Effectiveness of Health Promotion Intervention on Suspected Sarcopenia in Community-Dwelling Older Adults

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Background and Objectives

The world is gradually transitioning into an aging society. According to the United Nations World Population Report, the global population aged 65 and over is projected to increase from 10% in 2022 to 12% in 2030 and further to 16% by 2050. Taiwan is one of the countries experiencing the most rapid growth in the elderly population. In March 2018, it officially entered an aging society with 14% of the population being elderly, a percentage that continues to rise. It is expected to surpass 20% by 2025, marking a "super-aging society." With advancing age, older adults experience decreases in muscle mass, muscle strength, and physical performance, leading to suspected sarcopenia, considered a significant contributor to frailty and disability in the elderly. Therefore, promoting healthy aging and delaying disability among older adults is a critical societal issue. The aim of this study is to explore the effectiveness of health promotion interventions on suspected sarcopenia in community-dwelling older adults.

Methods and Interventions

This study adopts a quasi-experimental research design with community-dwelling older adults in Keelung City, Taiwan. Participants are divided into experimental and control groups based on their residential areas, from July 12, 2023, to August 2, 2023. The experimental group undergoes a 12-week health promotion intervention (home-based resistance band exercise, diverse nutritional education, utilizing communication software for care, self-management nutritional passport, and weekly nutritional counseling). The control group maintains their regular activities. After 12-week intervention, data are collected through demographic variables, physiological indicators, and dietary behavior questionnaires. Statistical analysis is conducted using SPSS 26.0 for Windows, with mean (SD) used for descriptive data. Analysis of covariance (ANCOVA) is employed to assess differences between the two groups in sarcopenia indicators post-intervention, with significance set at $p < 0.05$.

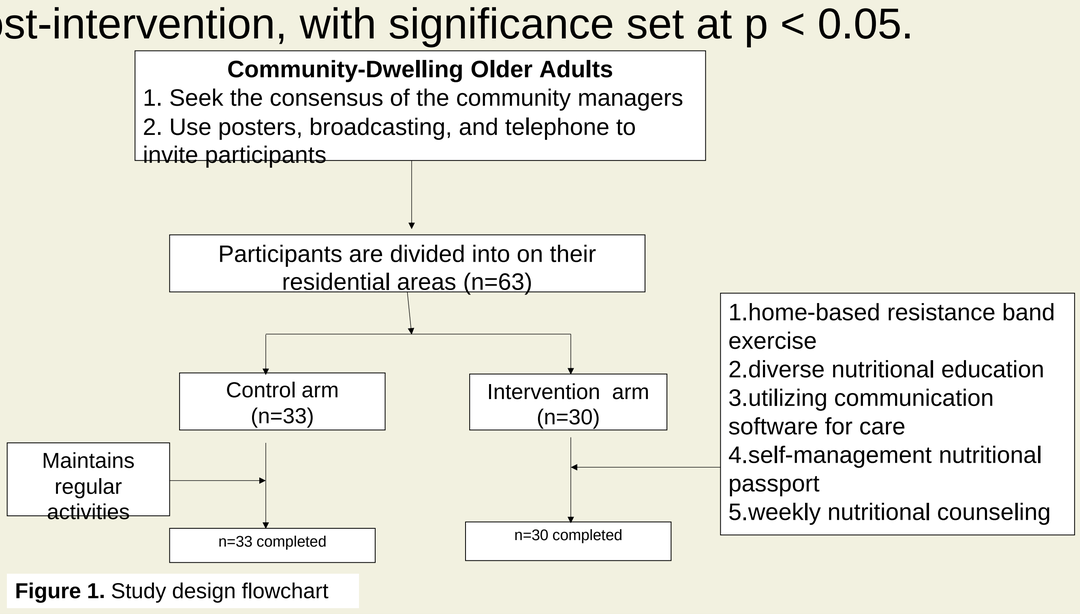

Figure 1. Study design flowchart

Results

A total of 63 participants, with an average age of 74.3 years, mostly female (61 individuals, 96.8%), participated in the study. Statistical tests show no significant differences between the experimental and control groups in terms of demographic characteristics, sarcopenia indicators, and dietary behaviors, indicating high homogeneity between the two groups.

Only vegetable intake in dietary behavior shows a difference. After the 12-week health promotion intervention, paired t-tests within the experimental group reveal significant differences in sarcopenia indicators: grip strength ($t = -3.18$, $p = 0.004$) and 5-time sit-to-stand test ($t = 2.67$, $p = 0.012$). There is also a significant difference in dietary behavior post-intervention, with post-intervention measurements being superior to pre-intervention ones. Additionally, ANCOVA tests show significant effects of the intervention on grip strength ($F(1,60)=4.824$, $p=0.032$, $\eta 2p=0.074$) and 5-time sit-to-stand test ($F(1,60)=0.459$, $p=0.050$, $\eta 2p=0.008$) after controlling for covariates, indicating a moderate explanatory power of the health promotion intervention.

	Total (n=63)	Control (n=33)	Intervention (n=30)	p
Age	74.30±7.87	72.67±7.35	76.10±8.16	0.084
BW (kg)	54.92±6.29	54.67±5.09	55.19±7.46	0.746
Sex				0.945
Male	2(3.2)	1(3.0)	1(3.3)	
Female	61(96.8)	32(97.0)	29(96.7)	
Marriage				0.845
Married	26(41.3)	14(42.4)	12(40.0)	
Unmarried	37(59.7)	19(57.6)	18(60.0)	
Living				0.735
Solitary living	28(44.4)	14(42.4)	14(46.7)	
Cohabiting	35(55.6)	19(57.6)	16(53.3)	
Children				0.789
No	7(11.1)	4(12.1)	3(10.0)	
Yes	56(88.9)	29(87.9)	27(90.0)	
Current Drinker				0.336
No	62(98.4)	32(97.0)	30(100.0)	
Yes	1(1.6)	1(3.0)	0(0)	
Suspected Sarcopenia				0.200
No	25(39.7)	14(42.4)	11(36.7)	
Yes	38(60.3)	19(57.6)	19(63.3)	
Dietary behaviors				
Whole grains	2.05±0.68	2.03±0.73	2.07±0.64	0.835
Proteins	3.30±0.82	3.45±0.75	3.13±0.86	0.119
Vegetables	3.70±0.84	3.91±0.81	3.47±0.82	0.035*
Nuts	3.02±1.35	3.24±1.42	2.77±1.25	0.164
Dairy products	3.16±1.22	3.21±1.17	3.10±1.30	0.719
Fruits	3.63±0.92	3.58±0.90	3.70±0.95	0.597

Table 1. Demographic characteristics, sarcopenia indicators, and dietary behaviors. Values are mean (SD) or number (%). The Mann– Whitney U test or Chi-square tests indicated no differences (P > 0.05) between the intervention and control at baseline.

	Pre-test mean±SD	Post-test mean±SD	p
Dietary behaviors			
Whole grains			
Intervention	2.07±0.64	3.40±0.77	0.000***
Control	2.03±0.73	2.30±0.64	0.107
Proteins			
Intervention	3.13±0.86	4.50±0.77	0.000***
Control	3.45±0.75	3.48±0.76	0.845
Vegetables			
Intervention	3.47±0.82	4.60±0.62	0.000***
Control	3.91±0.81	3.61±0.70	0.016*
Nuts			
Intervention	2.77±1.25	3.97±1.03	0.000***
Control	3.24±1.42	3.09±1.28	0.169
Dairy products			
Intervention	3.10±1.30	3.80±1.24	0.010**
Control	3.21±1.17	3.27±0.72	0.645
Fruits			
Intervention	3.70±0.95	4.43±0.73	0.001***
Control	3.58±0.90	3.36±0.74	0.07
Sarcopenia			
Grip strength			
Intervention	20.17±4.49	22.13±4.82	0.004**
Control	21.03±3.92	21.36±4.30	0.47
5-time sit-to-stand			
Intervention	11.05±3.56	10.40±3.65	0.012*
Control	10.40±2.73	10.11±3.27	0.345
Six-meter gait speed			
Intervention	1.13±0.29	1.11±0.31	0.454
Control	1.11±0.21	1.12±0.29	0.091
SMI			
Intervention	7.51±0.89	7.65±0.96	0.289
Control	7.52±0.86	7.36±1.04	0.231

Table 2.Comparison of pre- and post-test results in the intervention and control arms

	Effect size (phi/η^2_p)	p	95%CI		Effect size (phi/h2 p)	p	95%CI
Dietary behaviors				**Sarcopenia**			
Whole grains	0.387	<.001***	0.737, 1.447	Grip strength	0.074	0.032	-0.008, 2.985
Proteins	0.345	<.001***	0.699, 1.472	5-time sit-to-stand	0.008	0.050*	-0.704, 1.425
Vegetables	0.405	<.001***	-1.023, -0.267	Six-meter gait speed	0.005	0.592	-0.145, 0.084
Nuts	0.383	<.001***	0.802, 1.585				
Dairy products	0.120	0.006**	0.193, 1.090				
Fruits	0.386	<.001***	0.691, 1.358				

Table 3. Effectiveness of Health Promotion Intervention on Suspected Sarcopenia between-arm analysis.

Conclusion and Experience

The study demonstrates significant differences in sarcopenia indicators before and after the 12-week health promotion intervention, indicating improvements in sarcopenia indicators among the experimental group. Short-term health promotion intervention programs show effectiveness, but post-program, older adults may revert to their original dietary behaviors. Future recommendations include training community volunteers to continuously encourage healthy dietary behaviors among community-dwelling older adults, thereby strengthening their health behaviors.