



Feasibility and Safety study of Exercise and nutrition intervention during chemotherapy for older cancer patients

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Introduction

- In our previous feasibility exercise study (1), we demonstrated that a 6-week home-based exercise program was safe and achievable in patients with advanced GI cancer receiving palliative chemotherapy. However, that study enrolled predominantly younger patients (median age 60), and did not include protein supplementation—an essential component of sarcopenia mitigation, particularly in the older adults.
- This study assessed the feasibility, safety, and effects of combined exercise and nutritional interventions on skeletal muscle index (SMI), body composition, safety and quality of life(QoL) in older adults with cancer receiving palliative chemotherapy

Materials and Methods

- From 2021 to 2023, 60 patients aged ≥65 with advanced cancer participated in a 12-week program.
- Patients were divided into an intervention group (exercise and nutrition, n=20) and a control group (n=40).
- The primary endpoint : the feasibility of the exercise and nutrition intervention program, assessed by compliance over six weeks. Exercise compliance ≥50% and nutrition compliance ≥50% were each considered acceptable. Secondary endpoints: SMI, subcutaneous and visceral fat, safety, and QoL.

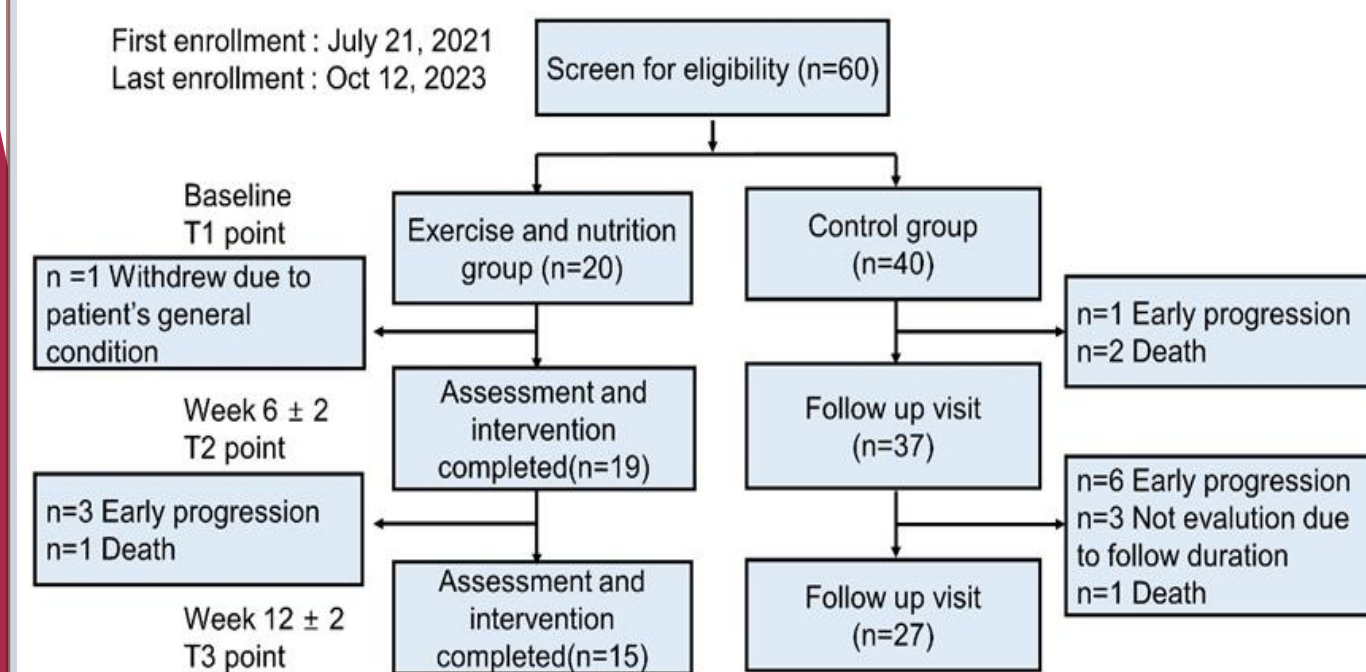


Figure1. Patient flowchart

Results

- The median age was 72 years, with 65% male participants. Sarcopenia was present in 41.7% of patients. The compliance to the exercise intervention in was 65.0% (13/20), with 30.0% (6/20) achieving over 80% exercise session compliance, and the mean exercise duration was 27.3 minutes. Nutrition compliance was 75.0% (15/20). The attrition rate was 5.0% (1/20) and no adverse events were reported.

Characteristics	Total (N=60)	Exercise and Nutrition group (N=20)	Control (N=40)	P value
Age - year				
median	72	68	72	0.013
range	65-88	65-82	65-88	
Sex, n (%)				
Male	39 (65.0%)	15 (75.0%)	24 (60.0%)	0.251
ECOG PS, n (%)				
0-1	47 (78.3%)	19 (95.0%)	28(70.0%)	0.027
2	13 (21.7%)	1 (5.0%)	12(30.0%)	
BMI, kg/m ² , mean ± SD	22.1 ± 3.6	22.7 ± 3.7	21.8 ± 3.6	0.374
L3 Skeletal muscle index (cm ² /m ²)	43.0 ± 7.4	44.8 ± 9.0	42.1 ± 6.4	0.187
Sarcopenia, n (%)	15 (41.7%)	8 (40.0%)	7 (43.8%)	0.821
Primary cancer				0.573
Stomach cancer	12 (20.0%)	5 (25.0%)	7 (17.5%)	
Esophageal cancer	2 (3.3%)	1 (5.0%)	1 (2.5%)	
Colorectal cancer	21 (35.0%)	6 (30.0%)	15 (37.5%)	
Biliary pancreas cancer	18 (30.0%)	7 (35.0%)	11 (27.5%)	
lung cancer	6 (8.4%)	0 (0%)	5 (12.5%)	
other cancer	2 (3.3%)	1 (5.0%)	1 (2.5%)	
Palliative chemotherapy line				0.039
1st line	40 (66.7%)	13 (65.0%)	27 (67.5%)	
2nd line	13 (21.7%)	2 (10.0%)	11 (27.5%)	
≥3rd line	7 (11.6%)	65(25.0%)	2 (5.0%)	

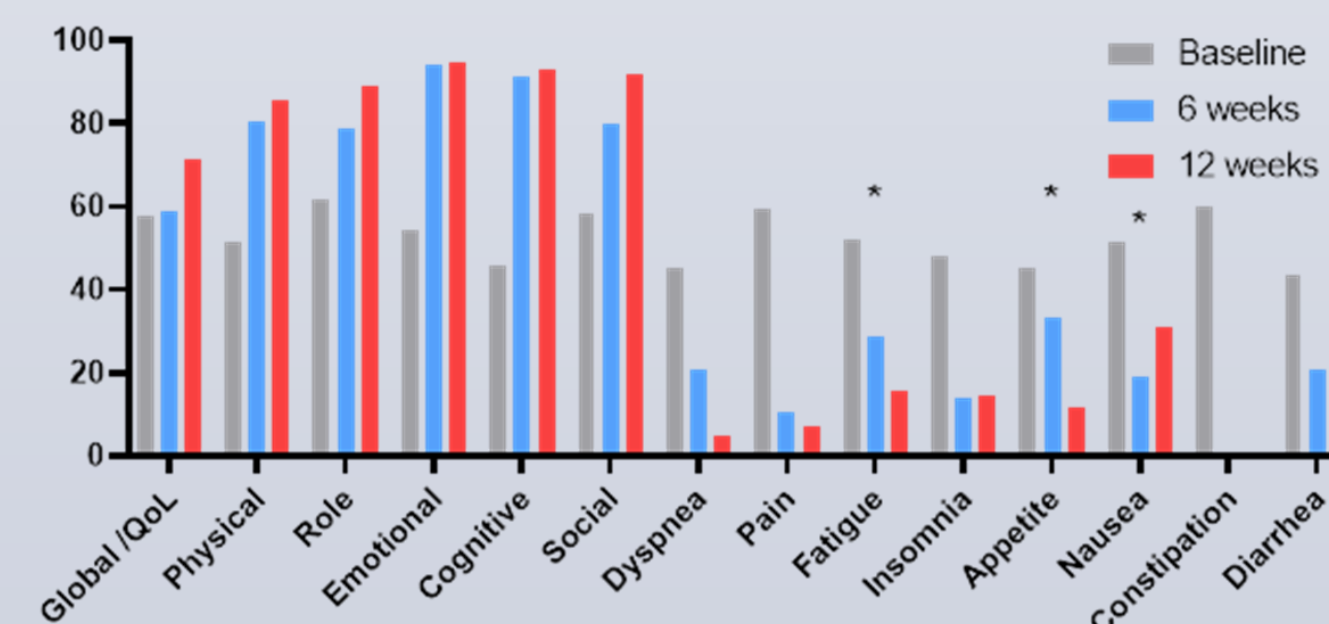
Table1. Baseline characteristics

- At six weeks, the control group experienced significant SMI declines (-1.3 ± 3.0 , $p=0.010$), while SMI was maintained in the intervention group (-3.3 ± 12.0 , $p=0.234$). Subcutaneous fat significantly decreased in the intervention group (-11.0 ± 20.4 , $p=0.030$). Visceral fat reduction trends were noted (-10.5 ± 26.9 , $p=0.105$), with significant reductions in males (-17.5 ± 26.8 , $p=0.031$). At 12 weeks, the intervention group maintained stable SMI and fat levels, while the control group showed continued declines.

	Baseline (Mean)		Change from baseline (6 weeks)				Change from baseline (12 weeks)			
	Intervention group (n=20)	control group (n=40)	Intervention group (n=19)	P value	control group (n=37)	p value	Intervention group (n=15)	p value	control group (n=27)	p value
SMI (cm ² /m ²)	44.8	42.1	-3.3 ± 12.0	0.234	-1.3 ± 3.0	0.010	-0.6 ± 2.8	0.413	-0.4 ± 3.7	0.546
Male	46.9	44.6	-4.4 ± 13.9	0.259	-1.2 ± 2.9	0.062	-0.4 ± 3.0	0.604	-0.7 ± 2.9	0.303
Female	38.5	38.3	-0.5 ± 1.6	0.493	-1.5 ± 3.3	0.093	-1.1 ± 2.1	0.430	0.1 ± 5.2	0.941
Subcutaneous fat (cm ²)	108.1	98.7	-11.0 ± 20.4	0.030	-4.1 ± 22.2	0.268	-6.2 ± 38.5	0.538	2.4 ± 26.1	0.633
Male	78.9	100.1	-5.9 ± 17.7	0.232	-1.3 ± 17.9	0.737	5.4 ± 33.8	0.591	6.3 ± 19.5	0.183
Female	195.8	96.6	-25.4 ± 22.7	0.067	-8.2 ± 27.5	0.267	-53.0 ± 2.6	0.001	-5.4 ± 36.1	0.661
Visceral fat (cm ²)	94.1	131.5	-10.5 ± 26.9	0.105	-9.9 ± 31.4	0.061	-18.1 ± 33.8	0.057	-2.0 ± 30.6	0.736
Male	95.6	155.7	-17.5 ± 26.8	0.031	-10.3 ± 36.5	0.198	-18.8 ± 37.6	0.110	-2.0 ± 30.5	0.781
Female	89.4	95.1	8.4 ± 18.0	0.358	-9.2 ± 22.0	0.127	-15.0 ± 14.1	0.208	-1.9 ± 32.7	0.861

Table2. Comparative Changes in Body Composition at 6 and 12 Weeks Between Intervention and Control Groups

- At 12 weeks, QoL improved ($P = 0.095$), with significant reductions in fatigue ($P = 0.009$), appetite loss ($P = 0.002$), and nausea ($P = 0.026$), and a trend toward pain relief ($P = 0.068$) in the intervention group.



* indicates statistically significant improvement compared to baseline ($p < 0.05$).

Figure 2. Changes in quality of life (QoL) scores over time following a combined exercise and nutritional intervention in patients with cancer

Conclusions

- A combined exercise and nutrition intervention was feasible, safe, and well-tolerated in older adults with cancer receiving palliative chemotherapy.
- It preserved muscle mass and reduced subcutaneous fat, highlighting its potential to mitigate sarcopenia and improve body composition, while modestly improving quality of life.
- These findings suggest its potential to counteract cancer-related sarcopenia and support the need for larger confirmatory studies.

References

- Park SE, Kim DH, Kim DK, Ha JY, Jang JS, Choi JH, et al. Feasibility and safety of exercise during chemotherapy in people with gastrointestinal cancers: a pilot study. Support Care Cancer. 2023;31(10):561.

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