



DEEPDIVE SUMMARIES

- **•** How Does the Menstrual Cycle Affect Gastric Emptying?
- The Dreaded Dietary Guidelines: Who Will Survive?
- Effectiveness of Weight Loss Interventions and Mortality Risk
- Will Calcium Supplements Clog Your Arteries?

How Does the Menstrual Cycle Affect Gastric Emptying?

Campolier M, Thondre SP, Clegg M, Shafat A, Mcintosh A, Lightowler H. Changes in PYY and gastric emptying across the phases of the menstrual cycle and the influence of the ovarian hormones. *Appetite*. 2016;107:106-115.

Background

- Numerous aspects of metabolism, from energy expenditure to postprandial metabolic responses, have been suggested to vary over the course of the menstrual cycle.
- One specific area of potential sex differences in metabolism is in relation to gastric emptying, i.e., the process of delivery of food from the stomach to the small intestine for further digestion and absorption, with evidence suggesting a slower rate of gastric emptying in women compared to men.
- However, whether gastric emptying varies according to the menstrual cycle has been controversial, with evidence both for and against this hypothesis.

The Study

• A non-randomised intervention trial to investigate the effects of a standardised test breakfast on gastric emptying and subsequent energy intake during an *ad libitum* buffet lunch in women at three phases of their menstrual cycle.

Findings, Strengths & Limitations

- Nine women completed the study, with an average age of 31yrs, BMI of 22.6kg/m², and cycle length of 29 days.
- The gastric emptying half-time, i.e., the time taken for 50% of the meal to empty the stomach, during the luteal phase was 28min and 13min faster compared to the menstrual and follicular phases, respectively. The gastric emptying half-time increased as progesterone decreased.
- Strengths include advanced and accurate techniques to assess gastric emptying, and assessing outcomes at three different menstrual cycle phases. Limitations include the non-randomised design and small [*n* = 9] sample size.

Context

- Experimental evidence suggests that increased progesterone slows the speed at which food leaves the stomach, which may explain at least in part gastrointestinal distress during the third trimester of pregnancy.
- However, the precise mechanisms by which progesterone may exert effects on gastric emptying remain speculative.
- The largest trial to date [n = 50] found no differences in gastric emptying rate between the follicular and luteal phases, however, the study compared two groups of women in each menstrual phase, rather than consider within-person effects at difference stages of individual cycles.

Application

- It is difficult to come to a firm conclusion as to whether, and to what magnitude of difference, there may be changes in gastric emptying according to menstrual phase.
- Cumulatively, it is difficult to make targeted, specific recommendations for altering diet according to menstrual phase where factors like gastric emptying are concerned.

The Dreaded Dietary Guidelines: Who Will Survive?

Kebbe M, Gao M, Perez-Cornago A, Jebb SA, Piernas C. Adherence to international dietary recommendations in association with all-cause mortality and fatal and non-fatal cardiovascular disease risk: a prospective analysis of UK Biobank participants. *BMC Med*. 2021;19(1):134..

Background

- No doubt you are all familiar with this line of reasoning at this point; that dietary guidelines are causative of increased levels of non-communicable disease in the population over the period following their introduction.
- 2004 the World Health Organisation [WHO] Expert Consultation identified several dietary characteristics for dietary recommendations, which have been considered in the adoption of dietary guidelines in up to 81 countries.
- What of adherence to these more universal recommendations in a national-level population? The present study investigated this question in the United Kingdom.

The Study

- The study was conducted in the UK Biobank, a national prospective cohort study in adults aged 37–75yrs, to analyse the associations between four main WHO dietary recommendations and mortality risk: saturated fat <10% energy; added sugars <10% energy; dietary fibre >25g/d; fruit and vegetables >5/d servings [~400g].
- The primary analysis categorised participants based on number of recommendations met: 0, 1, 2, or 3-4.
- The outcomes of interest were all-cause mortality, total cardiovascular disease [CVD], and CVD mortality.

Findings, Strengths & Limitations

- Compared to the reference group of 0 recommendations, those meeting 2 recommendations had a 9% lower risk of all-cause mortality, while those meeting 3–4 had a 21% lower risk. CVD mortality was 22% lower in those meeting 3–4 recommendations.
- Strengths include the very large sample size, balanced between sexes. and socio-economic status. Limitations include the 96.6% White ethnicity sample, not representative of the general UK population, and the potential for 24 h recalls to have introduced measurement error of diet.

Context

- At this point, we should be able to put questions over dietary guidelines, whether at the national level or the more universal WHO recommendations, to bed.
- Only 9.5% of the overall cohort [9,712 of 115,051 participants] met 3–4 of the recommendations.
- There is little evidence that dietary guidelines are: followed by any substantial proportion of the general population; associated with increased risk if they are adhered to; associated with better health if they are not adhered to.

Application

- There is a lesson that is important for nutrition practitioners to hold dear; that the best practices are the ones right in front of us.
- The role of nutrition professionals is to help an individual become competent in meeting best practice nutrition recommendations in their daily life, and that is the challenge.

Effectiveness of Weight Loss Interventions and Mortality Risk?

Singh N, Stewart RAH, Benatar JR. Intensity and duration of lifestyle interventions for long-term weight loss and association with mortality: a meta-analysis of randomised trials. *BMJ Open*. 2019;9(8):e029966.

Background

- It is important to acknowledge that no health intervention is benign; each, whether dietary, pharmacological, or surgical, must be appraised through our first principles: efficacy, effectiveness, and safety.
- Weight loss research provides an excellent example of the delineation between efficacy, effectiveness, and safety, in a research context.
- The present study brought together several of these questions in a meta-analysis, namely what is the effect of weight loss interventions relative to intensity of follow-up, and does weight loss associate with lower risk of mortality?

The Study

 The study conducted a meta-analysis of RCTs with a minimum of 100 participants and 1yr duration that investigated intentional weight loss from lifestyle interventions compared to controls with no specific advice to achieve weight loss. Primary outcome was weight loss at 1yr; other outcomes included intensity of intervention required to achieve weight loss, and odds of mortality associated with weight loss.

Findings, Strengths & Limitations

- Compared to controls after 1yr, lifestyle interventions resulted in 3.63kg weight loss. Compared to controls, in interventions with <28 contacts over 1yr weight loss was 2.38kg, while interventions with >28 contacts resulted in 4.50kg weight loss.
- Over an average of 9.2yrs, compared to controls the odds of mortality in the intervention groups were 14% lower.
- Strengths include the clearly stated aim and outcome measures, and large overall sample size of ~21,000. Limitations include the lack of definition for "lifestyle intervention", and the inability to look at individual differences in weight loss from the included studies.

Context

- Prior evidence on intentional weight loss from RCTs indicated a 15% lower risk of overall mortality in trials with an average weight loss of ~5.5kg.
- Thus, intentional weight loss is not associated with higher mortality risk, and may be associated with modestly lower mortality risk.
- The findings that the greatest magnitude of weight loss [4.50kg] was achieved in trials with an average of 28 contacts with healthcare professionals during the first year, adds to prior evidence that active follow-up was consistently associated with improved success rates compared to passive follow-up.

Application

- The effect of number of contacts, and the primacy of the therapeutic relationship, is arguably the top-line application of the present study.
- However, it is crucial that safety is not overlooked; weight loss is not a benign intervention. It carries risks, and it is incumbent on practitioners to weigh-up risks and benefits appropriately. Evidence-based practice is also safe practice.

Will Calcium Supplements Clog Your Arteries?

Anderson JJ, Kruszka B, Delaney JA, He K, Burke GL, Alonso A, Bild DE, Budoff M, Michos ED. Calcium Intake From Diet and Supplements and the Risk of Coronary Artery Calcification and its Progression Among Older Adults: 10-Year Follow-up of the Multi-Ethnic Study of Atherosclerosis (MESA). J Am Heart Assoc. 2016 Oct 11;5(10):e003815.

Background

- Calcium is one of the most important minerals in the human body, and up to 99% of calcium in the body is deposited in the skeletal system; the remaining ~1% of extracellular calcium plays vital roles in muscle contraction [including the heart], neurotransmitter release, and vascular functions.
- Much of the emphasis on calcium has been by reference to bone health, however, there is evidence suggesting that calcium supplementation may in fact increase risk for cardiovascular disease [CVD].
- The present study investigated the associations between calcium intakes and coronary artery calcification [CAC] in a U.S. cohort.

The Study

- In the Multi-Ethnic Study of Atherosclerosis [MESA] cohort, participants underwent CAC scans to assess the presence of arterial calcification, dietary assessment, and medical examination.
- At 10yrs follow-up a subgroup of participants underwent a second CAC scan. The primary exposure of interest was calcium intake, including total calcium intake, dietary calcium or supplemental calcium. The primary outcome was CAC at baseline and follow-up.

Findings, Strengths & Limitations

- The risk of a CAC score >0 at baseline was 6% and 7% lower risk in quintiles 2 [~500mg/d] and 4 [~1,100mg/d] of total calcium intake, respectively.
- The highest total calcium intake was associated with a 27% lower risk of developing CAC at 10yrs follow-up. However, supplemental calcium was associated with a 22% higher risk of CAC.
- Strengths include the clearly stated aim and outcome measures, mixed ethnicity cohort, accurate measurements of CAC, and validated dietary assessment method. Limitations include the modest overall sample size for a cohort, and thus potential for bias.

Context

- Participants with the highest calcium intakes of 1,280mg/d, but with no calcium supplement use, showed a 26% lower risk of developing CAC.
- Conversely, the addition of calcium supplementation was overall associated with a direction of higher risk.
- The overall evidence from epidemiology and RCTs suggests that there is some risk of CVD/ CHD associated with calcium supplements, but this is not an issue for dietary calcium.

Application

• If calcium supplementation is to be considered [i.e., osteoporosis risk], then it seems prudent to keep the dose to a range of 500-600mg/d, and aim to obtain the remainder of total calcium intake from dietary sources up to a level of ~1,000 to 1,200mg/d.