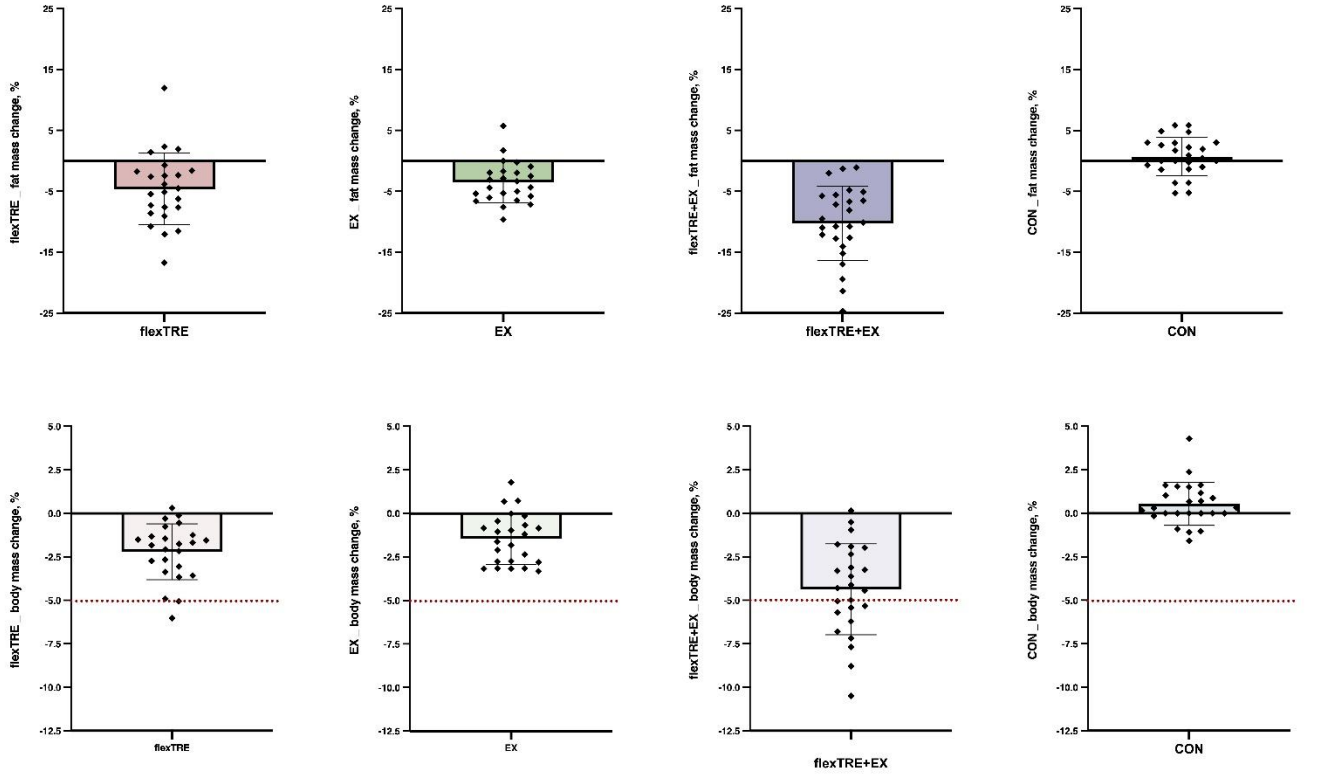
Appendix: Key findings

Figure 1: Percentage changes in fat mass and body mass for each participant



Note: **flexTRE** refers to flexible time-restricted eating, **EX** to aerobic exercise, **flexTRE+EX** to flexible time-restricted eating combined with aerobic exercise, and **CON** to the control group. The upper four charts display the percentage changes in fat mass for individual participants in the flexTRE, EX, flexTRE+EX, and CON groups after the 12-week intervention. Each data point represents the raw fat mass change for a single participant. The lower four charts illustrate the percentage changes in body mass for the same groups over the 12-week intervention. A red line is included in the lower charts to indicate a 5% body mass reduction, which represents the threshold for a minimally clinically important difference.

Table 1: Changes in body composition and metabolic health after 12 weeks – comparison with control group (intention-to-treat analysis)

Indicator	**flexTRE vs CON**	**EX vs CON**	**flexTRE+ EX vs CON**	**Significance between intervention groups**
Fat mass (kg)	-1.29	-0.84	-2.85	✓
Body mass (kg)	-1.59	-1.27	-3.37	✓

Waist circumference (cm)	-3.24	-3.21	-6.18	✓
Body fat percentage (%)	-1.14	-0.75	-2.4	✓
HOMA-IR	N/S	N/S	N/S	✓
Leptin (ng/ml)	-4.73	-4.89	-8.22	✓
Adherence rate (%)	86.9%	83.7%	84.6%	N/A

Note: ✓ indicates that the combined intervention group showed significantly greater improvement than both the flexTRE-only and EX-only group ($p^* < 0.05$, adjusted for multiple comparisons). Values are adjusted mean differences from the intention-to-treat analysis. N/S indicates not significant, while N/A indicates not available.

Table 2: Intervention characteristics and feasibility

Feature	**Details**
flexTRE protocol	Self-selected eight-hour eating window (must end by 8:00 p.m.), intake as desired
EX protocol	Three sessions per week, 40 minutes per session at moderate intensity (64-76% HRmax), with five minutes' warm-up and five minutes' cool-down
Retention rate	94.2% (98 out of 104 completed)
Adherence rate	83.7% to 86.9%
Adverse events	No serious adverse events; minor events included hunger affecting sleep in six participants during the first two weeks and mild exercise discomfort in two participants