

3° CONGRESSO NAZIONALE SIMPeSV / 70° Congresso FIMMG

DALLA MEDICINA DI PREVENZIONE ALL'AMBULATORIO DEGLI STILI DI VITA

Il MMG nell'alimentazione e nelle patologie correlate



Modelli dietetici

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*Sezione di Fisiopatologia Medica,
Scienza dell'Alimentazione ed Endocrinologia*

6 – 11 ottobre 2014

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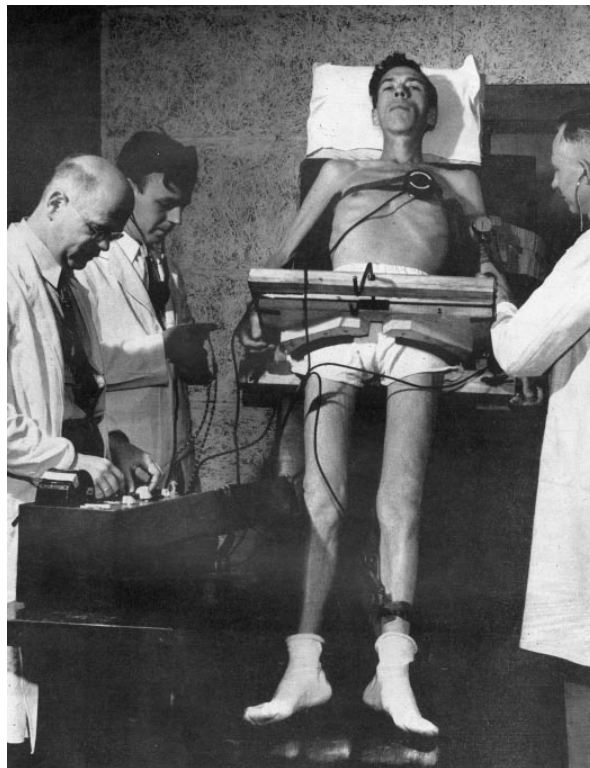
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WILL YOU *Starve* THAT
They BE BETTER FED?



On November 19, 1944, 36 healthy caucasian young men (22-23 yrs old) selected from a pool of over 200 volunteers entered the brick confines of the Laboratory of Physiological Hygiene at the University of Minnesota, where they were to embark on a medical experiment: the **Minnesota (semi)-Starvation Experiment**.

The study was divided into three phases:

1. **12-week control phase**, where physiological and psychological observations were collected to establish a baseline for each subject
2. **24-week starvation phase: reduction of caloric intake (from 3492 to 1567 kcal/day)** ⇒ average reduction of 25% of their pre-starvation body weight
3. **12-week recovery phase** with various rehabilitative diets

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[Weight reduction on low-fat and low-carbohydrate diets.](#)

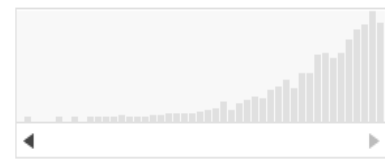
3881. BREWER WD, CEDERQUIST DC, WILLIAMS B, BEEGLE RM, DUNSING D, KELLEY AL, OHLSON MA.
 J Am Diet Assoc. 1952 Mar;28(3):213-7. No abstract available.
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Pediatría (Napoli). 1967 Mar-Apr;75(2):221-7. Italian. No abstract available.

PMID: 5615135 [PubMed - indexed for MEDLINE]

[Related citations](#) [Weight reduction: fasting versus a ketogenic diet.](#)85. [No authors listed]
Nutr Rev. 1966 May;24(5):133-4. Review. No abstract available.

PMID: 5326662 [PubMed - indexed for MEDLINE]

[Related citations](#) [Changes in body composition during weight reduction in obesity. Balance studies comparing effects of fasting and a ketogenic diet.](#)86. Benoit FL, Martin RL, Watten RH.
Ann Intern Med. 1965 Oct;63(4):604-12. No abstract available.

PMID: 5838326 [PubMed - indexed for MEDLINE]

[Related citations](#) [IMPORTANCE OF BODY CHARACTERISTICS IN THE EXCRETION OF 17-KETOSTEROIDS AND 17-KETOGENIC STEROIDS IN OBESITY.](#)87. JACOBSON G, SELTZER CC, BONDY PK, MAYER J.
N Engl J Med. 1964 Sep 24;271:651-6. No abstract available.

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Is a calorie a calorie?¹⁻⁴

Andrea C Buchholz and Dale A Schoeller

TABLE 2

Atwater factors for heat of combustion, coefficient of availability, and “available energy” for nutrients in a mixed diet

| Macronutrient | Heat of combustion | Coefficient of availability | Available energy |
|---------------|--------------------|-----------------------------|-------------------------------|
| | <i>kcal/g</i> | <i>%</i> | <i>kcal/g total nutrients</i> |
| Protein | 5.65 | 92 | 4.0 ¹ 5,6 |
| Fat | 9.40 | 95 | 8.9 |
| Carbohydrate | 4.10 | 97 | 4.0 |

¹ Corrected for unoxidized material in the urine, ie, $(5.65 \text{ kcal/g} \times 0.923) - 1.25 \text{ kcal/g}$.

Is a calorie a calorie?¹⁻⁴

Andrea C Buchholz and Dale A Schoeller

- Although some studies provide some evidence of a change in the **thermic effect of food** when fat is substituted for carbohydrate, the magnitude of this change is usually small, **the substitution of one macronutrient for another** has been shown in some studies to have a statistically significant effect on the expenditure half of the energy balance equation.
- This has been **observed most often for high-protein diets**.
- Evidence indicates, however, that **the difference in energy expenditure is small** and can potentially account for less than **one-third** of the differences in weight loss that have been reported between high-protein or low-carbohydrate diets and high carbohydrate or low-fat diets.
- As such, **a calorie is a calorie**.

Am J Clin Nutr 2004;79(suppl):899S-906S.

Is a calorie a calorie?¹⁻⁴

Andrea C Buchholz and Dale A Schoeller



The American Journal of
CLINICAL NUTRITION
A Publication of the American Society
for Nutrition

DECEMBER 2010 • VOLUME 92 • NUMBER 6

| | |
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| EDITORIAL | 1000 |
| ANNOUNCEMENT FROM THE PRESIDENT OF ASAN | 1001 |
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| SYMPOSIUM | 1003 |
| SYMPOSIUM | 1004 |
| SYMPOSIUM | 1005 |
| SYMPOSIUM | 1006 |
| SYMPOSIUM | 1007 |
| SYMPOSIUM | 1008 |
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- ***OTHER EXPLANATIONS FOR DIFFERENCES IN WEIGHT LOSS : if a calorie is a calorie, then what other factors could account for the reported differences in weight loss between either high protein or low-carbohydrate diets and low-fat diets ?***
- **composition of the weight loss: greater loss of solids or water from FAT-FREE MASS** for one treatment than for a second treatment would result in greater weight loss with the former treatment.
- One particular factor for a low-carbohydrate diet is, of course, the **loss of glycogen stores and associated water, which can be as great as 2 kg.**

Am J Clin Nutr 2004;79(suppl):899S–906S.

Diete ad alto contenuto proteine e basso contenuto di CHO EFFETTI DI PROMOZIONE DEL CALO PONDERALE



Ketone-Body Production and Oxidation in Fasting Obese Humans

G. A. REICHARD, JR., O. E. OWEN, A. C. HAFF, P. PAUL, and W. M. BORTZ

From the Division of Research, Lankenau Hospital, Philadelphia, Pennsylvania 19151, and the Department of Medicine and the General Clinical Research Center, Temple University Health Sciences Center, Philadelphia, Pennsylvania 19140

... assuming an average caloric value of 4.5 kcal/g for ketone-body oxidation

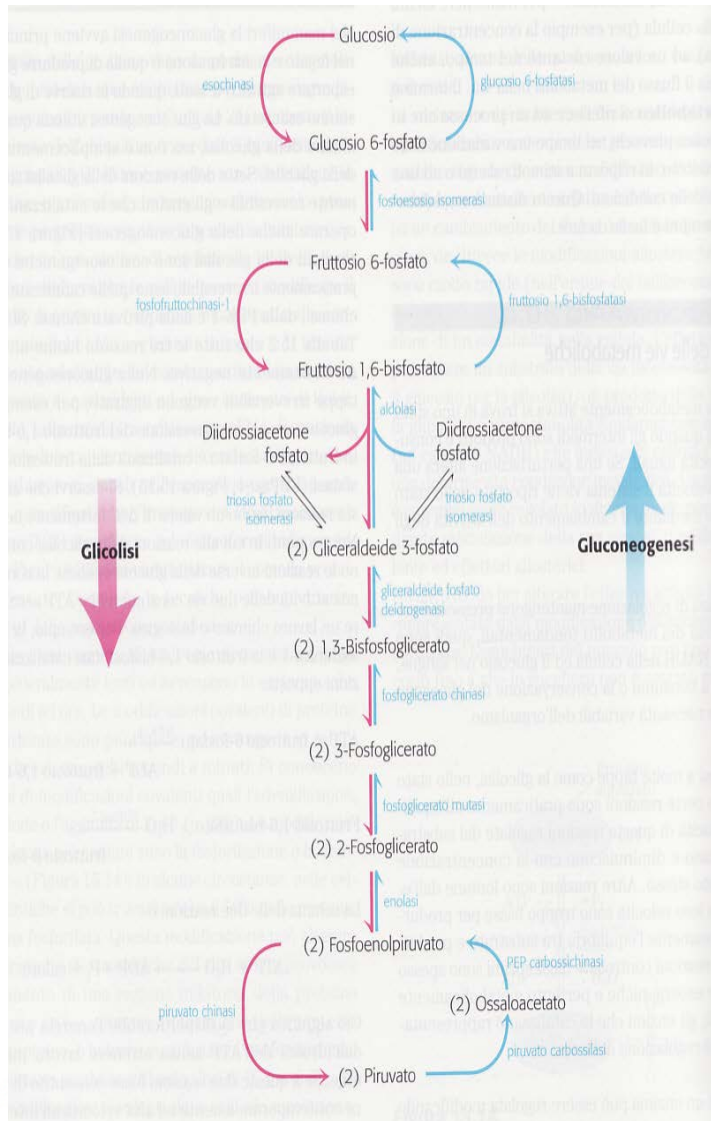
The Journal of Clinical Investigation Volume 53 February 1974 • 508–515

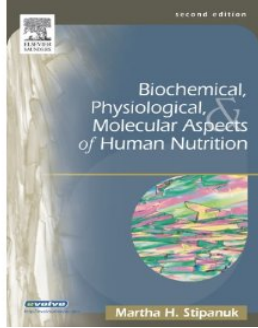
Fabbisogno di Glucosio:
120g per SNC e 40-60g per
altri tessuti

Substrati GLUCONEOGENESI:

- **LATTATO** : liberato nel sangue dai muscoli scheletrici in esercizio e dai GR (ciclo di Cori);
- **GLICEROLO** : derivante dall'idrolisi dei trigliceridi (18g di glucosio/die);
- **AMINOACIDI** : scheletro carbonioso degli AA glucogenici come ossalacetato e α chetoglutarato (1.6g di AA per la sintesi di 1g di glucosio)

⇒ Per assicurare al SNC il glucosio necessario è necessario catabolizzare ogni giorno di digiuno 160-200 g di proteine (**≈ 1 kg di tessuto muscolare**) (Stipanuk MH)





ENERGETIC EQUIVALENT OF BODY TISSUES

in “*Biochemical, physiological, molecular aspects of human nutrition*” MH Stipanuk ed – Saunders, 2006

Control of Energy Balance – chap 22 by JC Peters

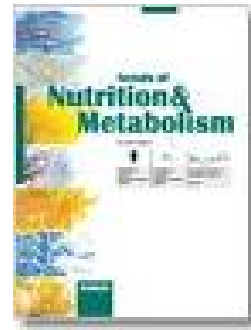
• Body Energy lost when:

- **1 kg of adipose tissue** (85% lipid) = 7905 kcal
(850g * 9.3 kcal/g)

- all the E represented by stored fat can contribute to net fuel E

- **1 kg of muscle is lost** (20% protein) = 1120 kcal
(200g * 5.6 kcal/g)

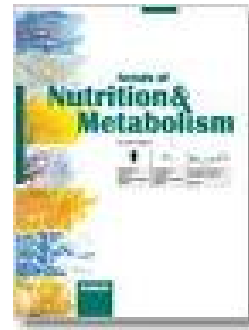
- 800 kcal = net E available to supply body's fuel needs
- 320 kcal = necessary to metabolise N derived from the breakdown of the AA (\Rightarrow urea)



Low-Carbohydrate Diets: A Matter of Love or Hate

María-Eugenia Frigolet^a Victoria-Eugenia Ramos Barragán^b
Martha Tamez González^c

- **Low-carb Diets (LChD)** contain **< 200 g of CHO** per day, or **< 30%-40%** of the total E requirement (e.g. Zone diet)
- **VLChD** generally have a content of **≤ 20–50 g/day of CHO** and a **high fat and/or high protein content** (e.g. Atkins diet)
- When the CHO is reduced, **the fat and protein content in the diet increases**, resulting in:
 - a low-CHO/**hyperproteic** diet (**LChHPD**)
 - or nonketogenic low-CHO/**high-fat** diet (**NLChHFD**)



Low-Carbohydrate Diets: A Matter of Love or Hate

María-Eugenia Frigolet^a Victoria-Eugenia Ramos Barragán^b
Martha Tamez González^c

Table 1. Distribution of the percent of energy intake for carbohydrates, protein, and lipids in LChD and VLChD

| Diet | Energy carbohydrates, % | Energy protein, % | Energy fat, % |
|---------|-------------------------|-------------------|---------------|
| LChD | 20–40 | | |
| LChHPD | 20–40 | 30–60 | 20–30 |
| NLChHFD | 20–40 | 20–30 | 30–60 |
| VLChD | 0–20 | | |
| VLChHPD | 0–20 | 55–65 | 25–35 |

The protein-sparing modified fast for obese patients with type 2 diabetes: What to expect

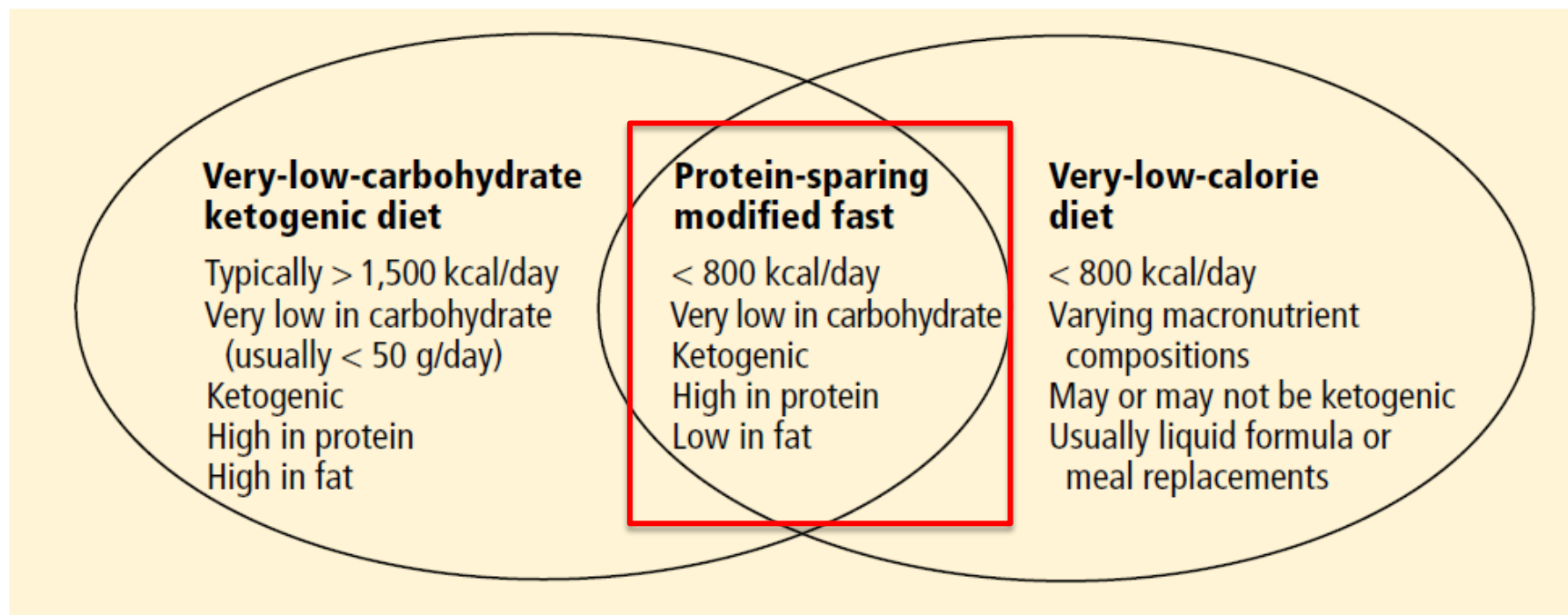


FIGURE 1. The protein-sparing modified fast combines a very-low-carbohydrate ketogenic diet and a very-low-calorie diet. It may contrast with other very-low-calorie diets, which may contain higher amounts of carbohydrate and lower amounts of fat. In addition, the protein-sparing modified fast differs from many very-low-carbohydrate ketogenic diets because of its additional caloric and fat restriction.

The protein-sparing modified fast for obese patients with type 2 diabetes: What to expect

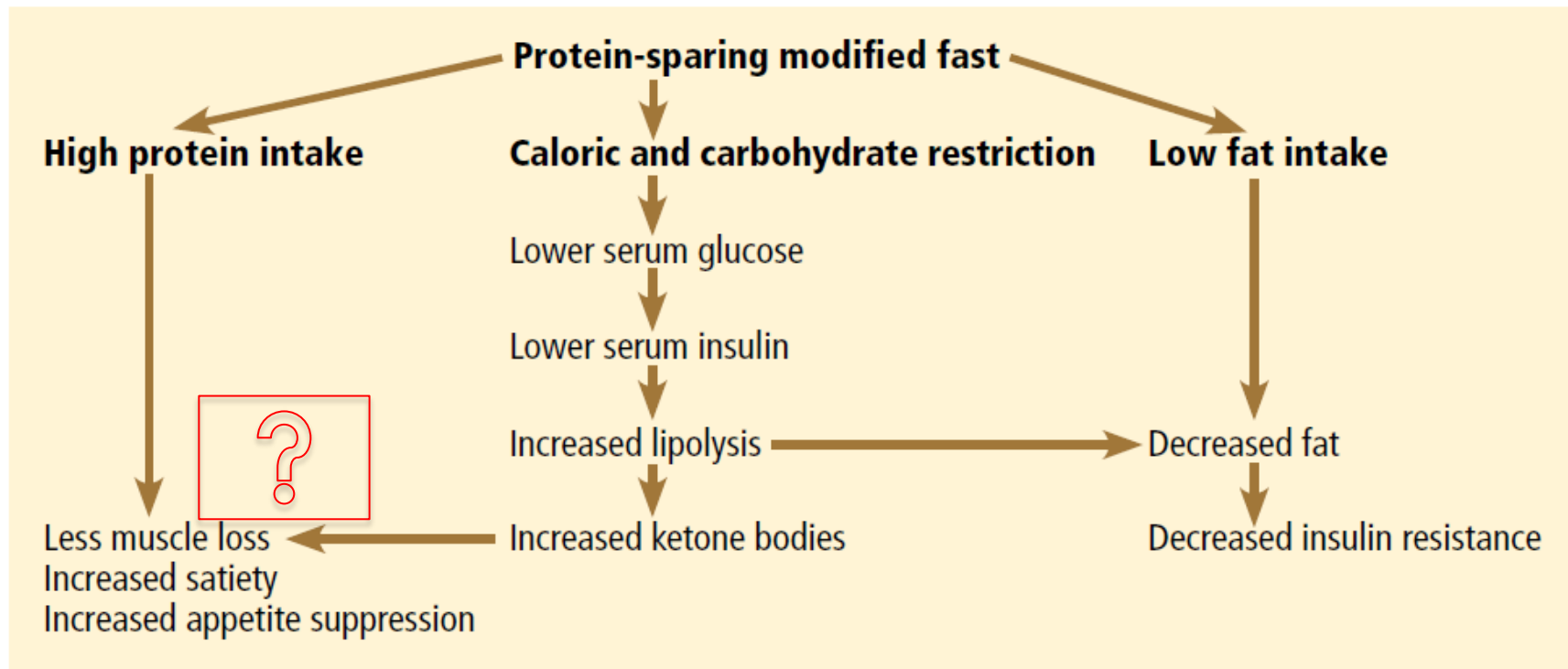


FIGURE 2. As a result of carbohydrate restriction, high protein intake, and ketosis, the protein-sparing modified fast leads to lower blood glucose levels as well as rapid weight loss, mostly in the form of fat mass, while lean body mass (muscle) is preserved.

The protein-sparing modified fast for obese patients with type 2 diabetes: What to expect

SAFETY CONCERNS AND CONTRAINDICATIONS

- The first very-low-calorie diets in the 1970s, which were associated with fatal cardiac arrhythmias and sudden death.
- Supplementation with vitamins and minerals, reducing the **risk of electrolyte and cardiac abnormalities!!!**
- Before starting the PSMF all patients must have an **ECG** to exclude arrhythmias (eg, heart block, QT interval prolongation) or ischemia.
- **gallstone formation** has been associated with bile stasis, which occurs from rapid weight loss with liquid formula diets of low fat intake (< 10 g/day).
- **Gout** as hyperuricemia with risk of gout is also linked to high-protein diets.
- Unfortunately, **many patients tend to regain weight after completing a PSMF program**

Mechanisms that can induce weight loss in ketogenic diets

- **suppression of appetite** (\Rightarrow higher levels of CCK)
- ‘metabolic advantage’ by requiring increased gluconeogenesis and upregulating mitochondrial uncoupling protein causing the waste of ATP as heat
- limitation of food choices
- reduction of the palatability
- **satiating effect of high protein intake**
- **increased thermogenic effect of protein**
- **increased adipose tissue lipolysis** (\Leftarrow reduced circulating insulin levels and increased fatty acid oxidation)

Frigolet ME, et al: Ann Nutr Metab 2011;58:320–334; Erlanson-Albertsson C, et al: Int J Obes 2005; 2: 26–30; Acheson KJ, et al: Am J Clin Nutr 2011; 93: 525–534; Kather H, et al: J Clin Invest 1987; 80: 566–572; Halyburton AK, Am J Clin Nutr 2007; 86: 580–587; Veldhorst MA, et al: Br J Nutr 2010; 104: 1395–1405; DeVivo DC, et al: Ann Neurol 1978; 3: 331–337; Chearskul S, et al: Am J Clin Nutr 2008; 87: 1238–1246

Effects of a high-protein ketogenic diet on hunger, appetite, and weight loss in obese men feeding ad libitum¹⁻³

Alexandra M Johnstone, Graham W Horgan, Sandra D Murison, David M Bremner, and Gerald E Lobley



- **The use of ketogenic diets as a weight-loss therapy is not a novel idea** (Yang MU et al: J Clin Invest 1976; Bistrian BR: Diabetes Care 1978)
- In the short term, high-protein, **low-CHO ketogenic diets reduce hunger** and lower food intake significantly more than do high-protein, medium-carbohydrate non-ketogenic diets.

ultimate “holy grail” for dieters—to eat less to lose weight, and yet not to feel hungry

- **Limited data are available on daily hunger scores** (Eat Inv Quest, Likert scale) during ketogenic and nonketogenic diets.
- In some studies (Johnston CS et al: AmJ Clin Nutr 2006), subjects following a high-protein, low-fat diet reported feeling more satiated in the first 4 wk than did subjects following a high-carbohydrate, low fat diet, but, in other studies (Johnston CS et al: J Nutr 2004), there was no difference between the diets.

Am J Clin Nutr 2008;87:44–55.

Diete ad alto contenuto proteine e basso contenuto carboidrati

POSSIBILI EFFETTI NEGATIVI A LIVELLO RENALE

EFFETTI LEGATI ALLA CHETONURIA

- Aumento escrezione urinaria di SODIO e ACQUA (**disidratazione**, ipotensione ortostatica)
- Aumento escrezione urinaria di POTASSIO, CALCIO, MAGNESIO (aumentato rischio di nefrolitiasi, **squilibri elettrolitici**)

EFFETTI LEGATI ALL'ACIDOSI METABOLICA CRONICA

- Ossidazione epatica degli aminoacidi contenenti S (metionina e cisteina) con formazione di **radicali acidi**
- Tendenza all'acidosi metabolica compensata da **liberazione di cationi dalla matrice ossea** con riassorbimento osseo

!!! KD may lead to **progressive loss of bone mineral content**, albeit the exact mechanisms underlying this adverse effect remain unclear

(Bergqvist AG et al: Am J Clin Nutr 2008)



Kinetics, safety and tolerability of (*R*)-3-hydroxybutyl (*R*)-3-hydroxybutyrate in healthy adult subjects

Kieran Clarke^{a,*}, Kirill Tchabanenko^{b,1}, Robert Pawlosky^c, Emma Carter^a, M. Todd King^c, Kathy Musa-Veloso^d, Manki Ho^d, Ashley Roberts^d, Jeremy Robertson^b, Theodore B. VanItallie^e, Richard L. Veech^c

- An **excess of circulating ketones**, may result in **metabolic acidosis and cerebral edema** (Edge et al., 2001; Isales et al., 1999; Wootton-Gorges et al., 2005)
- Such effects are observed only when ketones reach supra-physiological levels (**10–20 mM or higher**) during pathological states (Cahill and Veech, 2003; Laffel, 1999; VanItallie, 2003)
- Plasma levels of ketones following an overnight fast or prolonged exercise are **normally in the ranges of 0.2–0.5 mM** (Laffel, 1999)
- Circulating ketone levels can **increase up to 50-fold during periods of caloric deprivation**, with b-hydroxybutyrate levels reported to be 4–5 mM in the blood following a 5- to 8-day fast (Cahill, 2006; Mensink et al., 1992; Owen et al., 1967)

⇒ **0.2-0.5 * 50 = 10-25 mM**



Acute Intractable Vomiting x
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J Emerg Med. 2014 Oct;47(4):e109-12. doi: 10.1016/j.jemermed.2014.06.020. Epub 2014 Aug 22.

Acute Intractable Vomiting and Severe Ketoacidosis Secondary to the Dukan Diet®.

Freeman TF¹, Willis B², Krywko DM².

Author information

Abstract

BACKGROUND: The benefits of low-carbohydrate, high-protein diets, such as the Dukan Diet®, are well documented, whereas reported adverse effects are rare in literature. Such diets mimic starvation states in that they promote the breakdown of fat and the production of ketones secondary to fatty acid metabolism. In fact, one measure of the effectiveness of such diets is the presence of ketosis. To our knowledge, there have been no reported cases of ketoacidosis resulting from the Dukan Diet.

OBJECTIVES: The purpose of this case report is to illustrate the importance of a detailed dietary history in patients with severe ketoacidosis secondary to the Dukan Diet and suggest treatment that may allow outpatient management.

CASE REPORT: A 42-year-old Iranian woman with no prior medical problems presented with 10 h of intractable nausea and vomiting secondary to ketoacidosis 2 days after starting the Dukan Diet.

CONCLUSION: Although rare, ketoacidosis secondary to a low-carbohydrate, high-protein diet can have serious complications if untreated. Clinical suspicion should arise in any patient presenting with intractable nausea and vomiting after starting a diet such as the Dukan Diet. Early recognition and intervention is essential to quicken patient recovery and outpatient management.

Published by Elsevier Inc.

KEYWORDS: ketoacidosis; ketonuria; low-carbohydrate diet; nausea; vomiting

PMID: 25154557 [PubMed - in process]

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Research

Open Access

Effects of consuming a high carbohydrate diet after eight weeks of exposure to a ketogenic diet

Mary Ann Honors, Brandon M Davenport and Kimberly P Kinzig*

Background: Ketogenic diets have been utilized for weight loss and improvement in metabolic parameters. The present experiments examined the effects of returning to a chow diet after prolonged ingestion of a ketogenic diet.

Methods: Rats were maintained on chow (CH) or a ketogenic diet (KD) for 8 weeks, after which the KD rats were given access to chow only (KD:CH) for 8 additional weeks. Caloric intake, body weight, and plasma leptin, insulin and ghrelin were measured before and after the dietary switch.

Results: After 8 weeks of consuming a ketogenic diet, KD rats had increased adiposity and plasma leptin levels, and reduced insulin, as compared to CH controls. One week after the diet switch, fat pad weight and leptin levels remained elevated, and were normalized to CH controls within 8 weeks of the dietary switch. Switching from KD to chow induced a transient hypophagia, such that KD:CH rats consumed significantly fewer calories during the first week after the dietary switch, as compared to calories consumed by CH rats. This hypophagia was despite significantly increased plasma ghrelin in KD:CH rats. Finally, KD:CH rats developed hyperphagia over time, and during weeks 6-8 after the diet switch consumed significantly more calories per day than did CH-fed controls and gained more weight than CH-fed controls.

Conclusion: Collectively, these data demonstrate that returning to a carbohydrate-based diet after a period of consuming a ketogenic diet has post-diet effects on caloric intake, body weight gain, and insulin levels.

Research

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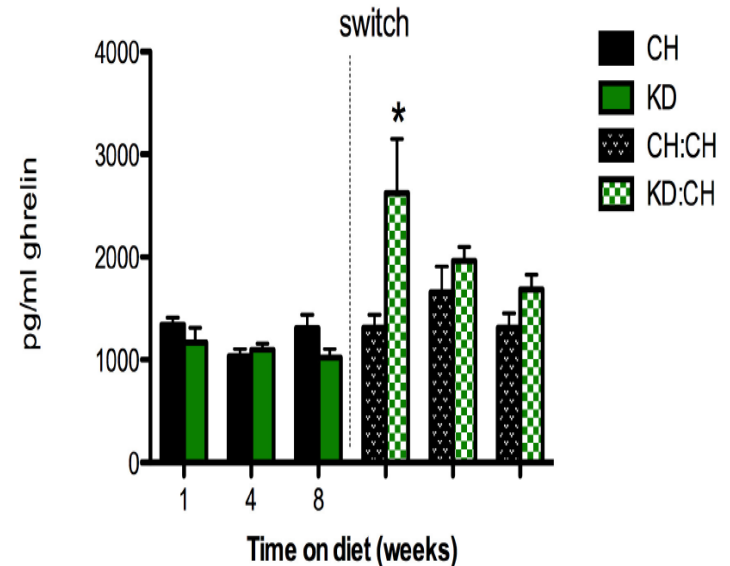


Figure 5

Plasma ghrelin. There were no differences between dietary groups with regard to plasma ghrelin levels prior to the dietary switch. Plasma ghrelin levels were significantly increased in KD:CH ($p < 0.05$) rats one week after switching from the ketogenic diet to chow, as compared to CH rats at this time point. This effect was only present at this time point and in this dietary group. Data are represented as mean \pm SEM. * denotes a statistically significant difference from CH values.

Long-term effects of low-fat diets either low or high in protein on cardiovascular and metabolic risk factors: a systematic review and meta-analysis

- **HP diet** ($\geq 25\%$ of total energy content, TEC) vs **LP dietary intervention** ($\leq 20\%$ of TEC), with both protocols adopting a **low fat diet** ($\leq 30\%$ of TEC)
- Since biomarkers under investigation were not affected by changes in dietary protein content, **unanimous recommendation of a high protein dietary approach is not supported by evidence.**
- With respect to the **potential risk of high-protein contents, further studies are required** before dietary recommendations can be changed towards a higher percentage of daily protein consumption.

Does the 5:2 intermittent fasting diet work?

Behind the Headlines

Monday January 14 2013

What we don't know about intermittent fasting

Despite its increasing popularity, there is a great deal of uncertainty about IF with significant gaps in the evidence.

For example, it is unclear:

- what pattern of IF is the most effective in improving health outcomes – 5:2, alternative day fasting, or something else entirely different
- what is the optimal calorie consumption during the fasting days – the 5:2 diet recommends 500 calories for women and 600 for men, but these recommendations seem arbitrary without clear evidence to support them
- how sustainable is IF in the long-term – would most people be willing to stick with the plan for the rest of their lives?

Are there any side-effects from intermittent fasting?

Little is known about possible side-effects as no systematic attempt has been made to study this issue. Anecdotal reports of effects include:

- difficulties sleeping
- bad breath (a known problem with low carbohydrate diets)
- irritability
- anxiety
- dehydration
- daytime sleepiness

Does the 5:2 intermittent fasting diet work?

Behind the Headlines

Monday January 14 2013

Conclusion

Compared to other types of weight loss programmes the evidence base of the safety and effectiveness of the 5:2 diet is limited.

If you are considering it then you should first talk to your GP to see if it is suitable for you. Not everyone can safely fast.

Other methods of weight loss include:

- eating a healthy balanced diet with at least five portions of fruit and vegetables a day
- taking regular exercise
- quitting smoking if you smoke
- drinking alcohol in moderation

Find recommended, simple, low cost ways to lose weight in the [Live Well: lose weight pages](#).

Edited by [NHS Choices](#). Follow [Behind the Headlines](#) on Twitter.

CASE REPORT

Recurrent torsades de pointes in association with a very low calorie diet



Figure 2 Electrocardiography rhythm strip taken 12 h after admission, demonstrating first episode of torsades de pointes.

Table 2 Daily content of the very low calorie diet.

| | |
|----------------------------|----------|
| Total calorie intake | 530 kcal |
| Protein | 50 g |
| Carbohydrate | 50 g |
| Fat | 17 g |
| Sodium | 4 g |
| Water | 4 l |
| Vitamin and mineral intake | Complete |

Preoperative Very Low-Calorie Diet and Operative Outcome After Laparoscopic Gastric Bypass

A Randomized Multicenter Study

Table 2. Intraoperative Variables in Patients Undergoing Laparoscopic Gastric Bypass

| | Study Group ^a | | P Value |
|--|--------------------------|-----------------|---------|
| | Control (n=136) | VLCD (n=137) | |
| Operating time, mean (SD), min | 81 (21) | 80 (23) | NS |
| BMI <48 | 78 (22) | 77 (20) | NS |
| BMI ≥48 | 91 (20) | 88 (26) | NS |
| VAS of difficulty, median (IQR), mm ^b | 35 (18-50) | 26 (15-42) | .04 |
| BMI <48 | 25 (15-41) | 30 (14-45) | NS |
| BMI ≥48 | 44 (25-57) | 35 (15-45) | NS |

Table 3. Complications Recorded at 30 Days After Surgery in Patients Undergoing Laparoscopic Gastric Bypass^a

| Complication ^b | Study Group, No. of Patients | |
|--------------------------------------|------------------------------|-------------------|
| | Control (n=136) | VLCD (n = 137) |
| Wound hemorrhage | 1 | 0 |
| Deep wound hemorrhage | 1 | 0 |
| GI tract hemorrhage | 1 | 1 |
| Pulmonary infection | 2 | 1 |
| Urinary tract infection | 1 | 1 |
| Wound infection | 7 | 4 |
| Pyrexia of unknown origin | 3 | 1 |
| Wound dehiscence | 1 | 0 |
| Anastomotic leak | 1 | 0 |
| All Complications^c | 18 | 8 |

VLCD=800 kcal: 70 g protein, 15 g fat, and 100 g carbohydrates

Comparison of the Atkins, Zone, Ornish, and LEARN Diets for Change in Weight and Related Risk Factors Among Overweight Premenopausal Women

The A TO Z Weight Loss Study: A Randomized Trial

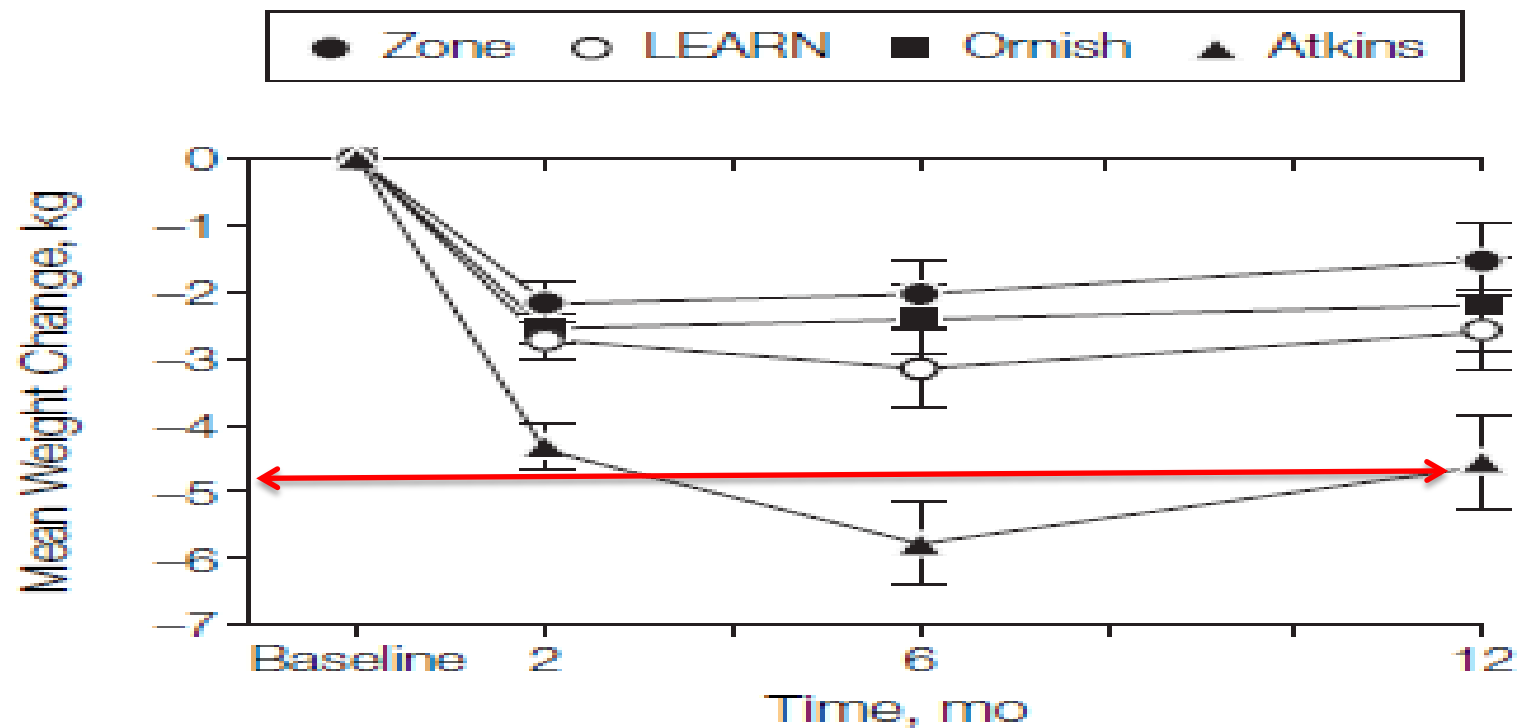
- The **Atkins** group: **20 g/d or less of carbohydrate** for “induction” (2-3 months) and **50 g/d or less of carbohydrate** for the subsequent “ongoing weight loss” phase.
- The **Zone** group: **40%-30%-30%** distribution of **carbohydrate, protein, and fat**, respectively.
- The **LEARN** group : **55% to 60% energy from carbohydrate** and **less than 10% energy from saturated fat**, caloric restriction, increased exercise, and behavior modification strategies.
- The **Ornish** group: **no more than 10% of energy from fat**.

JAMA. 2007;297:969-977

Comparison of the Atkins, Zone, Ornish, and LEARN Diets for Change in Weight and Related Risk Factors Among Overweight Premenopausal Women

The A TO Z Weight Loss Study: A Randomized Trial

Figure 2. Weight Change Relative to Baseline



Comparison of the Atkins, Zone, Ornish, and LEARN Diets for Change in Weight and Related Risk Factors Among Overweight Premenopausal Women

The A TO Z Weight Loss Study: A Randomized Trial

- While questions remain about **long-term effects and mechanisms**, a low-carbohydrate, high-protein, high-fat diet may be considered a feasible alternative recommendation for weight loss.
- As with any diet, physicians should caution patients that **long-term success requires permanent alterations in energy intake and energy expenditure, regardless of macronutrient content.**

Weight Loss with a Low-Carbohydrate, Mediterranean, or Low-Fat Diet

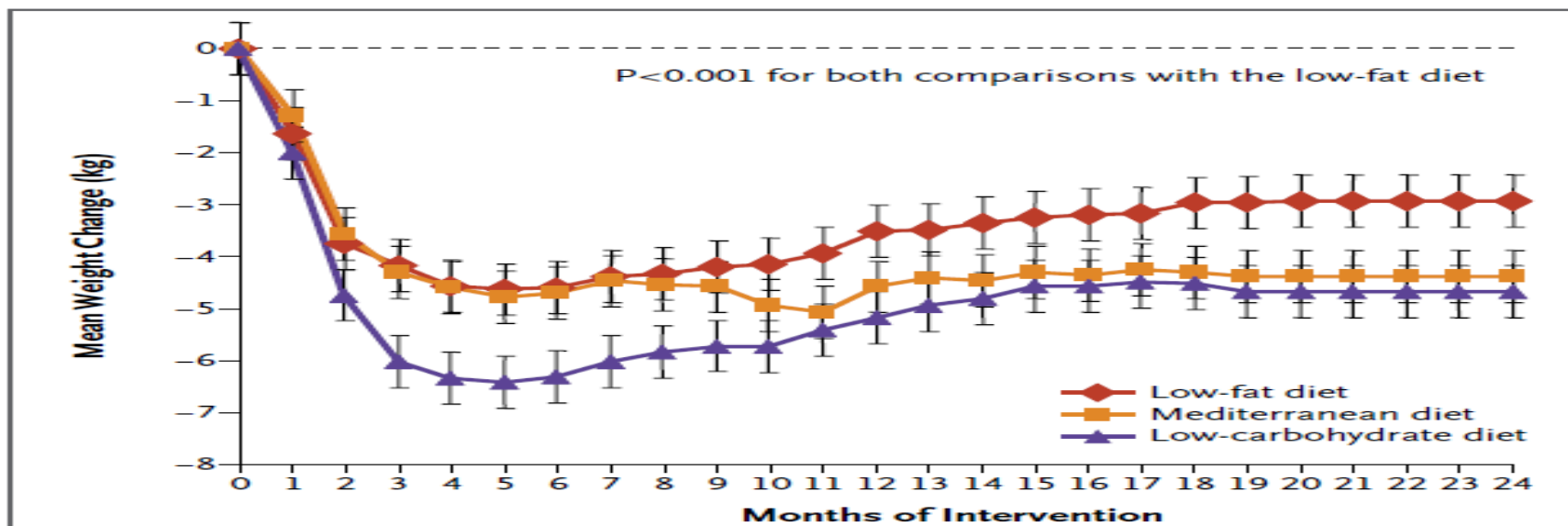


Figure 2. Weight Changes during 2 Years According to Diet Group.

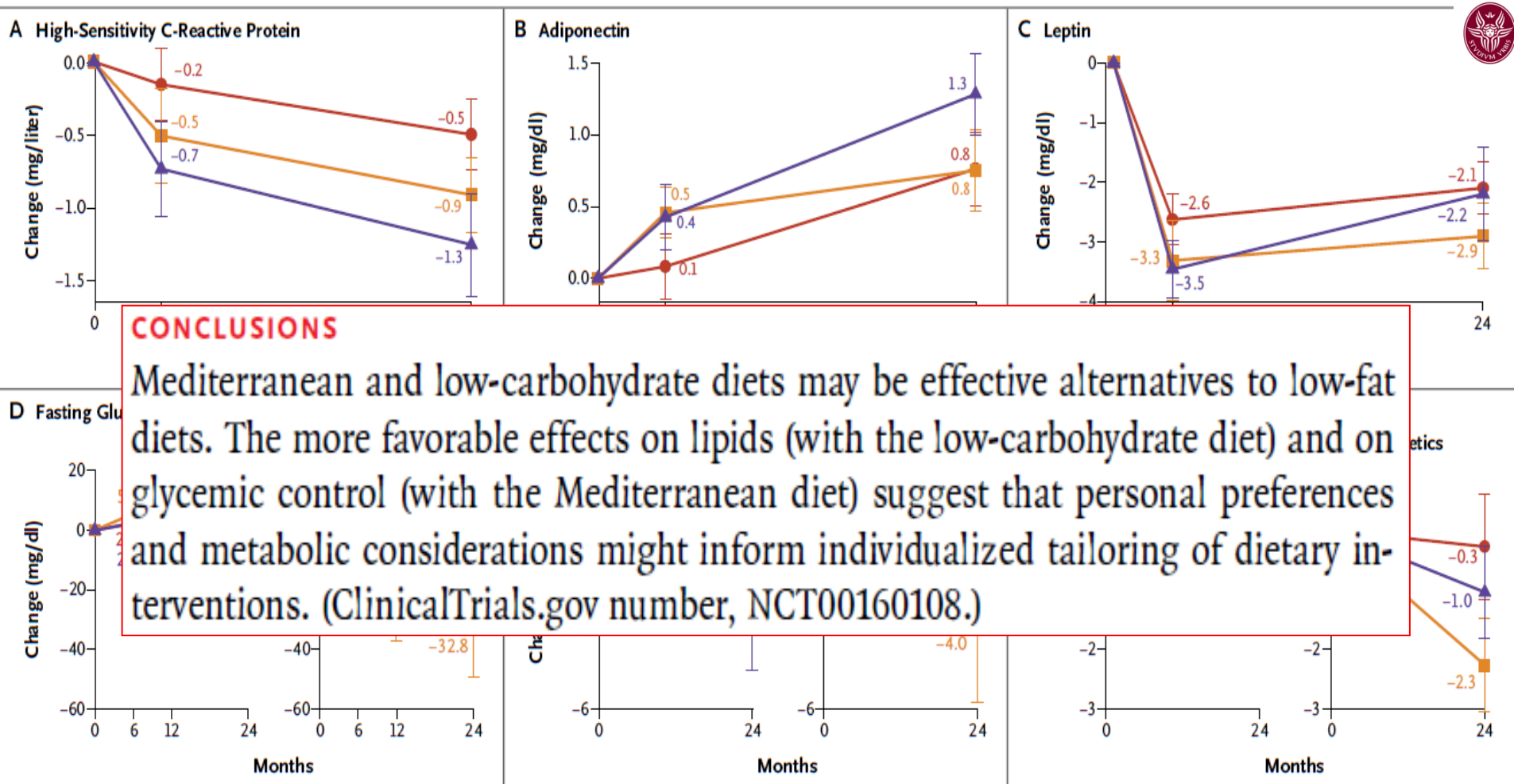
Vertical bars indicate standard errors. To statistically evaluate the changes in weight measurements over time, generalized estimating equations were used, with the low-fat group as the reference group. The explanatory variables were age, sex, time point, and diet group.

CONCLUSIONS

Mediterranean and low-carbohydrate diets may be effective alternatives to low-fat diets. The more favorable effects on lipids (with the low-carbohydrate diet) and on glycemic control (with the Mediterranean diet) suggest that personal preferences and metabolic considerations might inform individualized tailoring of dietary interventions. (ClinicalTrials.gov number, NCT00160108.)



● Low-fat diet ■ Mediterranean diet ▲ Low-carbohydrate diet



CONCLUSIONS

Mediterranean and low-carbohydrate diets may be effective alternatives to low-fat diets. The more favorable effects on lipids (with the low-carbohydrate diet) and on glycemic control (with the Mediterranean diet) suggest that personal preferences and metabolic considerations might inform individualized tailoring of dietary interventions. (ClinicalTrials.gov number, NCT00160108.)

Figure 4. Changes in Biomarkers According to Diet Group and Presence or Absence of Type 2 Diabetes.

Panel A shows the results for plasma high-sensitivity C-reactive protein, Panel B for plasma adiponectin, Panel C for plasma leptin, Panel D for fasting plasma glucose, Panel E for fasting plasma insulin, and Panel F for the homeostasis model assessment of insulin resistance (HOMA-IR). Vertical bars indicate standard deviations. To statistically evaluate the response of weight measurements over time, generalized estimating equations were used, with the low-fat group as the reference group. The explanatory variables were age, sex, time point, and diet group. Data were available for 36 participants with type 2 diabetes: 11 in the low-fat group, 13 in the Mediterranean-diet group, and 12 in the low-carbohydrate group. The P values for the comparison between the low-fat group and the Mediterranean-diet group are 0.49 for high-sensitivity C-reactive protein, 0.50 for adiponectin, 0.54 for leptin, <0.001 for fasting glucose, 0.78 for fasting insulin, and 0.04 for HOMA-IR. The P values for the comparison between the low-fat group and the low-carbohydrate group are 0.12 for high-sensitivity C-reactive protein, 0.32 for adiponectin, 0.47 for leptin, 0.12 for fasting glucose, 0.20 for fasting insulin, and 0.27 for HOMA-IR. The P values for the interaction among diabetes and Mediterranean diet and time are <0.001 for fasting glucose and 0.04 for HOMA-IR. To convert values for glucose to millimoles per liter, multiply by 0.05551.

Mediterranean diet pyramid today. Science and cultural updates

Anna Bach-Faig¹, Elliot M Berry², Denis Lairon³, Joan Reguant¹, Antonia Trichopoulou⁴, Sandro Dernini^{5,6}, F Xavier Medina⁷, Maurizio Battino⁸, Rekia Belahsen⁹, Gemma Miranda¹ and Lluís Serra-Majem^{1,10,*} on behalf of the Mediterranean Diet Foundation Expert Group

Mediterranean diet pyramid: a lifestyle for today
guidelines for adult population

Serving size based on frugality
and local habits



Wine in moderation
and respecting social beliefs



2010 edition

s = Serving

© 2010 Fundacion dieta mediterranea the use and promotion of this pyramid is recommended without any restriction

Nutritional Recommendations for Cardiovascular Disease Prevention

Sigal Eilat-Adar ^{1,*}, Tali Sinai ², Chaim Yosefy ^{3,4} and Yaakov Henkin ^{4,5}

Table 4. Level of evidence and classes of recommendations for food patterns.

| Food pattern | Recommendations | Strength | Level of evidence |
|-----------------------|---|----------|-------------------|
| Low-fat diet | Low-fat diet with restricted calories may present a healthy alternative to the typical Western diet. It may improve quality and life expectancy in healthy people, as well as in patients with overweight, diabetes, and CVD. | II a | A |
| Low-carbohydrate Diet | In the short-run, low-carbohydrate diets lead to a greater weight loss compared to low-fat diets. Some studies have shown that this advantage is retained at 2 years but not at longer follow-up periods | II b | A |
| | Low-carbohydrate diets are preferable to a low-fat diet in reducing TG levels and increasing HDL-C blood levels. It should be emphasized that carbohydrates should preferably be replaced by unsaturated vegetable fats. | II a | A |
| | Low-carbohydrate diets, which include 30%–40% of calories from carbohydrates and are low in saturated fat and high in monounsaturated fat, were found to be safe in healthy and overweight individuals at follow-up up to 4 years | II a | A |
| Mediterranean Diet | A Mediterranean diet with restricted calories may present a healthy alternative to the typical Western diet. It may improve quality and life expectancy in healthy people, as well as in patients with overweight, diabetes, and CVD. | II a | A |
| | Mediterranean diets are preferable to a low-fat diet in reducing TG levels, increasing HDL-C blood levels, and improving insulin sensitivity. | II a | A |
| DASH Diet | The DASH diet is recommended to prevent hypertension and lower blood pressure. | I | A |
| | The diet should be accompanied by lifestyle changes such as: weight reduction in overweight people, increased physical activity, sodium restriction, and alcohol avoidance. | I | A |

Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults

A Meta-analysis

Table 1. Diet Classes Based on Macronutrient Composition

| Type of Diet | Branded Diets ^a | Carbohydrates, % kcal | Protein, % kcal | Fat, % kcal |
|-------------------------|---|-----------------------|---------------------|-------------|
| Low carbohydrate | Atkins, South Beach, Zone | ≤40 | Approximately 30 | 30-55 |
| Moderate macronutrients | Biggest Loser, Jenny Craig, Nutrisystem, Volumetrics, Weight Watchers | Approximately 55-60 | Approximately 15 | 21-≤30 |
| Low fat | Ornish, Rosemary Conley | Approximately 60 | Approximately 10-15 | ≤20 |

^a The Lifestyle, Exercise, Attitudes, Relationships, and Nutrition (LEARN) diet was applied as both a low-fat diet (2 trials) and a moderate macronutrient diet (5 trials) among the 7 included trials having used the LEARN diet (Table 2).

Slimming World was excluded from the diet class analyses because it does not fit any of the definitions above.

Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults

A Meta-analysis

Figure 1. Difference in Mean Weight Loss at 6- and 12-Month Follow-up Across All Diet Classes With 95% Credible Intervals

| | | 12-mo Weight Loss, kg | | | | |
|----------------------|-------------------------|--|---|--|---|------------------------|
| | | No diet (6 mo: 0; 12 mo: 0) ^a | 5.16 (2.68 to 7.63) | 5.70 (4.14 to 7.35) | 7.25 (5.33 to 9.25) | 7.27 (5.26 to 9.34) |
| 6-mo Weight Loss, kg | 6.07 (4.23 to 7.84) | LEARN (6 mo: 0; 12 mo: 0.02) ^a | 0.55 (-1.71 to 2.87) | 2.10 (-0.20 to 4.47) | 2.12 (-0.33 to 4.59) | |
| | 6.78 (5.50 to 8.05) | 0.71 (-0.97 to 2.44) | Moderate macronutrients (6 mo: 0; 12 mo: 0) ^a | 1.55 (0.13 to 2.95) | 1.56 (-0.17 to 3.30) | |
| | 8.73 (7.27 to 10.20) | 2.66 (0.93 to 4.44) | 1.95 (1.13 to 2.79) | Low carbohydrate (6 mo: 0.83; 12 mo: 0.48) ^a | 0.02 (-1.78 to 1.79) | |
| | 7.99 (6.01 to 9.92) | 1.92 (-0.19 to 4.06) | 1.20 (-0.42 to 2.79) | -0.74 (-2.31 to 0.78) | Low fat (6 mo: 0.17; 12 mo: 0.50) ^a | |

The values above the diet classes (blue boxes) correspond to the difference in mean weight lost between the columns and row at 12 months (eg, the difference in average weight lost between moderate macronutrients and no diet at 12 months is 5.70 kg). The values below the diet classes correspond to the difference in mean weight lost between the row and the column at 6 months (eg, the difference in average weight lost between moderate

macronutrients and no diet at 6 months is 6.78 kg). LEARN indicates Lifestyle, Exercise, Attitudes, Relationships, and Nutrition.

^a The values in parentheses represent the estimated probability of that treatment being the best.

Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults

A Meta-analysis

CONCLUSIONS AND RELEVANCE Significant weight loss was observed with any low-carbohydrate or low-fat diet. Weight loss differences between individual named diets were small. This supports the practice of recommending any diet that a patient will adhere to in order to lose weight.

JAMA. 2014;312(9):923-933.

Effects of Low-Carbohydrate Diets Versus Low-Fat Diets on Metabolic Risk Factors: A Meta-Analysis of Randomized Controlled Clinical Trials

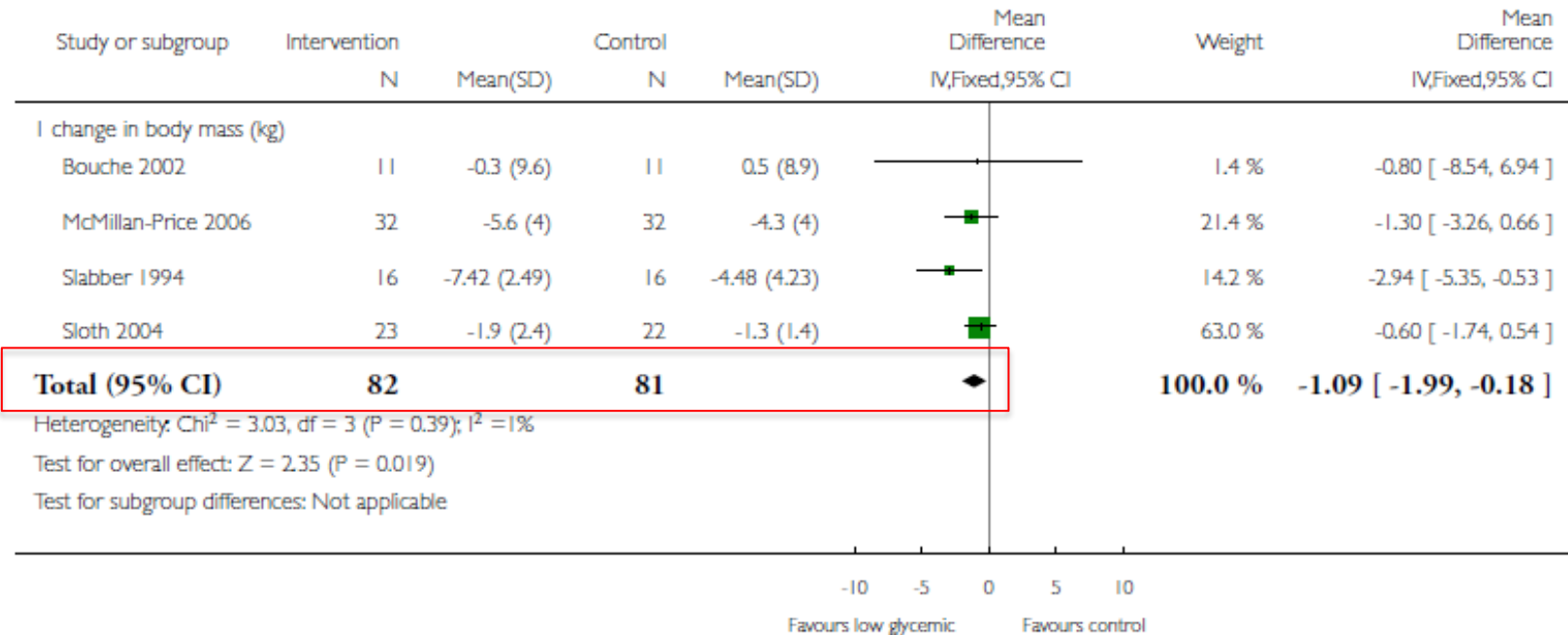
The effects of low-carbohydrate diets ($\leq 45\%$ of energy from carbohydrates) versus low-fat diets ($\leq 30\%$ of energy from fat) on metabolic risk factors were compared in a meta-analysis of randomized controlled trials. Twenty-three trials from multiple countries with a total of 2,788 participants met the predetermined eligibility criteria (from January 1, 1966 to June 20, 2011) and were included in the analyses. Data abstraction was conducted in duplicate by independent investigators. Both low-carbohydrate and low-fat diets lowered weight and improved metabolic risk factors. Compared with participants on low-fat diets, persons on low-carbohydrate diets experienced a slightly but statistically significantly lower reduction in total cholesterol (2.7 mg/dL; 95% confidence interval: 0.8, 4.6), and low density lipoprotein cholesterol (3.7 mg/dL; 95% confidence interval: 1.0, 6.4), but a greater increase in high density lipoprotein cholesterol (3.3 mg/dL; 95% confidence interval: 1.9, 4.7) and a greater decrease in triglycerides (-14.0 mg/dL; 95% confidence interval: -19.4 , -8.7). Reductions in body weight, waist circumference and other metabolic risk factors were not significantly different between the 2 diets. These findings suggest that low-carbohydrate diets are at least as effective as low-fat diets at reducing weight and improving metabolic risk factors. Low-carbohydrate diets could be recommended to obese persons with abnormal metabolic risk factors for the purpose of weight loss. Studies demonstrating **long-term effects** of low-carbohydrate diets on cardiovascular events were warranted.




Am J Epidemiol. 2012;176(Suppl):S44–S54

Low glycaemic index or low glycaemic load diets for overweight and obesity

Analysis 1.1. Comparison 1 Low glycaemic diet versus high glycaemic or other diet, Outcome 1 change in body mass (kg).



- In studies comparing **ad libitum LGI diets** to conventional **restricted energy low-fat diets**, participants fared as well or better on the LGI diet, even though they could eat as much as desired.
- **Further research with longer term follow-up** will determine whether improvement continues long-term and improves quality of life. 

[Cochrane Database Syst Rev. 2007;\(3\):CD005105.](https://doi.org/10.1002/14651858.CD005105)

glycemic index
vs
glycemic load



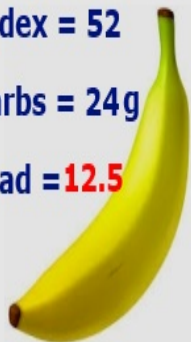
$$\text{Glycemic Load} = \frac{\text{Glycemic Index} \times \text{Carbohydrates in a given serving (g)}}{100}$$

GI uses a scale of **0** to **100**, with higher values given to food items that cause the blood sugar to rise rapidly.

GL studies the glycemic response, while considering the carbohydrate content in a specified serving size of a food item.

Which To Choose?

Glycemic Index = 52
Available Carbs = 24g
Glycemic Load = **12.5**



Glycemic Index = 80
Available Carbs = 13g
Glycemic load = **10.4**



Medium high
glycemic food



Low glycemic foods

= Medium
glycemic meal

The formula for calculating glycemic load (GL)

$$GL = (GI \times \text{carbohydrates less fiber}) / 100$$

The examples below are based on GL ranges of low, moderate, and high

Low GL < 10

Moderate GL 10–14

High GL > 15



Example of a high-GI/low-GL food

A 120-gram serving of watermelon has a GI of 72 and the available carbohydrate is 6 grams (the amount of fiber contained in this serving does not warrant inclusion in the calculation).

Therefore, the GL of watermelon is $(72 \times 6) / 100 = 4.3$.



Example of a low-GI/high-GL food

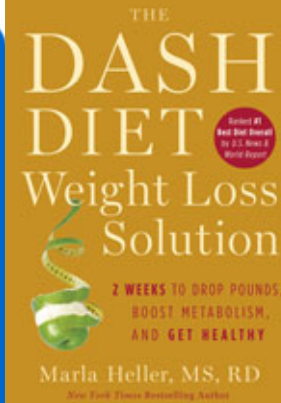
A 180-gram serving of cooked whole wheat spaghetti has a GI of 37. The amount of available carbohydrate is 36 grams

(42 grams of carbohydrate minus the approximate 6 grams of fiber content). Therefore, the GL of whole wheat spaghetti is:

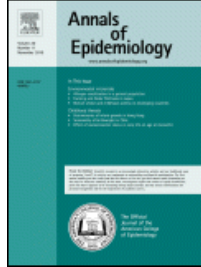
$(37 \times 36) / 100 = 13$

Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes¹⁻³

In conclusion, our review of the existing literature on low-carbohydrate, low-GI, Mediterranean, and high-protein diets suggests that these diets may be effective in improving various markers of cardiovascular risk in people with diabetes and could have a wider role in the management of diabetes. Dietary behaviors and choices are often personal, and it is usually more realistic for a dietary modification to be individualized rather than to use a one-size-fits-all approach for each person. The diets reviewed in this study show that there may be a range of beneficial dietary options for people with T2D.



& WORLD REPORT
U.S. News



Rationale and Design of the Dietary Approaches to Stop Hypertension Trial (DASH)

A Multicenter Controlled-Feeding Study of Dietary Patterns to Lower Blood Pressure

FRANK M. SACKS, MD, EVA OBARZANEK, PhD, MARLENE M. WINDHAUSER, PhD, LAURA P. SVETKEY, MD, WILLIAM M. VOLLMER, PhD, MARJORIE McCULLOUGH, RD, NJERI KARANJA, PhD, PAO-HWA LIN, PhD, PRISCILLA STEELE, RD, MICHAEL A. PROSCHAN, PhD, MARGUERITE A. EVANS, RD, LAWRENCE J. APPEL, MD, GEORGE A. BRAY, MD, THOMAS M. VOGT, MD, AND THOMAS J. MOORE, MD,
FOR THE DASH INVESTIGATORS

AEP Vol. 5, No. 2
March 1995: 108–118

- DASH (Dietary Approach to Stop Hypertension) è il programma alimentare del momento.
- E' stata eletta migliore dieta del **2012** dalla rivista *Usa News & World Report*.

A CLINICAL TRIAL OF THE EFFECTS OF DIETARY PATTERNS
ON BLOOD PRESSURE
THE DASH COLLABORATIVE RESEARCH GROUP

Dietary Attempt to Stop Hypertension

The combination diet was

- rich in fruits, vegetables, and low-fat and dairy foods
- had reduced amounts of saturated fat, total fat, and cholesterol.

This diet provided:

- potassium, magnesium, and calcium at levels close to the 75th percentile of U.S. consumption,
- high amounts of fiber and protein.
- The sodium content of each diet was similar — approximately 3 g per day.

NEJM 1997; 336:1117-24

Vegetarian diet, Seventh Day Adventists and risk of cardiovascular mortality: A systematic review and meta-analysis

In conclusion, the reduction in IHD and all-cause mortality with vegetarian diet stems mainly from the Adventist studies, and there is much less convincing evidence from studies conducted in other populations. Once the SDA studies have been excluded, the results are either less significant or with a lesser magnitude of benefit, and this raises the concern that the non-dietary factors (confounders) in SDA lifestyle may be responsible for the risk reduction among the vegetarian studies. In addition, among men there appears to be greater benefit of vegetarian diet compared to women. In view of these inconsistent findings, we conclude that the benefits of vegetarian diet for reducing death and vascular events remain unproven.

International Journal of Cardiology xxx (2014) xxx-xxx

Oils

2-3 Teaspoons

Nuts & Seeds

1-2 servings

Dairy

Vegan: Fortified Non-dairy Substitutes

3 servings

Vegetables

2-4 servings

And

Green Leafy Vegetables

2-3 servings



Vegan:

B-12 : 2.4 ug/d Vit D : 200 IU/d Calcium : 600 mg/d

Beans & Protein Foods

2-3 servings

Fruits

1-2 servings

And

Dried Fruit

1-2 servings

Breads, Cereals,

Pasta, Rice

6-10 servings

VEGETARIAN FOOD PYRAMID



Water: 8 cups daily - Needs increase with activity



© 2002 Department of Nutrition, Arizona State University
Art by Nick Rickert

Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets

A variety of menu planning approaches can provide adequate nutrition for vegetarians. The Vegetarian Food Guide Pyramid and Vegetarian Food Guide Rainbow (72,73) suggest one approach. In addition, the following guidelines can help vegetarians plan healthful diets:

- Choose a variety of foods including whole grains, vegetables, fruits, legumes, nuts, seeds, and if desired, dairy products, and eggs.
- Choose whole, unrefined foods often and minimize the intake of highly sweetened, fatty and heavily refined foods.
- Choose a variety of fruits and vegetables.
- If animal foods such as dairy products and eggs are used, choose lower-fat dairy products and use both eggs and dairy products in moderation.
- Use a regular source of vitamin B-12 and, if sunlight exposure is limited, of vitamin D.

FIG 2. Meal planning.

J Am Diet Assoc. 2003;103:748-765.

Dietary patterns and cardiovascular disease

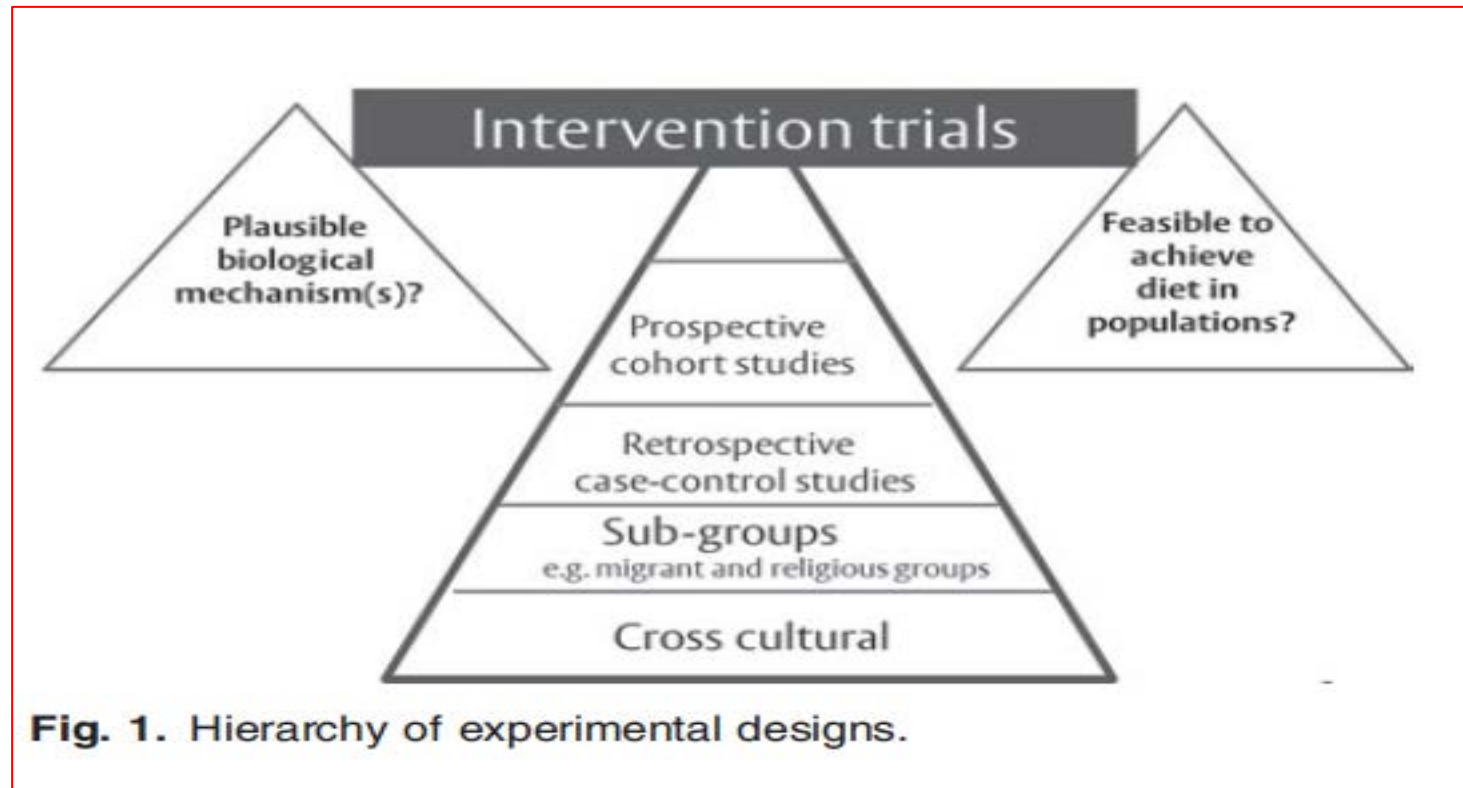




Fig. 1. Hierarchy of experimental designs.

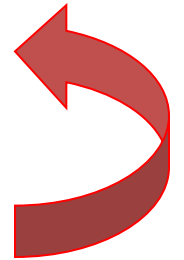
-  Feasibility of achieving dietary change within free-living populations
-  Reliance on indirect biomarkers, rather than clinical endpoints of CVD

RESTRIZIONE

Tendenza di un soggetto a ridurre consapevolmente l'assunzione di cibo per evitare incrementi di peso

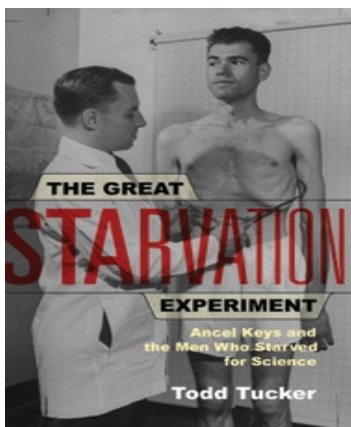


DIETING



DISINIBIZIONE

Assunzione più o meno compulsiva di una certa quantità di alimenti



Effetti comportamentali

- Pensieri ricorrenti sul cibo
- Rituali alimentari
- Incremento di spezie, ...
- Onicofagia
- Incremento del fumo
- Episodi bulimici
- Autolesionismo

Effetti fisici

- Disturbi del sonno
- Vertigini/Debolezza
- Disturbi gastrointestinali
- Cefalea
- Ipersensibilità a rumore e luce
- Riduzione di TC, FC, FR, MB
- Parestesie
- Aumento della fame
- Precoce senso di pienezza

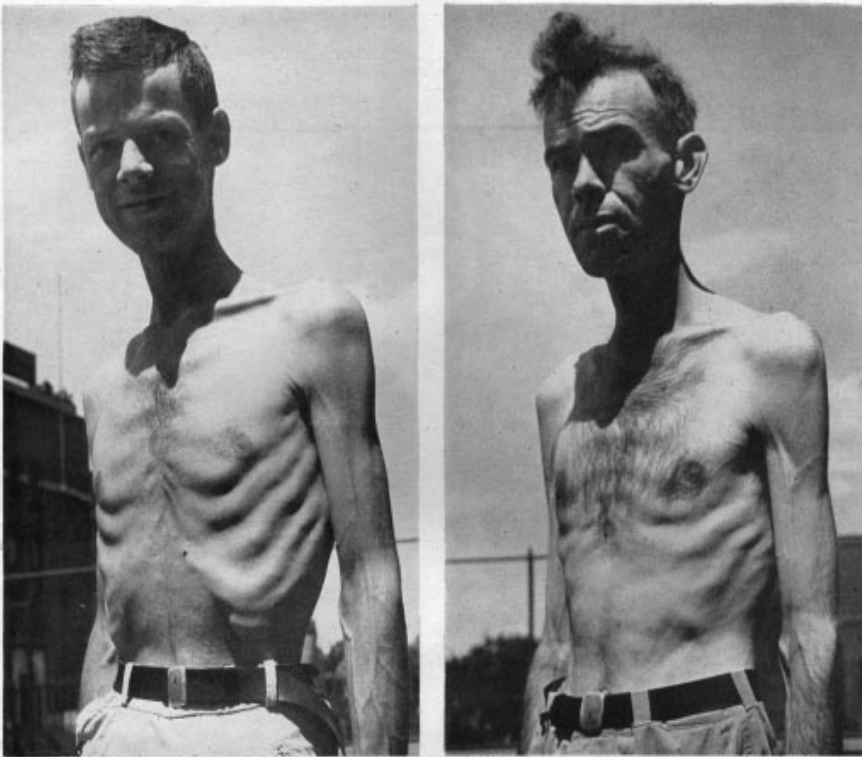
Effetti psicologici

- ↓ capacità di concentrazione
- Scarsa capacità di *insight* e giudizio critico
- Depressione
- Sbalzi del tono dell'umore
- Irritabilità/Rabbia/Ansia
- Ossessività
- Apatia
- Episodi psicotici
- Cambiamenti di personalità

Effetti sociali

- Isolamento sociale
- Riduzione dell'interesse sessuale

Keys A, et al: (1950) The Biology of Human Starvation, Vols. I – II. University of Minnesota Press, Minneapolis, MN.



AFTER FIVE MONTHS OF STARVATION DIET CONSCIENTIOUS OBJECTORS SAMUEL LEGG (LEFT) AND EDWARD COWLES HAVE LOST 35 AND 31 POUNDS RESPECTIVELY

MEN STARVE IN MINNESOTA

CONSCIENTIOUS OBJECTORS VOLUNTEER FOR STRICT HUNGER TESTS TO STUDY EUROPE'S FOOD PROBLEM



FIGURE 8.5. Minnesota volunteers at mealtime. Copyright 1950 by the University of Minnesota Press. Reprinted by permission.

The understanding that starvation dramatically alters personality and that **nutrition directly and predictably affects mind as well as body** is one of the legacies of **the experiment.**

Keys A, (1950) The Biology of Human Starvation, Vols. I – II. University of Minnesota Press, Minneapolis, MN.

**They Starved So That Others Be Better Fed:
Remembering Ancel Keys and the Minnesota Experiment**

Leah M. Kalm and Richard D. Semba

The Johns Hopkins School of Medicine, Baltimore, MD

J. Nutr. 135: 1347–1352, 2005.

Dei 36 partecipanti al Minnesota Study, nel 2004, 18 erano ancora vivi, furono intervistati da ricercatori della prestigiosa Scuola Medica di Baltimora e parlarono con entusiasmo dello studio fornendo ulteriori informazioni sulla loro esperienza.

In particolare tennero a sottolineare il chiaro ricordo dello stupore e del disorientamento legato agli importanti cambiamenti della loro personalità e alla drammatica ossessione che vissero nei confronti del cibo.

Per molti di essi il periodo più difficile fu quello della rialimentazione, nessuno riuscì a riprendere le attività abituali alla fine delle dodici settimane, e il pieno recupero richiese un tempo variabile da molti mesi a due anni.



Obesity, Disordered Eating, and Eating Disorders in a Longitudinal Study of Adolescents: How Do Dieters Fare 5 Years Later?

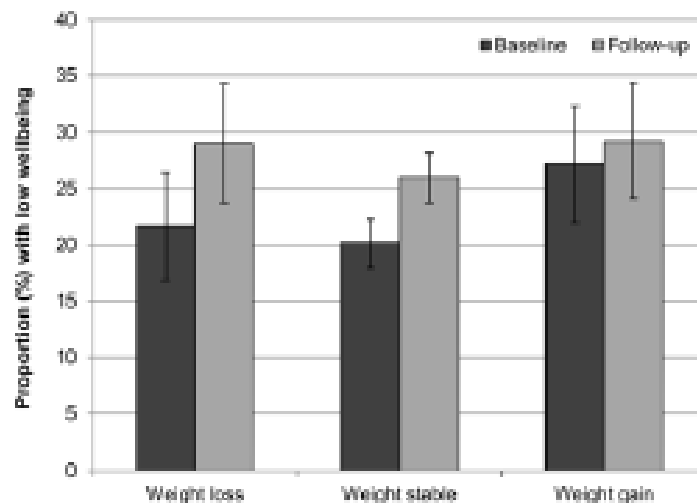
DIANNE NEUMARK-SZTAINER, PhD, MPH, RD; MELANIE WALL, PhD; JIA GUO, MS; MARY STORY, PhD, RD;
JESS HAINES, PhD, MHS, RD; MARLA EISENBERG, ScD, MPH

J Am Diet Assoc. 2006;106:559-568.

| Unhealthy Dieting | Change in BMI (Kg/m ²) | Overweight status |
|-------------------|------------------------------------|-------------------------------|
| F | 1.87 | 2.67 |
| M | 2.63 | 1.86 |
| | Binge eating | Extreme weight control |
| F | 6.42 | 2.5 |
| M | 5.94 | 4.8 |

Dati espressi come odds ratio

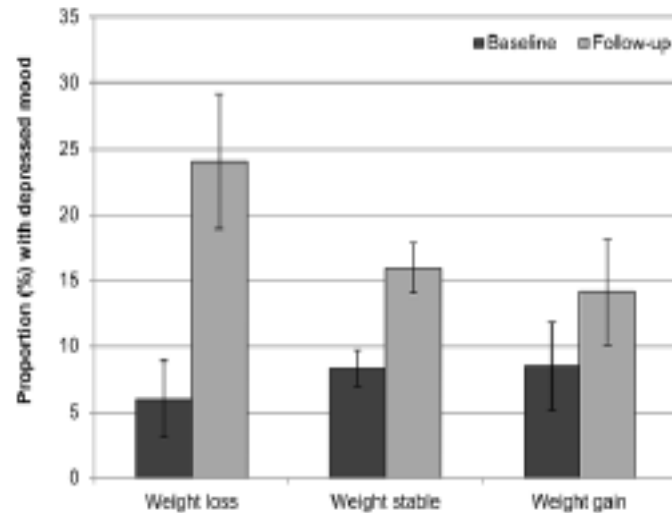
Psychological Changes following Weight Loss in Overweight and Obese Adults: A Prospective Cohort Study



Weight loss Weight stable Weight gain

Figure 2. Prevalence of low wellbeing at baseline and follow-up by weight change status. Values are mutually adjusted for age, sex, wealth, and weight loss intention. Error bars represent the 95% confidence interval.

Psychological Changes following Weight Loss in Overweight and Obese Adults: A Prospective Cohort Study



Weight loss Weight stable Weight gain

Figure 1. Prevalence of depressed mood at baseline and follow-up by weight change status. Values are mutually adjusted for age, sex, wealth, and weight loss intention. Error bars represent the 95% confidence interval.

PlosOne 2014; 9: e104552

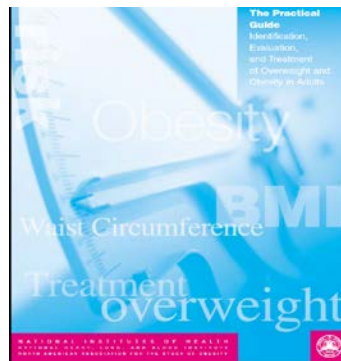
Prevention and Management of Obesity (Mature Adolescents and Adults)

Is Patient Ready to Lose Weight?

Key Points:

- Knowing the patient's readiness to change can help the provider understand a patient's level of motivation and how to tailor communication about weight loss.
- Patients need to set realistic, achievable goals and to be held accountable to practice new behaviors that produce and maintain weight loss.

- Effective weight management strategies are available and include nutrition, physical activity, lifestyle changes, medication and surgery. (*Annotation #6; Aim #2*)
- A 5%-10% weight loss can reduce a patient's risk of heart disease and diabetes that is clinically significant, and should be encouraged for all patients who are overweight and obese. This amount of weight loss and maintenance should be considered a clinical success and commended. This can be achieved and maintained with a high-intensity medical weight loss program even for the morbidly obese. (*Annotation #8; Aim #2*)



A 10 percent reduction in body weight reduces disease risk factors. Weight should be lost at a rate of 1 to 2 pounds per week based on a calorie deficit of 500–1,000 kcal/day.



RECOMMENDATION: *The initial goal of weight loss therapy should be to reduce body weight by approximately 10 percent from baseline. With success, further weight loss can be attempted, if indicated through further assessment. Evidence Category A.*

Diagnosi - Quantificazione dell'eccesso ponderale (BMI + Circonferenza vita) + Valutazione Patologie Associate

- BMI >35
- BMI <30 con comorbidità

MMG

- Lavorare sulla motivazione indicazioni per un corretto stile di vita → DIETA & ATTIVITA' FISICA
- Verifiche periodiche dell'aderenza alla terapia

- BMI ≥35
- BMI ≥30 con comorbidità

Ambulatorio Specialistico

- Educazione terapeutica
- Intervento nutrizionale
- Riduzione sedentarietà
- Terapia farmacologica obesità e/o complicanze
- Gestione DCA e comorbidità psichiatriche

- BMI ≥ 45 anche in assenza di complicanze documentate
- BMI ≥ 35 in presenza di comorbidità

Degenza Specialistica

Acuzie (rischio di vita, scompenso clinico, ...)

Riabilitazione nutrizionale-psicologica metabolico
(educazione terapeutica, intervento nutrizionale, ricondizionamento fisico, terapia motivazionale)

Se livello di gravità e/o comorbidità medica e/o psichiatrica è elevato, l'impatto sulla disabilità e sulla qualità della vita del paziente è pesante, gli interventi da mettere in atto diventano numerosi ed è opportuno - per ragioni cliniche che economiche - concentrarli in tempi relativamente brevi secondo un progetto coordinato, precedenti percorsi a minore intensità non hanno dato i risultati sperati ed il rischio per lo stato di salute del paziente tende ad aumentare.

Chirurgia Bariatrica (LG SICOB) (7)

- BMI >40
- BMI >35 ≤40 in presenza di comorbidità "che, presumibilmente, possono migliorare o guarire a seguito della notevole e persistente perdita di peso ottenuta con l'intervento" (malattie del metabolismo, patologie cardiorespiratorie, gravi malattie articolari, gravi problemi psicologici, ecc.).
- Fallimento di un corretto trattamento medico (mancato o insufficiente calo ponderale; scarso o mancato mantenimento a lungo termine del calo di peso).



The British Dietetic Association

BDA Press Release

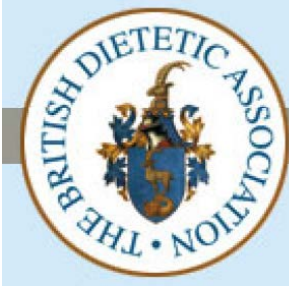
22 November 2012

www.bda.uk.com - website

[@BrDieteticAssoc](https://twitter.com/BrDieteticAssoc) - twitter

BDA TOP 5 WORST DIETS





3

'Party Girl' IV Drip Diet (new entry)

Celebrity Fans: Rihanna and Simon Cowell are reportedly fans of this diet.

2

The KEN (Keto)

Celebrity Fans: It is a diet that celebrities are fans of.

1

Dukan Diet (last)

Celebrity Fans: Carc

Being famous does not make someone an expert on diet

celebrities are fans of

fans of this diet.