

Comparison of the clinical effectiveness of three different dietary patterns in overweight and obese adults

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STUDY AT A GLANCE

158
adults randomised
5-month trial

3
diet groups
FDD · MCD · ABD

563
kcal/day deficit
vs total energy expenditure

5
study visits
Day 0 · 15 · 45 · 90 · 150

BACKGROUND

Overweight and obesity are **major public-health challenges of the 21st century**. In 2022, ~43% of adults were overweight and ~16% obese worldwide (WHO, 2024). In Greece, ~37.5% of adults are overweight and ~17.8% obese, with rising abdominal obesity and cardiometabolic risk.

Digital health tools are increasingly applied for obesity management, offering personalisation, real-time feedback and sustained engagement. However, **direct comparisons** between app-based and conventional structured diets remain limited.

OBJECTIVES

To compare the clinical effectiveness of **three hypocaloric dietary interventions** in overweight and obese adults, evaluating:

- changes in body weight, body composition and anthropometric indices
- adherence to the Mediterranean diet
- post-intervention dietary satisfaction

METHODS

Design. Randomised 5-month dietary intervention trial.

Setting. Endocrinology & Metabolic Diseases Clinic, University Hospital of Larissa.

Ethics. Approval No. 34/13.03.2019 (Declaration of Helsinki).

Participants. n = 158 adults; mean age 49.5 ± 10.6 years; stratified by BMI and age.

Intervention groups

- FDD** – Fixed-Daily Diet (n = 54): predetermined meal plan, no choice.
- MCD** – Multiple-Choice Diet (n = 49): selection from predefined options.
- ABD** – App-Based Diet (n = 55): mobile-app recording & adjustment of food choices and meal frequency.

Energy prescription.

563 kcal/ day deficit relative to TEE (Mifflin–St Jeor + activity factor).

Outcomes.

body weight (BW, %BW), body fat (BF%), waist (WC) and hip circumference (HC), waist-to-hip ratio (WHR), MedDiet Score, Diet Satisfaction Questionnaire (DSat-28).

Statistics.

ANOVA + Tukey post-hoc; SPSS v.25; p < 0.05.

RESULTS

KEY FINDING

At 5 months, the App-Based Diet (ABD) achieved the greatest reductions across all anthropometric outcomes and the highest dietary-satisfaction score.

Body weight loss at 5 months

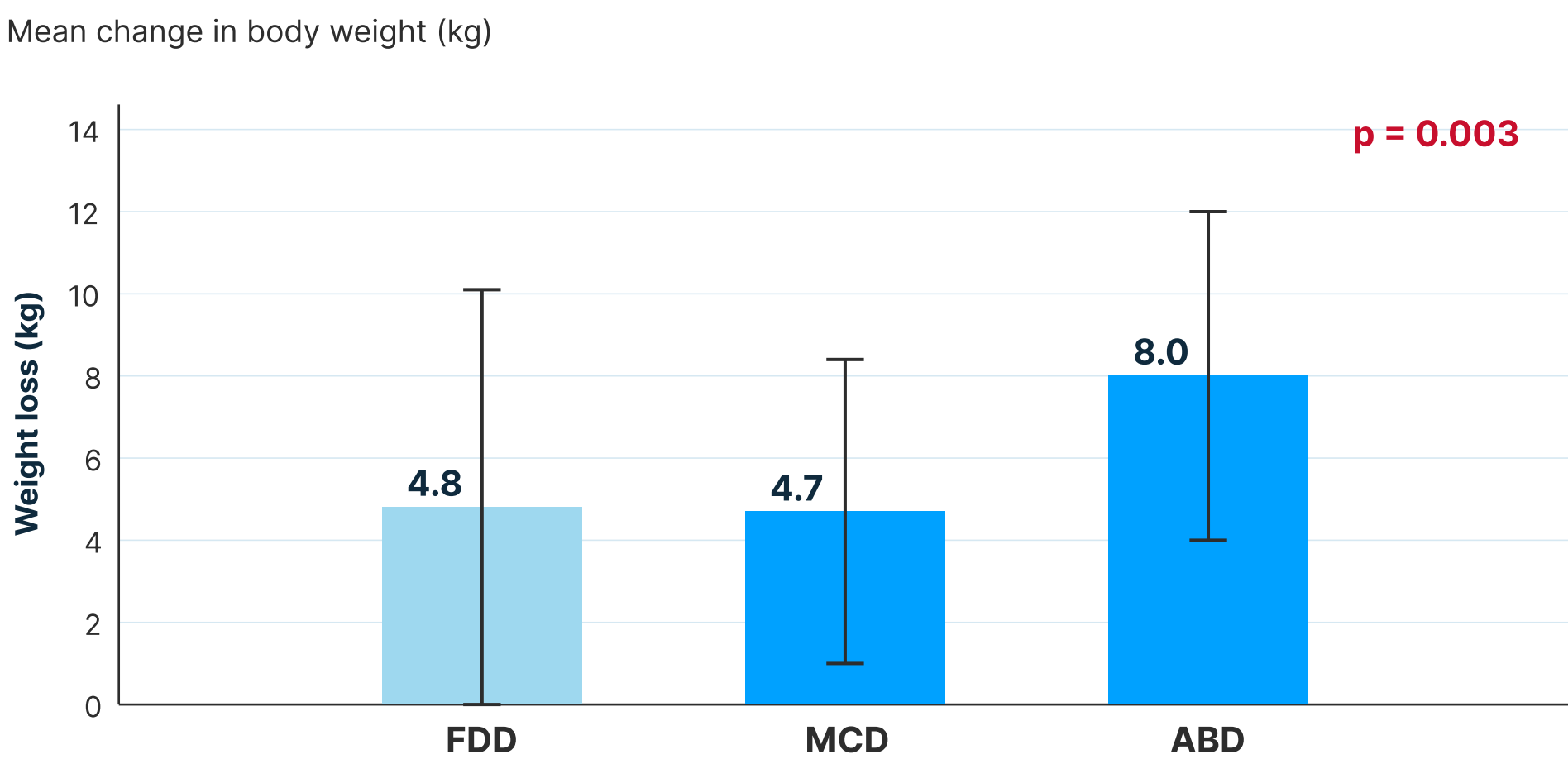


Figure 1. Mean (± SD) body-weight loss at 5 months by intervention group.

ADHERENCE & SATISFACTION

Mediterranean Diet Adherence

MedDiet Score (low≤ 20, moderate 21–35, high 36–55) was **moderate and comparable across groups**:

- FDD: 26.1 ± 6.2
- MCD: 27.7 ± 5.3
- ABD: 28.2 ± 5.8

ANOVA **p = 0.145** (no significant difference).

Dietary Satisfaction (DSat-28)

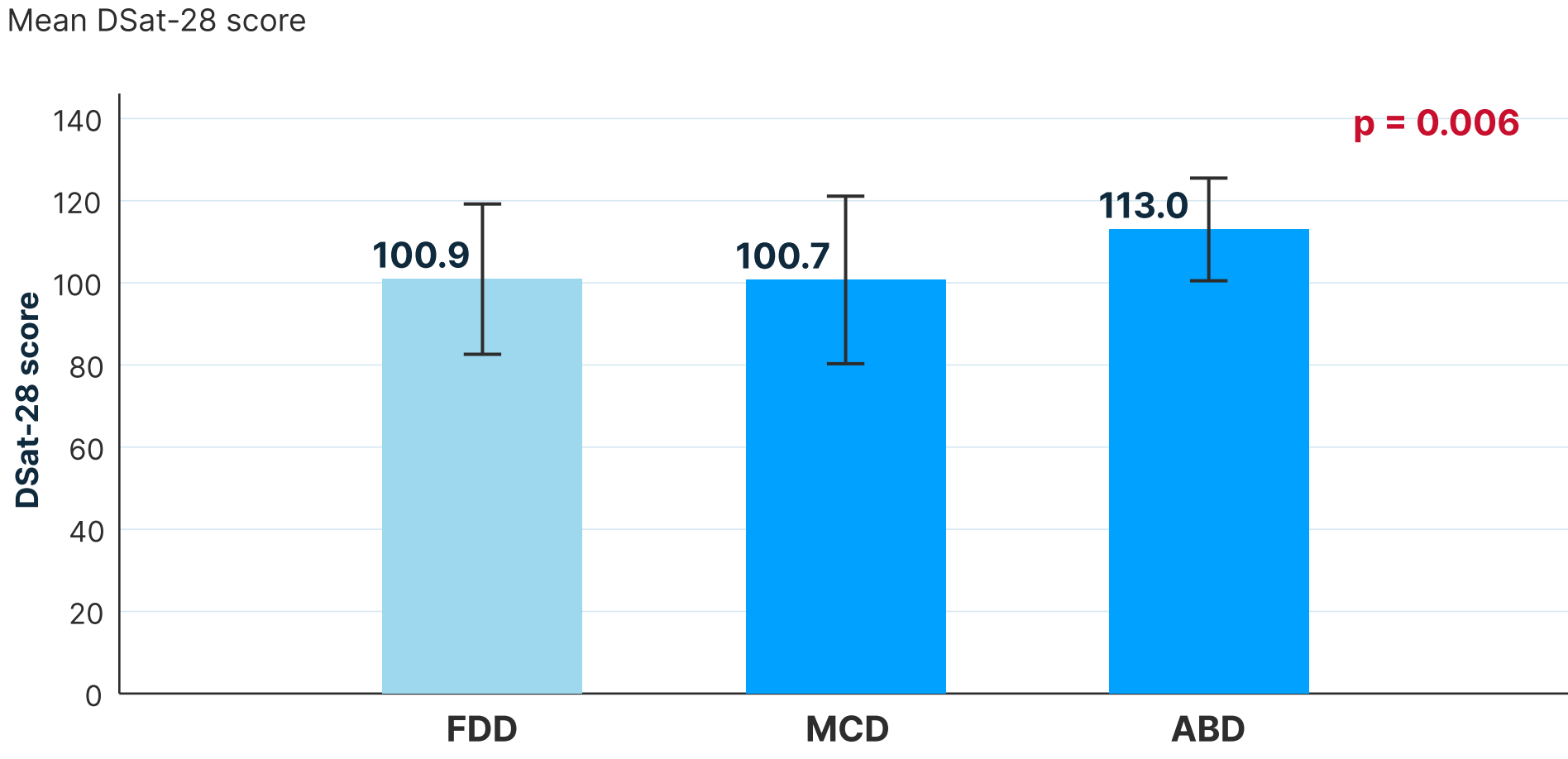


Figure 2. Post-intervention dietary satisfaction (DSat-28). ABD scored significantly higher than FDD and MCD.

ANTHROPOMETRIC OUTCOMES

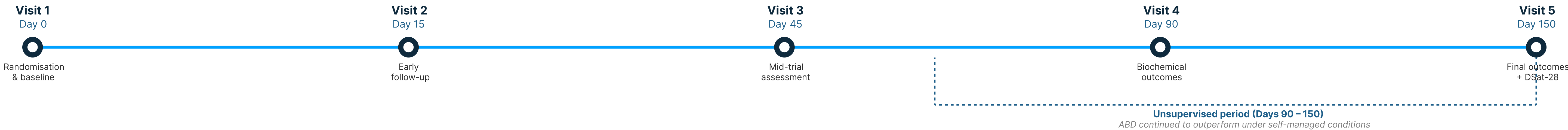
Outcome	FDD	MCD	ABD	p
Δ %BW	-5.4 ± 5.3	-5.0 ± 3.7	-8.3 ± 4.5	0.006
Δ BF (%)	-2.8 ± 2.5	-3.0 ± 2.0	-4.9 ± 2.8	0.001
Δ WC min (cm)	-4.5 ± 5.0	-3.4 ± 3.4	-7.6 ± 4.2	<0.001
Δ WC umb (cm)	-5.3 ± 5.1	-4.0 ± 4.4	-7.1 ± 3.4	0.009
Δ HC (cm)	-4.1 ± 3.8	-3.5 ± 3.5	-6.4 ± 3.0	0.002
Δ WHR	-0.012	-0.008	-0.028	0.010

Table 1. Mean change (± SD) at 5 months. Δ = change from baseline; BW = body weight; BF = body fat; WC = waist circumference (minimum / umbilical); HC = hip circumference; WHR = waist-to-hip ratio. ANOVA p-values; Tukey post-hoc.

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STUDY DESIGN & TIMELINE



KEY TAKEAWAYS

1 Greater weight loss

ABD: -8.0 ± 4.0 kg vs -4.7–4.8 kg in FDD/MCD (p = 0.003).

2 Better body composition

ABD showed the largest reductions in BF%, WC, HC and WHR (all p<0.010).

3 Higher satisfaction

ABD DSat-28: 113.0 ± 12.5 vs ~101 in FDD/MCD (p = 0.006), supporting adherence.