligns with data from the United Nations (n.d.), which highlights that women outnumber men at older ages due to their longer life expectancy, with a global average of 74 years. In 2022, women represented 55.7% of individuals aged 65 and over worldwide.

In this context, the anthropometric evaluations revealed one of the most relevant findings: a significant variation in waist circumference across both evaluated groups, although in opposite directions. While the short-term follow-up group (six weeks) exhibited a mean reduction of approximately two centimetres, the long-term follow-up group (47 and 48 weeks) showed a comparable increase. This divergence suggests that, in the short term, physical activity programs may produce a positive initial impact on cardiometabolic health, as also reported by Varela-Gutiérrez and Rojas-Quirós (2021). Similarly, the waist circumference reduction parallels findings from Pacheco-Godoy et al. (2024), who observed improvements in participants engaging in virtually guided and regularly supervised exercise. These outcomes reinforce the notion that participant engagement and perceived evaluation—particularly during early phases—can enhance outcomes. However, in the absence of sustained stimuli, behavioural reinforcement, or individualized interventions, long-term benefits may be attenuated.

With regard to functional performance, assessed through the SFT, the short-term group demonstrated statistically significant changes in five out of six tests. These small-to-moderate improvements suggest that even a six-week period is sufficient to induce positive functional adaptations when programs are implemented systematically (Pinheiro et al., 2022; Mosqueda-Fernández, 2021). Nevertheless, the 8-foot walk test, which assesses agility and functional speed, showed contradictory results. Despite statistical significance, the increased time recorded in the post-test indicates a decline in agility, potentially related to daily variability, accumulated fatigue, or uncontrolled environmental factors during testing.

In contrast, the long-term group sustained improvements in lower-body flexibility, supporting the idea that continued training stimuli can maintain specific physical capacities. However, the group experienced a significant decline in aerobic capacity, as measured by the 6-minute walk test. This finding suggests that even with ongoing participation, multiple factors may influence cardiorespiratory performance in older adults, including age-related physiological decline (Al Nayf Mantas et al., 2022), intermittent dropout, comorbidities, or loss of adherence to the intensity required for physiological progression.

When comparing these results with similar studies, the functional fitness levels observed in this study's groups fall within expected ranges for physically active older adults in Latin America, although in some cases, they remain below values reported for special populations. For instance, in the short-term group, the mean 6-minute walk distance was 392.3 meters, which does not surpass the sarcopenia risk threshold of <408.5 meters proposed by Barreto-De Lima et al. (2023) in Brazil and is lower than the 512 ± 89 meters reported by Castillo-Daza et al. (2024) among Colombian police retirees enrolled in structured programs. This discrepancy may reflect differences in training intensity, baseline fitness levels, or participant commitment to the program.

Regarding upper-body strength, the average number of bicep curls in both groups —17.4 and 17.7 repetitions in the short-term group; 17.1 and 18.8 in the long-term group— was comparable to national and Latin American studies that have utilized the SFT (Castillo-Daza et al., 2024). These values are well above the sarcopenia risk threshold for women, defined as 11.5 repetitions. Similarly, the improvement in lower-body flexibility, from –9.0 cm to –0.2 cm in the short-term group, is consistent with the results reported in successful interventions such as Nordic walking (Paou et al., 2019) and resistance band training programs (Sánchez-Roa et al., 2024), which have documented gains of 20–28% in this functional component. This trend suggests that the evaluated program has positive potential, especially in the short term, although its effects appear to diminish over longer follow-up periods —possibly, as mentioned earlier, due to the challenges in sustaining motivation, adherence, and adequate training intensity over time. These findings should be interpreted within the realistic constraints of community-based programs, where material conditions, methodological variability, and environmental factors may substantially influence the observed outcomes.

The variation in outcomes between the short- and long-term follow-up groups raises important questions about the factors influencing the effectiveness of physical activity programs for older adults. Interestingly, it was the group with the highest average age —median of 75–76 years in Groups 3, 4, and 5— that demonstrated the greatest functional improvements, with statistically significant changes in five out of six SFT measures. In contrast, the younger group —median age of 69–70 years in Groups 1 and 2— exhibited more modest gains. A potential explanation may lie in the "*observer effect*", whereby the perception of being evaluated may have more strongly influenced the short-term group, due to the shorter time span between baseline and post-testing. This could have generated increased motivation, leading participants to improve attendance, increase effort during sessions, or even engage in more physical activity outside of the formal program. This type of adaptive response, however, is difficult to maintain over time, potentially explaining why the long-term group, despite participating for nearly a year, showed fewer functional gains.

Although this study identified some beneficial outcomes from the public physical activity program, such as improvements in upper- and lower-body flexibility and a significant reduction in waist circumference in the short-term group, the overall impact was modest, particularly when compared with similar interventions conducted in other settings. Studies from Europe, North America, and Latin America have reported greater gains in lower-body flexibility, muscular strength, and aerobic endurance (Fernández-Rodríguez et al., 2024). These programs, despite having similar durations and frequencies, achieved stronger outcomes across multiple SFT domains, raising critical questions about the training intensity, progression, and overall design quality of the program evaluated here (Fuertes-Paredes, 2023; Pinheiro et al., 2022; Mosqueda-Fernández, 2021).

While statistically significant improvements were recorded in five out of six SFT tests for the short-term group, the effect sizes were small to moderate. In the long-term group, a decline in aerobic capacity, as measured by the 6-minute walk test, was even observed. These disparities may be attributed to low physical demand, lack of individualized or progressive training, or insufficient ongoing evaluation, all of which have been identified as key determinants of intervention effectiveness in older adults (Fernández-Rodríguez et al., 2024).

CONCLUSIONS

The findings of this study demonstrate that the public physical activity program evaluated in an older adult population produced positive but modest impacts on both anthropometric and physical performance variables. The most notable result was the significant reduction in waist circumference in the short-term follow-up group (six weeks). In contrast, the long-term follow-up group (47 and 48 weeks, respectively) showed an increase in this measurement, suggesting that initial benefits may dissipate over time in the absence of complementary strategies to support adherence, supervision, and progression of the exercise stimulus.

From a physical performance perspective, the short-term group exhibited significant improvements in five out of six SFT components, particularly in upper- and lower-body flexibility and aerobic capacity. However, a decline in agility was identified —specifically in the 8-foot up-and-go test. In contrast, the long-term group maintained improvements in only four of the six SFT domains and showed a notable deterioration in aerobic capacity, reinforcing the notion that the training stimulus was insufficient or poorly adapted in terms of intensity and progression.

When compared with international evidence, these results suggest that the benefits achieved by the program were lower than those reported in similar interventions conducted in Latin America and Europe. Programs of equal or shorter duration have demonstrated more robust improvements in physical fitness, highlighting possible weaknesses in the methodological design, planning, or execution of the public program assessed in this study.

It is therefore concluded that, while the evaluated program has real potential for impact, especially in the short term, its effects were inconsistent and not sustained over time. The limited improvements observed in strength-related tests indicate that the strength training component requires reassessment and enhancement. Ensuring appropriate volume, frequency, type, and progression of strength stimuli is critical to translating physical activity sessions into measurable and sustained improvements in the overall health of older adults. Current scientific evidence supports the central role of strength training in the prevention of multiple aging-related chronic diseases, such as sarcopenia, osteoporosis, type 2 diabetes, and cardiovascular disease. Improvements in muscular strength are not only essential for maintaining functional independence, but also strongly associated with increased longevity and reduced incidence of hospitalizations and falls.

This underscores the urgent need to revise the content, intensity, methodology, and evaluation mechanisms of public exercise programs, incorporating progressive adjustments, individualized training plans, systematic feedback, and sustained participant motivation. Only through these structural improvements can the full benefits of physical activity in older adults be realized and interventions be clinically meaningful, physically relevant, and sustainable over time.

This study provides a valuable foundation for future research and public interventions, as it identifies both the strengths and limitations of community-based physical activity programs for older adults. Expanding this line of inquiry to other settings, with larger and more diverse samples, would significantly contribute to understanding the true and potential impact of these strategies on the health of aging populations. Moreover, implementing such programs at a larger scale, with technical and academic support, could generate broader and more sustainable public health benefits, especially in urban Latin American contexts, where population aging and chronic disease prevalence are increasing.

Consequently, and given the widespread presence of similar public programs at the national level, it is recommended that relevant institutions strengthen or redesign the content, methodologies, and operational processes that guide physical activity initiatives for older adults. This requires continuous monitoring, intensity tracking, sustained intervention strategies, and updated staff training, in addition to tailored adjustments based on age, sex, and initial functional level of participants.

It is also recommended that complementary components —such as educational sessions on nutrition and quality of life, periodic feedback, and progressive exercise plan adaptations— be integrated into the program to enhance long-term outcomes. Only through such measures can the extensive body of evidence on the benefits of physical exercise for older adults be translated into consistent, lasting, and clinically significant improvements within both local and national contexts.

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