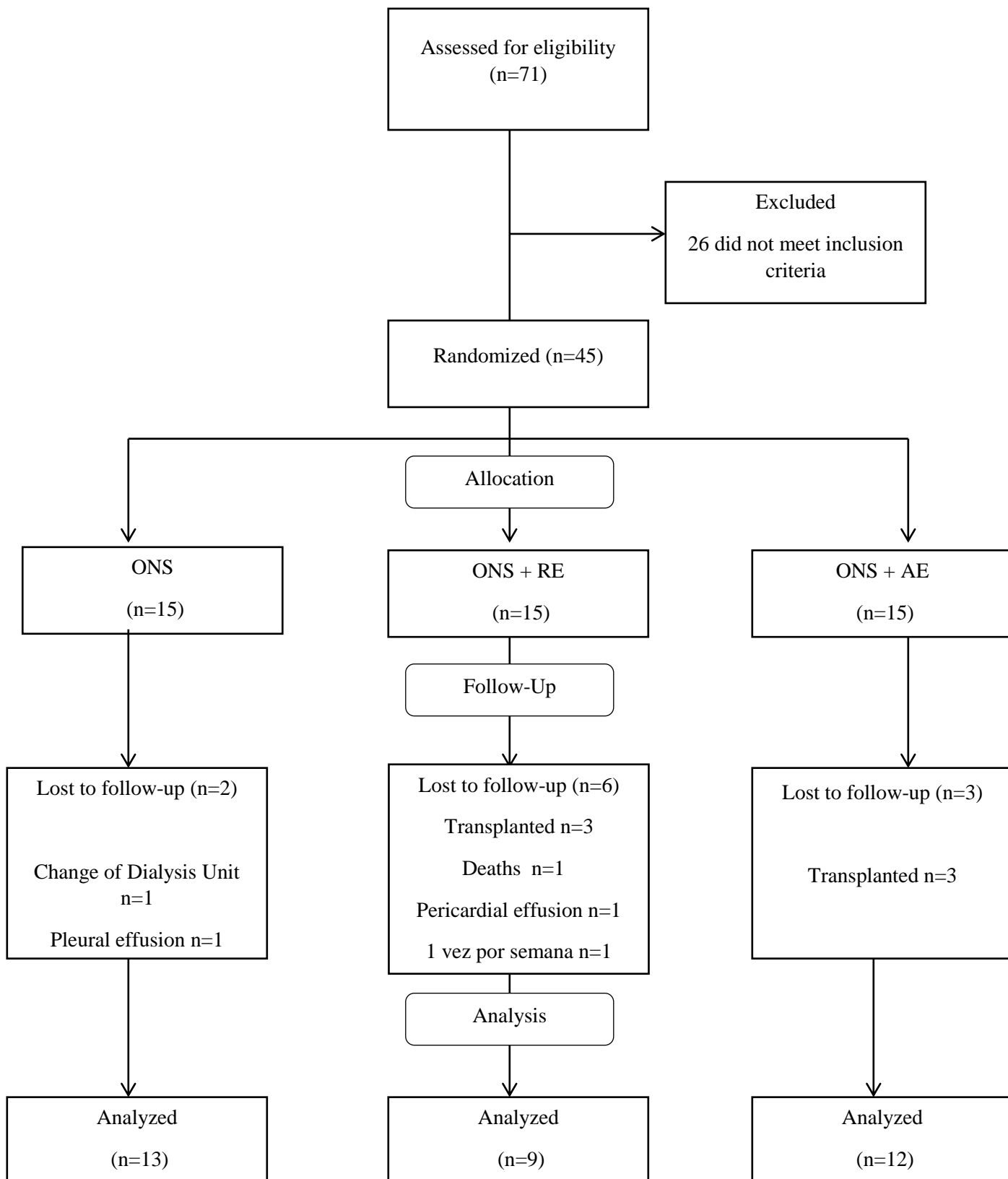


Participant flow

Figure 1. Screening, Randomization, and Follow-up according to the CONSORT diagram.



Baseline characteristics

Table 1. Baseline demographic, body composition, laboratory and physical function characteristics of the study population

	TOTAL (n=45)	ONS (n=15)	ONS + RE (n=15)	ONS + AE (n=15)	p
Age (years)	29 ± 9.3	27.1 ± 8.1	30.3 ± 10.8	31.58 ± 9.5	0.487
Sex (male)	21 (46.7)	9 (60)	5 (33.3)	7 (46.7)	0.343
Etiology					0.740
Unknow	36 (80)	12 (80)	13 (87.7)	11 (73.3)	
Diabetes mellitus	2 (4.4)	1 (6.7)	1 (6.7)	1 (6.7)	
Glomerulopathy	2 (4.4)	1 (6.7)	0 (0)	1 (6.7)	
Hypertension	3 (6.7)	0 (0)	1 (6.7)	2 (13.3)	
Other	2 (4.4)	1 (6.7)	1 (6.7)	0 (0)	
Frequency of dialysis					0.562
2 times per week	39 (86.7)	13 (86.7)	12 (80)	14 (93.3)	
3 times per week	6 (13.3)	2 (13.3)	3 (20)	1 (6.7)	
Dialysis vintage, months	21 (6.5,38)	28(8,48)	19(8,36)	24(4,36)	0.487
Comorbidities					0.593
Diabetes	2 (4.4)	1 (6.7)	0 (0)	1 (6.7)	
Hypertension	45 (100)	15 (100)	15 (100)	15 (100)	
Vascular access					0.757
Catheter	27 (60)	8 (53.3)	10 (66.7)	9 (60)	
AV fistula	18 (40)	7 (46.7)	5 (33.3)	6 (40)	
Body composition					
Weight (kg)	52.4 ± 8.2	52 ± 9.7	53.3 ± 6	52.2 ± 8.5	0.939
BMI (kg/m2)	20.3 ± 2.4	19 ± 1.8	21.5 ± 1.9	19.7±3.1	0.040
MAC (cm)	24.5 ± 2.9	23.8 ± 2.6	25.3 ± 2.8	23.6 ± 3.3	0.313
AMC (mm)	216 ± 25.2	217 ± 29.9	216.2 ± 20.8	205.4 ± 26.4	0.788
AMA (cm²)	31.2 ± 8.8	31.6 ± 10.5	31 ± 7.5	27.6 ± 8.7	0.833
FM% from anthropometry	17.7 ± 7	14.3 ± 5.7	21.2 ± 6.1	19.6 ± 7.5	0.043
Triceps skinfold thickness (mm)	9.3 ± 4.6	6.7 ± 3	11.8 ± 5.8	10 ± 4.6	0.042
Resistance (ohm)	595 ± 127.4	601 ± 125.7	562.5 ± 135.7	622.7 ± 131.2	0.402
Reactance(ohm)	54.4 ± 19.8	52.6 ± 17.5	54.7 ± 23.5	63.2 ± 18	0.577
Phase angle (°)	5 ± 1.1	4.8 ± .86	5.4 ± 1.4	5.6 ± .79	0.866
Laboratory tests					

Haemoglobin (g/dl)	9.9 ± 2.3	10.8 ± 2.3	10.1 ± 1.4	10.2 ± 2.1	0.636
Total lymphocytes count (cells/mm³)	1187 ± 405	1100 ± 360	1231.5 ± 515	1249 ± 328	0.586
Creatinine mg/dl	12.9 ± 3.2	13.7 ± 3.3	12.8 ± 3.2	12.1 ± 3.2	0.422
Albumin (g/dL)	3.7 ± .45	3.7 ± .48	3.7 ± .56	3.6 ± .31	0.888
Phosphorus (mg/dl)	5.7 (4.7,6.7)	5.4 (4,7.3)	6.3 (5.3,7.2)	5.6 (4.6,5.9)	0.549
Potassium (mmol/L)	5.5 ± .85	5.5 ± .81	5.5 ± .72	5.4 ± 1	0.895
CRP (mg/L)	4.2 (2.8,10.5)	3.6 (2.8,5.2)	4.6 (2.3,12)	7.2 (3.1,13.8)	0.781
Physical Function					
Six-minute walk (m)	435 ± 61	463.8 ± 51.7	424.7 ± 61.7	419.2 ± 62.7	0.090
Six-minute walk (m/s)	1.2 ± .16	1.2 ± .14	1.1 ± .17	1.1 ± .17	0.086
Time Up and Go (s)	7.3 ± 1.3	7 ± 1.2	7.5 ± 1.6	7.5 ± 1.3	0.671
Sit to stand (s)	10.16 ± 2.9	9.4 ± 2.1	9.7 ± 2.3	11.2 ± 3.8	0.284
Handgrip strenght (kg)	22.5 ± 7.4	25 ± 8.9	21.6 ± 7.9	20.8 ± 4.6	0.279
Physical Activity (Kcal from PAQ)	2211.9 ± 591	2256.6 ± 722	2223.7 ± 502	2154.7 ± 539	0.914

Data are indicated as absolute number (percentage), mean ± SD or median (first and third quartiles). ONS, oral nutritional supplementation; ONS + RE, oral nutritional supplementation plus resistance exercise; ONS + AE, oral nutritional supplementation + aerobic exercise; BMI, body mass index; MAC, midarm circumference; AMC, arm muscle circumference; AMA, arm muscle area; FM%, fat mass as a percentage of body weight; PAQ, physical activity questionnaire.

Outcome measures

Table 2. Effect size (Cohen's-d) calculation for physical function tests

	ONS	ONS + RE	ONS + AE
Six-minute walk test (m)	0.35	0.94	1.11
Sit to stand test (s)	0.52	0.81	1.20
Timed up and go test (s)	0.91	1.04	1.6
Handgrip strength (kg)	0.11	1.01	0.60

Cohen's -d was calculated considering repeated measures. ONS, oral nutritional supplementation; ONS + RE; oral nutritional supplementation plus resistance exercise; ONS + AE; oral nutritional supplementation plus aerobic exercise.

Table 3. Changes in body composition measured by anthropometrics and bioelectric impedance analysis

Variables	ONS			ONS + RE			ONS + AE			<i>P</i> [†]
	Baseline (n=13)	Final (n=13)	<i>p</i>	Baseline (n=9)	Final (n=9)	<i>p</i>	Baseline (n=12)	Final (n=12)	<i>p</i>	
Weight (kg)	52 ± 9.7	53 ± 9.3	0.032	53.3 ± 6	54.9 ± 5.1	0.006	52.2 ± 8.5	52.8 ± 8.3	0.097	0.216
BMI (kg/m²)	19.4 ± 1.6	19.8 ± 1.7	0.035	21.4 ± 1.2	22.1 ± 1	0.006	20.8 ± 2.8	21 ± 2.6	0.123	0.209
MAC (cm)	24.1 ± 2.3	24.4 ± 2.1	0.179	25.8 ± 2.1	26.2 ± 2.1	0.209	25.3 ± 2.8	25.5 ± 2.7	0.590	0.843
AMC (mm)	217.9 ± 27.6	219.9 ± 24	0.410	224.4 ± 23.1	225.1 ± 23.4	0.839	220.6 ± 24.7	219 ± 25	0.666	0.685
AMA (cm²)	31.8 ± 9.7	34.4 ± 8.4	0.500	33.9 ± 8.5	34.2 ± 8.6	0.821	32.7 ± 8.8	32.4 ± 8.8	0.684	0.752
FM % from anthropometry	14.3 ± 5.7	15.1 ± 5.6	0.082	21.2 ± 6.1	22.4 ± 6.2	0.031	19.6 ± 7.5	20.3 ± 7.7	0.316	0.797
Triceps skinfold thickness (mm)	7.3 ± 3	7.8 ± 2.6	0.139	10.8 ± 3.2	11.7 ± 3.2	0.035	10.5 ± 4.3	11.2 ± 4.6	0.222	0.780
R (ohm)	563.8 ± 120.2	577.2 ± 115.8	0.547	634.5 ± 118.6	647 ± 114.5	0.583	597.5 ± 148.2	598.1 ± 156.3	0.982	0.488
Xc (ohm)	52.6 ± 14.7	56.2 ± 14.6	0.410	61 ± 17.6	63.9 ± 15.1	0.489	58 ± 26.3	60.6 ± 23.4	0.511	0.983
Phase angle (°)	5.3 ± 1	5.5 ± 1.3	0.613	5.3 ± 3.7	5.6 ± .93	0.289	5.1 ± 1.3	5.6 ± 1.3	0.067	0.776
Physical activity (Kcal from PAQ)	2130 ± 586.3	2067 ± 502	0.569	2186 ± 523.6	2258 ± 254	0.695	2151.4 ± 565	2021.5 ± 368	0.322	0.591

Anthropometric indicators are mean ± SD or median (first and third quartiles).

ONS, oral nutritional supplementation; ONS + RE, oral nutritional supplementation plus resistance exercise; ONS + AE, oral nutritional supplementation plus aerobic exercise;

BMI, body mass index; MAC, midarm circumference; AMC, arm muscle circumference; AMA, arm muscle area; FM%, fat mass; PAQ, physical activity questionnaire

as percentage of body weight; R, resistance at 50 kHz; Xc, reactance at 50 kHz.

p[†]=Repeated Measures ANOVA (3 groups x 2 times)

Table 4. Changes in biochemical indicators

	ONS			ONS + RE			ONS + AE			p^{\dagger}
	Baseline (n=13)	Final (n=13)	p	Baseline (n=9)	Final (n=9)	p	Baseline (n=12)	Final (n=12)	p	
Hemoglobin (g/dl)	10.8 ± 2.3	10.6 ± 1.8	0.083	10.1 ± 1.4	11.7 ± 1.7	0.673	10.2 ± 2.1	9.8 ± 2.3	0.866	0.210
Total lymphocytes count (cell/mm³)	1134 ± 375	1443 ± 506	0.001	1260.6 ± 486.8	1327 ± 431.7	0.003	1215 ± 347	1128.3 ± 399	0.048	0.009
Creatinine (mg/dl)	14 ± 3.5	12.3 ± 3.4	0.078	12.6 ± 3.1	11.9 ± 3.9	0.095	12.6 ± 3.3	11.7 ± 3.6	0.037	0.732
Albumin (g/dL)	3.8 ± 0.47	3.9 ± 0.40	0.028	3.8 ± 0.52	3.8 ± 0.44	0.037	3.6 ± .32	3.4 ± 0.55 ^a	0.561	0.423
Phosphorus (mg/dl)	5.4 (4.2,7.5)	5.8 (3.6,7.9)	0.780	6 (4.7,6.4)	7 (6,8.7)	0.123	5.6 (5.2,6.3)	5.5(4.6,7.8)	0.814	0.234
Potassium (mmol/L)	5.6 ± 0.86	5.2 ± 0.92	0.024	5.6 ± 0.6	5.6 ± 0.58	0.788	5.4 ± 1.1	5.5 ± .74	0.656	0.405
CRP (mg/L)	3.5 (2.4,4.4)	3.4 (1.9,6.1)	0.834	3.4 (2.6,9.2)	6.2 (3.8,9.3)	0.110	7.2 (3.3,12.6)	5.4 (2.8,17.1)	0.784	0.441

Biochemical indicators are indicated as mean ± SD or median (first and third quartiles). CRP: C-Reactive Protein; ONS, oral nutritional supplementation; ONS + RE; oral nutritional supplementation plus resistance exercise; ONS + AE; oral nutritional supplementation plus aerobic exercise.

p^{\dagger} =Repeated Measures ANOVA (3 groups x 2 times)

Table 5. Changes in quality of life

	ONS		ONS + RE		ONS + AE	
	Pre	Post	Pre	Post	Pres	Post
Specific part						
Symptoms	80.80 ± 8.9	76.87 ± 13.4	77.39 ± 15.6	83.94 ± 12.5	76.33 ± 13.6	80.75 ± 11.7
Effects of Kidney disease	72.92 ± 21.8	64.59 ± 18.1	56.70 ± 19.9	76.79 ± 23.8	73.06 ± 13.7	73.06 ± 17.0
Burden of kidney disease	50.01 ± 16.2	56.96 ± 19.6	46.43 ± 11.9	50.90 ± 19.2	55.48 ± 16.8	64.86 ± 17.9
Work status	61.11 ± 33.3	50.00 ± 35.4	28.57 ± 26.7	42.86 ± 34.4	31.25 ± 45.8	37.50 ± 44.3
Cognitive function	20.00 ± 16.3	24.46 ± 27.3	8.557 ± 12.6	20.00 ± 21.4	26.66 ± 16.3	27.51 ± 33.3
Quality of social interaction	25.19 ± 15.2	25.92 ± 25.3	17.14 ± 16.3	11.43 ± 13.8	27.50 ± 18.3	31.66 ± 23.3
Sexual function	29.17 ± 44.1	8.333 ± 25.0	23.21 ± 41.1	41.07 ± 51.4	54.69 ± 47.2	29.69 ± 42.2
Sleep	73.06 ± 13.1	69.72 ± 6.9	69.29 ± 9.4	77.50 ± 10.7 [‡]	69.06 ± 5.5	72.50 ± 8.4
Social Support	72.21 ± 20.4	68.53 ± 10.0	78.57 ± 12.6	76.19 ± 16.2	66.68 ± 12.6	77.08 ± 21.7
Dialysis staff encouragement	81.94 ± 11.0	80.56 ± 12.6	83.93 ± 17.2	83.93 ± 15.7	75.00 ± 21.1	82.81 ± 16.3
Patient satisfaction	53.33 ± 15.0	52.22 ± 13.4	68.57 ± 3.8	57.14 ± 17.1	52.50 ± 13.4	60.00 ± 10.7
Generic part						
Physical function	83.33 ± 12.7	84.44 ± 22.7	75.00 ± 20	80.00 ± 13.2	74.38 ± 16.1	74.38 ± 14.7
Physical role	61.11 ± 46.9	88.89 ± 33.3	46.43 ± 44.3	85.71 ± 37.8	34.38 ± 44.2	71.88 ± 45.2
Pain	73.61 ± 27.6	85.00 ± 18.3	88.93 ± 15.9	86.79 ± 14.6	63.44 ± 17.6	71.88 ± 29.3
General Health perceptions	52.78 ± 17.1	53.33 ± 17.5	40.00 ± 17.5	52.86 ± 18.2 [‡]	52.50 ± 17.3	54.38 ± 18.2
Emotional well-being	74.22 ± 10.2	75.11 ± 24.7	82.86 ± 15.4	82.29 ± 8.5	65.00 ± 18.8	73.00 ± 12.4
Emotional role	77.78 ± 44.1	92.59 ± 22.2	66.67 ± 47.1	90.49 ± 16.2	54.18 ± 46.9	100.0 ± 0 [‡]
Social function	84.72 ± 16.2	90.28 ± 19.5	75.00 ± 20.4	96.43 ± 9.4 [‡]	70.31 ± 25.8	85.94 ± 26.2
Energy/fatigue	69.44 ± 16.8	72.78 ± 22.6	71.43 ± 71.4	70.00 ± 9.5	62.50 ± 24.6	49.38 ± 14.0

Data are mean ± SD. ONS, oral nutritional supplementation; ONS + RE, oral nutritional supplementation plus resistance exercise; ONS + AE, oral nutritional supplementation plus aerobic exercise

$p^{\dagger} < 0.05$, Students T-test for comparison with the baseline measurement. Group x time interaction $p = N.S$

Adverse events

There were no adverse events associated with this trial