Study Protocol and Statistical Analysis Plan (SAP) — Frailty Evaluation Component

1. Administrative information

Study title (short): FRAGSALUD — educational programme for frail/pre-frail older adults.

ClinicalTrials.gov Identifier: NCT05610605.

Study period: Conducted March 2022 – September 2023; assessments at baseline, 6 months (end of intervention), and 12 months (6 months post-intervention).

Primary SAP scope: frailty phenotype (Fried criteria) — score, categorical status (robust / pre-frail / frail).

Document date: 24/09/2025

2. Background & rationale (frailty)

Frailty is a state of increased vulnerability to stressors reflecting reduced physiological reserve. The study tested whether a 6-month educational intervention changes frailty status and frailty score compared with usual care in community-dwelling older adults with at least one Fried criterion.

3. Objectives (frailty component)

Primary frailty objective: Evaluate the effect of the 6-month educational programme on the Fried frailty total score at 6 months (end of intervention) and at 12 months (6 months post-intervention), compared with control.

Secondary frailty objectives:

- Evaluate shifts in frailty categories (robust / pre-frail / frail) between baseline, 6 months and 12 months.

4. Study design (brief)

Multicentre, parallel-group randomised controlled trial; participants randomised to educational programme or control (usual care). Assessments at baseline, 6 months, and 12 months.

5. Population and eligibility

Inclusion: Community-dwelling adults aged ≥65 years with ≥1 Fried frailty criterion (pre-frail or frail).

Exclusion: Institutionalised individuals; robust participants (zero Fried criteria).

Final analysed sample: 199 participants (109 intervention, 90 control after attrition).

6. Frailty measurement (operational definition)

Frailty was operationalised using the Fried physical frailty phenotype, consisting of:

- Shrinking (unintentional weight loss ≥4.5 kg or ≥5% in past year).

- Weakness (sex- and BMI-specific grip strength cut-offs).

- Poor endurance/exhaustion (self-reported ≥3 days in previous week).

- Slowness (4-m timed walk with sex- and height-specific cut-offs).

- Low physical activity (Minnesota Leisure Time Physical Activity Questionnaire).

Scoring: 0–5. Categories: robust = 0; pre-frail = 1–2; frail ≥3.

7. Outcomes (frailty-specific)

Primary frailty outcome: Change in Fried total score from baseline to 6 months and 12 months.

Secondary frailty outcomes:

- Proportion of participants in each frailty category at each timepoint.

8. Sample size

Target ≥196 participants, based on effect size 0.5 SD, α = 0.05, power = 80%, allowing for 15% dropout.

9. Randomisation and allocation

Computerised block randomisation ensuring balance between groups.

10. Blinding

Participants and intervention deliverers were not blinded. Outcome assessors and analysts were blinded where possible.

11. Data collection schedule

Baseline: Fried components.

6 months: repeat assessments.

12 months: repeat assessments.

12. Statistical Analysis Plan

Analysis populations: Intention-to-treat and per-protocol (sensitivity).

Primary analysis: Linear mixed-effects model with Fried score as dependent variable; fixed effects for group, time, and group × time; random effect for participant; adjusted for age, sex, education.

Secondary analysis: Frailty category transitions using chi-square, logistic regression, or multinomial models.

Sensitivity analyses: per-protocol, alternative frailty scoring, responder definitions.

13. Reporting and tables/figures

Baseline frailty table by arm.

Adjusted change table with β (95% CI) and p-values.

Frailty category transitions figure.

14. Key frailty results

At 6 months, intervention group reduced Fried score by −0.60 vs −0.015 in controls (β = −0.515, p = 0.007).

At 12 months, β = −0.714, $p < 0.001$.

Frailty category improved in intervention group: increase in robust participants, reduction in frail participants.