



Diet Quality, Intermittent Fasting, Cancer Risk

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Dietary patterns

- ▶ Level of diet quality can be identified with dietary patterns
- ▶ “. . . the quantities, proportions, variety, or combination of different foods, drinks, and nutrients (when available) in diets, and the frequency with which they are habitually consumed¹”
- ▶ Poor diet quality is thought to be a leading risk factor for years of life lost

1. Nutrition Evidence Library. A Series of Systematic Reviews on the Relationship Between Dietary Patterns and Health Outcomes. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, March 2014.

The study of dietary patterns is important

- Complexity of diet
 - People eat foods (and meals), not nutrients
- Correlation among dietary constituents
 - Analysis of single nutrients may be confounded by the effect of dietary patterns
- Clinical trials show positive health outcomes with changes in “total diet”
 - Dietary Approaches to Stop Hypertension (DASH)
 - Lyon Diet Heart Study – Mediterranean diet
- Relevance for policy and guidance

3

Dietary Patterns Methods Project

a systematic comparison of diet quality indices with mortality



	HEI-2010	AHEI-2010	aMED	DASH
Components Scores	100	110	9	8-40
Vegetables	+	+	+	+
Fruit	+	+	+	+
Nuts		+	+	+
Legumes			+	
Fish	+		+	
Whole grains	+	+	+	+
Total protein foods	+			
Dairy	+			+
Oils/fats	+	+	+	
Alcohol		+	+	
Red & processed meat		(+)	(+)	(+)
Refined grains	(+)			
Empty calories	(+)			
SSB & fruit juice		(+)		(+)
Sodium	(+)	(+)		(+)

Dietary Patterns Methods Project

- ▶ National Institutes of Health
National Cancer Institute
 - ▶ Jill Reedy
 - ▶ Susan Krebs-Smith
 - ▶ Amy Subar
 - ▶ Stephanie George



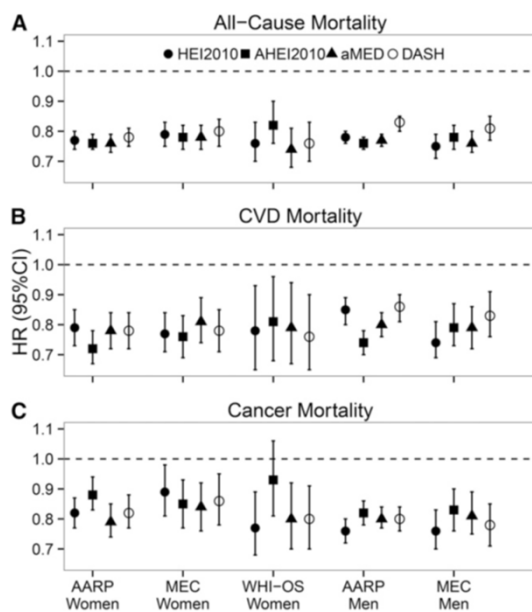
- ▶ University of Hawaii Cancer Research Center
 - ▶ Carol Boushey
 - ▶ Brook Harmon



- ▶ Fred Hutchinson Cancer Research Center & University of Washington
 - ▶ Marian Neuhouser
- ▶ University of South Carolina
 - ▶ Angela Liese



Comparing dietary quality and mortality across 3 cohorts.



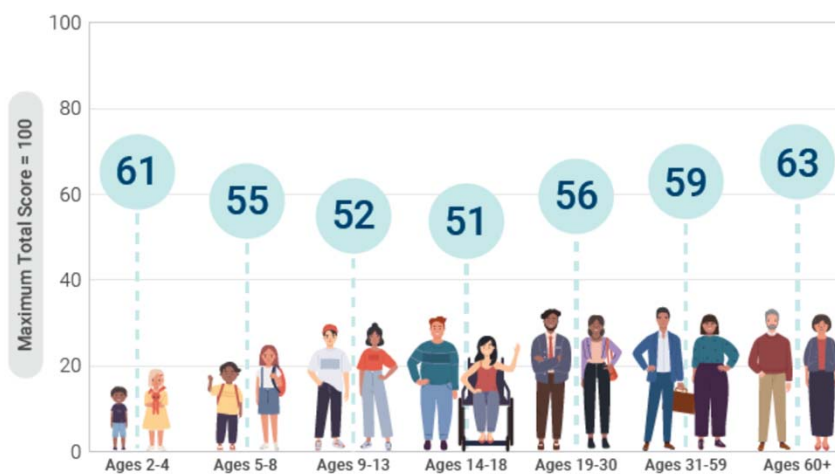
Association of dietary quality indexes and mortality from:

A: all-cause mortality,
B: CVD mortality
C: Cancer mortality by cohort and sex.

Hazard ratios and 95% confidence intervals comparing quintile 5 vs quintile 1.

Liese AD, et al. J Nutr 2015

Adherence of the U.S. Population to the *Dietary Guidelines* Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores



NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

DGA | Dietary Guidelines for Americans 2020-2025

Healthy Eating Index – 2015

Total and component scores of HEI-2015 at baseline and 10-year follow-up among the Multiethnic Cohort Study

Diet quality index	Baseline	Follow-up	P
HEI-2015			
MEN (n=27,001)			
Total score	65.6 ± 10.3	68.8 ± 10.6	<0.0001
Whole grains	4.5 ± 3.2	5.2 ± 3.2	<0.0001
Added sugars	8.7 ± 1.9	9.2 ± 1.5	<0.0001
WOMEN (n=36,254)			
Total score	69.4 ± 10.3	72.3 ± 10.6	<0.0001
Whole grains	5.5 ± 3.2	5.9 ± 3.1	<0.0001
Added sugars	8.8 ± 1.8	9.1 ± 1.5	<0.0001

Park S, Shvetsov YB, Kang M, Setiawan VW, Wilkens LR, Le Marchand L, Boushey CJ.
The Journal of Nutrition, July 2020

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Use MyPlate to Guide Healthy Dietary Patterns



DGA | Dietary Guidelines for Americans 2020-2025

Importance of Diet Quality

- ▶ We eat meals not single nutrients
- ▶ Complex interactions between nutrients
- ▶ Intercorrelation between nutrients
- ▶ The effect of a single nutrient might be too small to detect



iStock/ Public Domain



Review

Effectiveness of Intermittent Fasting and Time-Restricted Feeding Compared to Continuous Energy Restriction for Weight Loss

Corey A. Rynders ^{1,2,*}, Elizabeth A. Thomas ^{3,4}, Adnin Zaman ³, Zhaoxing Pan ⁵,
Victoria A. Catenacci ^{3,4} and Edward L. Melanson ^{1,2,3}



Homework

Cioffi et al. *J Transl Med* (2018) 16:371
<https://doi.org/10.1186/s12967-018-1748-4>

Journal of
Translational Medicine

REVIEW

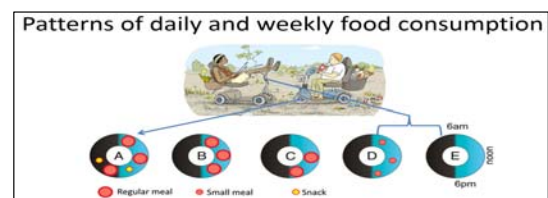
Open Access

Intermittent versus continuous energy restriction on weight loss and cardiometabolic outcomes: a systematic review and meta-analysis of randomized controlled trials

Iolanda Cioffi¹, Andrea Evangelista², Valentina Ponso³, Giovannino Ciccone², Laura Soldati⁴, Lidia Santarpi¹, Franco Contaldo¹, Fabrizio Pasanisi¹, Ezio Ghigo³ and Simona Bo^{3*}

Alternate-day and twice weekly energy restriction observations

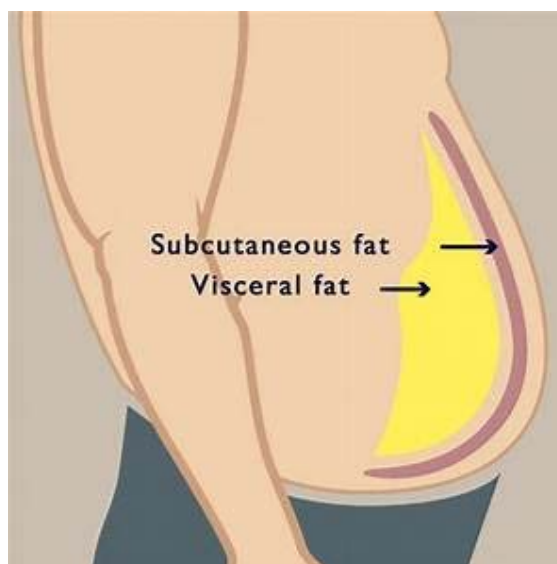
- Intermittent energy restriction (IER) diet – about 600 kcal 2 days/week
 - Improved insulin sensitivity
 - Reduced levels of insulin and leptin
 - Mobilization of fatty acids
 - Elevation of ketone levels
 - Increase insulin sensitivity
 - Visceral fat reduction



Mattson et al. PNAS 2014

Johnson JB et al 2007; Harvie MN et al 2011; Klempel MC et al 2013; Varady KA et al 2013

Cartoon distinguishing areas of fat distribution



Healthy Diet and Lifestyle Study

- ▶ Goal: Demonstrate feasibility to conduct a nutritional intervention to reduce VAT in East Asian middle-aged adults.

Active Comparator Prescription

- DASH diet for 7 days/wk
- Meet estimated energy requirements
- Macronutrient composition:
 - 20% energy from protein
 - 53% energy from carbohydrate
 - 30% energy from fat



"Healthy Diet" by Kisspng/ Public Domain

IER+MED Prescription

Mediterranean diet (MED) days

- 5 days/wk
- Meet estimated energy requirements
- Mediterranean style diet
- Macronutrient composition:
 - 25% energy from protein
 - 45% energy from carbohydrate
 - 30% energy from fat
- Overall weekly energy restriction of 25%

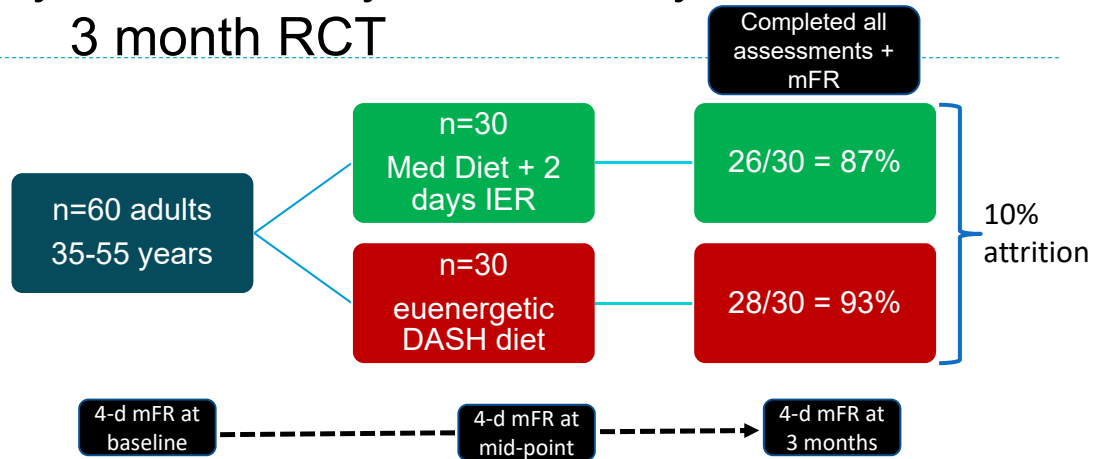
Intermittent energy restriction (IER) days

- 2 consecutive days/wk
- 70% energy restriction
- Macronutrient composition:
 - 34% energy from protein
 - 33% energy from carbohydrate
 - 33% energy from fat



"Mediterranean diet" by EverydayHealth/ Public Domain

Healthy Diet & Lifestyle Pilot Study 3 month RCT



Primary Outcome: reduce visceral adipose tissue (VAT) among East-Asian adults.

Med Diet = Mediterranean Diet, IER = Intermittent energy restriction, mFR=mobile food record

Panizza CE et al. Nutrients 2019

Intervention delivery was based on motivational interviewing and delivered by Registered Dietitians

Instructions provided on how to follow diet plan in a face-to-face dietary consultation with a dietitian (45-60 minutes appointment).



0 = in person session, X= telephone session

Change in Visceral Fat Overall Adiposity Within and Between Trial Groups at Wk 12

	IER+MED (mean \pm SEM)	DASH (mean \pm SEM)	Change between groups (P-value)
Visceral adipose tissue (VAT) (cm ²)	-22.6 \pm 3.6	-10.7 \pm 3.5	0.022
Total body fat (kg)	-3.3 \pm 0.4	-1.6 \pm 0.4	0.005
Subcutaneous adipose tissue (SAT) (cm ²)	-48.2 \pm 6.4	-15.0 \pm 6.1	<0.001
Body Weight (kg)	-5.9 \pm 0.7	-3.3 \pm 0.6	<0.007



What's
Next?

Effects of intermittent energy restriction on intra-abdominal fat and the gut microbiome: A randomized trial

- ▶ To investigate if IER+MED dietary pattern will be superior to ...
- ▶ Daily Energy Restriction+MED dietary pattern in reducing abdominal visceral and liver fat among a multiethnic, at-risk, adult population.
- ▶ 24 weeks (double length of pilot)
- ▶ Ethnic diversity: East-Asian, Pacific Islanders, White
- ▶ 312 men and women with high VAT (156 per study arm)



Healthy Diet and Lifestyle Study

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Dietary Patterns Methods Project

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