

Effects of a Multicomponent High Intensity Exercise Program on Physical Function and Health-Related Quality of Life in Older People with or at Risk of Mobility Disability After Discharge from Hospital: A Randomised Controlled Trial



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Background

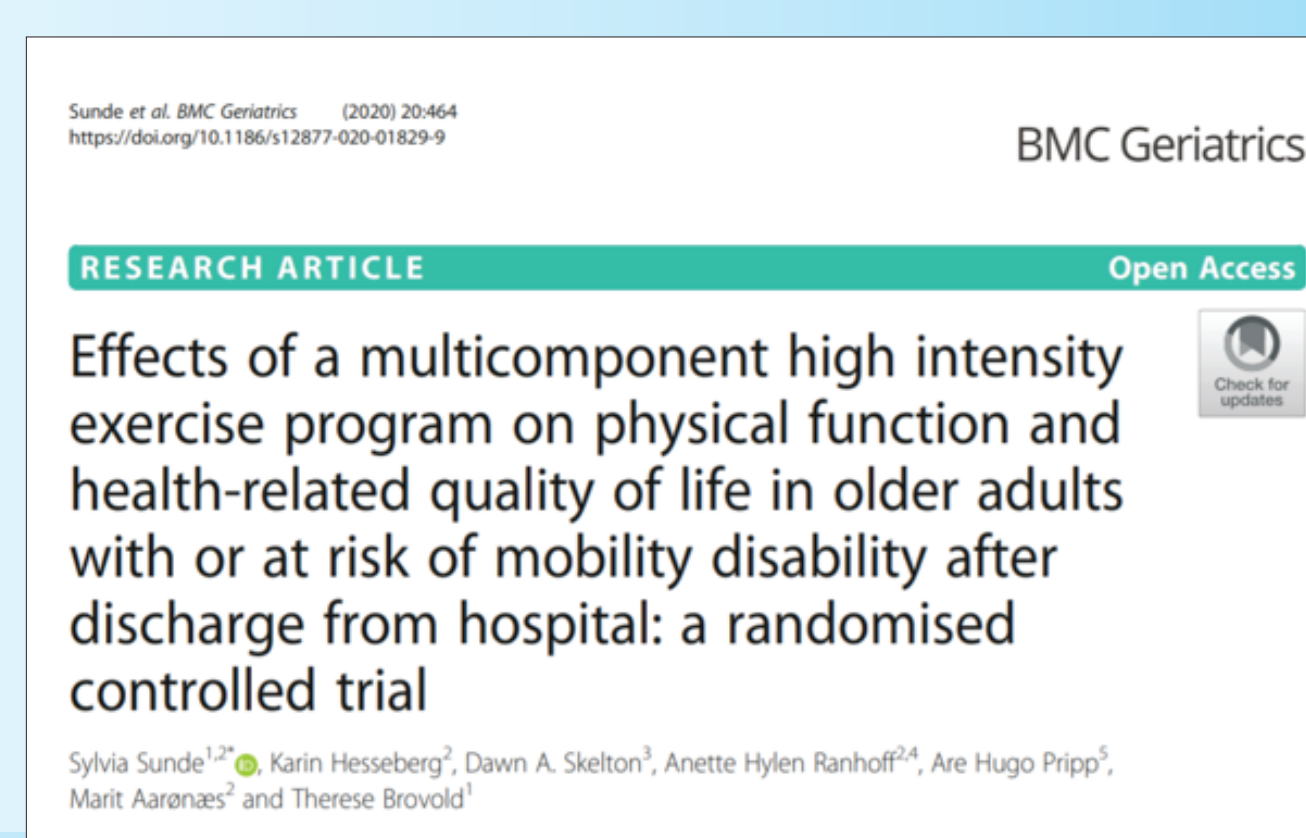
Although studies have shown that many older people have declined physical function and reduced health-related quality of life (HRQOL) after discharge from hospital, knowledge about effective interventions for this population is still scarce. Hence, our objective was to evaluate the effects of a group-based multicomponent high intensity exercise programme on physical function and HRQOL in older people with or at risk of mobility disability after discharge from hospital.

Methods

This single blinded parallel group randomised controlled trial recruited eighty-nine home dwelling older people (65–89years) while inpatient at medical wards at a general hospital in Oslo, Norway. The intervention group performed a group-based exercise program led by a physiotherapist twice a week for 4 months. Both groups were instructed in a home-based exercise program and were encouraged to exercise according to World Health Organisation's recommendations for physical activity in older people. The primary outcome, physical performance, was measured by the Short Physical Performance Battery. Secondary outcomes were 6-min walk test (6MWT), Berg Balance Scale, grip strength, Body Mass Index, and HRQOL (the Short-Form 36 Health Survey (SF-36)).

Results

Intention-to-treat analysis showed that the intervention group improved their functional capacity (6MWT) and the physical component summary of SF-36 significantly compared to the control group. No further between group differences in change from baseline to 4 months follow-up were found.



Key conclusions



A high intensity multicomponent exercise program significantly improved functional capacity and physical HRQOL in older people with or at risk of mobility disability after discharge from hospital.

Table 1. Characteristics of the study sample. Means, standard deviations (SD), numbers and percentages.

Characteristics	Total (N=88)	Intervention group (n=44)	Control group (n=44)
Age in years, mean (SD)	78.3 (5.5)	78.6 (5.7)	77.9 (5.2)
Sex, female n (%)	43 (48.9)	17 (38.6)	26 (59.1)
Living alone, n (%)	45 (51.1)	22 (50.0)	23 (52.3)
Education, n (%)			
Less than bachelor's degree	35 (39.8)	12 (27.3)	23 (52.3)
Bachelor's degree	32 (36.4)	20 (45.5)	12 (27.3)
More than bachelor's degree	21 (23.9)	12 (27.3)	9 (20.5)
Length of stay, in days, median (IQR)	2 (1-4)	2 (1-4.8)	3 (1-4)
Number of comorbidities, mean (SD)	4.47 (2.3)	4.2 (2.5)	4.8 (2.1)
Hospital admission diagnosis (ICD-10), n (%)			
Mental and behavioral disorders	4 (4.5)	2 (4.5)	2 (4.5)
Diseases of the nervous system	5 (5.7)	2 (4.5)	3 (6.8)
Diseases of the eye and adnexa/ear and mastoid process	6 (6.8)	5 (11.4)	1 (2.3)
Diseases of the circulatory system	31 (35.2)	16 (36.4)	15 (34.1)
Diseases of the respiratory system	14 (15.9)	8 (18.2)	6 (13.6)
Diseases of the musculoskeletal system and connective tissue	5 (5.7)	4 (9.1)	1 (2.3)
Diseases of the genitourinary system	9 (10.2)	2 (4.5)	7 (15.9)
Other diseases	14 (15.9)	5 (11.4)	9 (20.5)
Fall since discharge, n (%)	25 (28.4)	11 (25.0)	14 (31.8)
Physical function:			
Short Physical Performance Battery, mean (SD) ^a	8.7 (2.3)	8.6 (2.3)	8.9 (2.2)
Gait speed (m/s), mean (SD), n=85 (42 int. group and 43 cont. group)	0.8 (0.2)	0.8 (0.2)	0.8 (0.2)
Grip strength (kg), mean (SD)	26.3 (9.1)	26.8 (8.7)	25.8 (9.5)
Berg Balance Scale, mean (SD) ^a	48.9 (6.8)	48.8 (6.6)	48.9 (7.1)
6-minute walk test (m), mean (SD)	387.4 (115)	378.8 (109.8)	396.1 (120.7)
Body mass index, mean (SD)	26.9 (5.4)	26.1 (5.4)	27.8 (5.4)
International physical activity questionnaire (IPAQ), n=69			
High, n (%)	7 (10.2)	4 (10.8)	3 (9.4)
Moderate, n (%)	25 (36.2)	14 (37.8)	11 (34.4)
Low, n (%)	37 (53.6)	19 (51.4)	18 (56.3)
Health related quality of life (SF-36) ^b			
Physical functioning, n=88 (44 int. group and 44 cont. group)	58.9 (23.3)	57.1 (22.7)	60.7 (24.0)
Role physical, n=83 (41 int. group and 42 cont. group)	47.0 (27.8)	42.9 (27.5)	51.0 (27.9)
Bodily pain, n=83 (42 int. group and 41 cont. group)	56.6 (25.9)	55.8 (28.4)	57.4 (23.5)
General health, n=85 (43 int. group and 42 cont. group)	52.2 (21.6)	50.5 (21.2)	54.1 (22.2)
Vitality, n=86 (43 int. group and 43 cont. group)	44.9 (17.5)	44.8 (15.5)	44.9 (19.6)
Social functioning, n=87 (44 int. group and 43 cont. group)	67.5 (28.1)	67.3 (26.9)	67.7 (29.5)
Role emotional, n=83 (43 int. group and 40 cont. group)	59.4 (23.2)	62.2 (21.9)	56.5 (24.4)
Mental health, n=85 (43 int. group and 42 cont. group)	67.7 (14.4)	66.7 (15.2)	68.7 (13.6)
Physical component summary, n=79 (40 int. group and 39 cont. group)	39.0 (10.1)	37.3 (10.5)	40.7 (9.5)
Mental component summary, n=79 (40 int. group and 39 cont. group)	47.7 (8.1)	48.0 (8.7)	47.3 (7.5)

N = number of individuals. ICD = International Classification of Disease. BMI = Body Mass Index, calculated using the formula weight in kilograms divided by height in meters squared. SF-36 = the medical Outcome 36 -Item Short form Survey.

^a Higher scores reflect better physical function. ^b Higher scores reflect better HRQOL.

Table 2. Results at 4-month follow-up and effect of intervention based on intention-to-treat analysis.

Physical function	Intervention group 4 months, mean (SD)	Control group 4 months, mean (SD)	Mean between group difference ^a	95% confidence interval	P value	Effect size ^d
SPPB ^b	9.3 (2.8)	9.3 (2.7)	0.8	-0.3 - 1.8	0.151	0.38
6-minute walk test	419.3 (122.9)	412.7 (138.3)	30.9	2.1 - 59.8	0.036	0.56
Berg Balance Scale ^b	50.0 (7.0)	50.5 (7.7)	-0.6	-2.2 - 0.9	0.402	0.22
Grip strength (kg)	28.0 (8.3)	26.5 (9.8)	1.1	-0.5 - 2.7	0.178	0.36
BMI	25.9 (3.5)	27.1 (5.9)	0.1	-0.4 - 0.6	0.672	0.12
HRQOL (SF-36)						
PCSC ^c	42.9 (11.2)	38.5 (10.3)	7.1	3.1 - 11.1	0.001	0.94
MCS ^c	48.4 (8.1)	49.8 (7.8)	-0.7	-4.0 - 2.7	0.694	0.10

SPPB = Short Physical Performance Battery. BMI = Body Mass Index, calculated using the formula weight in kilograms divided by height in meters squared. SD = Standard deviation. HRQOL = Health Related Quality of Life. SF-36 = the medical Outcome 36 -Item Short form Survey. PCS = Physical component summary. MCS = Mental component summary. Statistically significant p-values are in bold. The level of significance was set at 0.5

^a Mean between group difference refers to difference between outcome at baseline and 4-month-follow up.

^b Higher scores reflect better physical function.

^c Higher scores reflect better HRQOL.

^d Effect size = Cohen's d