

A pilot study of low-carbohydrate diet intervention on obese elderly in China

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Yan-Bin Ye¹, HO HOI YAN², Shu-Yu Zhuo¹, Yi Sui¹, Shi Fang¹

¹ Department of Nutrition, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou, People's Republic of China.

² Department of Nutrition, the First Affiliated Hospital of Jinan University, Guangzhou, People's Republic of China

Introduction: Muscle-reducing obesity is the most common form of obesity in the elderly, so it is more difficult for the elderly to lose weight. The efficacy and safety of low-carbohydrate diet (LCD) for weight loss in the elderly remains controversial. This study aimed to explore the effect and safety of LCD on weight loss in overweight and obese elderly people.

Materials and methods: Obese or overweight elderly (>60 years old) with a BMI greater than 24 were recruited to use a restricted LCD for 1-3 months for weight loss intervention. According to the intervention time, participants were divided into short-time group (< 30 days), medium-time group (< 31-60 days) and long-time group (>60 days). The enrolled subjects were given an energy-restricted LCD for weight reduction intervention (1200-1400 kcal/d, carbohydrate accounts for 15-20% of energy). The primary outcome was change in body composition included weight, BMI, fat mass, and waist circumference, and there were other secondary outcomes including blood sugar, blood lipid and uric acid.

Results and discussion: Thirty-two obese or overweight elderly completed a LCD for 1-3 months, mean age were 64.9±4.2 years, median intervention time was 56 days[range: 26,100], mean BMI was 29.62±3.70kg/m², and there were 6, 14 and 12 participants were divided into the three time groups. After LCD intervention, the average body weight of the three groups decreased by 2.92±0.77 kg, 5.57±1.99 kg and 10.48±2.63 kg; the average waist circumference decreased by 3.41±0.66cm, 7.64±3.22cm and 10.50±2.97cm; the average BMI decreased by 1.43±0.34 kg/m²,

2.18±0.99 kg/m² and 3.18±1.77 kg/m²; the average body fat decreased by 2.28±0.43 kg, 4.07±2.08 kg and 7.05±2.53 kg; and the average muscle decreased by 0.68±0.76kg, 1.32±0.78 kg and 2.45±2.03kg (P<0.05). The average muscle loss was less than 20% of the total weight loss. Covariance analysis adjusted by age and sex showed that the percentage changes [(after intervention-before intervention)/before intervention] of body weight, BMI, body fat and waist circumference were significant different among the three groups (p < 0.05), which had linear trends with the intervention time, while the percentage of muscle and body fat decreased was not significantly different among the three groups, and did not increase with the intervening time (p > 0.05). Symptoms of patients with hypertension or sleep apnea syndrome were alleviated. There were no serious adverse events during weight loss.

Conclusion: LCD with restricted energy is a safe and effective weight-loss intervention for overweight or obese elderly people. It can significantly reduce BMI and body fat without losing more muscle with the increase of weight loss.

Key words: Low-carbohydrate diet, obese elderly, body composition.

Comparison of the mean differences in changes of body composition indices after LCD intervention according to the three groups among 32 participants¹

	Short-time group (n=6)	Medium-time group(n=14)	Long-time group(n=12)	P values ²	P trend ²
Weight change (%)	-4.56±1.31	-7.77±2.52	-12.18±2.20	0.000	0.000
BMI change (%)	-5.27±1.57	-7.60±3.30	-9.81±3.38	0.025	0.009
Muscle change (%)	-1.61±2.34	-3.13±2.51	-4.49±3.36	0.179	0.068
Body fat change (%)	-9.18±2.81	-15.48±6.91	-21.73±6.32	0.012	0.004
Waistline change (%)	-3.71±0.81	-7.73±3.11	-9.71±2.75	0.000	0.000

¹ Change (%) = (after intervention-before intervention)/before intervention × 100%, all values are unadjusted mean ± SD.

² ANCOVA, covariate with adjusted for sex and age.