

Mediterranean diet and musculoskeletal health – latest findings and solutions



Professor Ailsa Welch

The relationship between the Mediterranean Dietary Pattern and musculoskeletal health in children, adolescents and adults



Dr Karen Murphy

A Mediterranean Diet supplemented with dairy improves blood pressure in 'at risk' women and men: outcomes of the Med Dairy Study



The relationship between the
Mediterranean Dietary Pattern and
musculoskeletal health in children,
adolescents & adults

Ailsa Welch

a.welch@uea.ac.uk

Norwich Medical School
University of East Anglia
Norwich, UK

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Introduction & overview

Importance of the links between skeletal muscle, sarcopenia & bone health

Relevance of the Mediterranean Dietary Pattern to musculoskeletal health

Results & update of the systematic review

Conclusions

Osteoporosis, sarcopenia & fractures

Sarcopenia: age-associated low skeletal muscle mass with low muscle strength and/or low physical performance¹

Increased risk of osteoporosis, frailty, falls & fractures

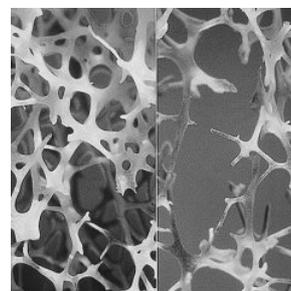


Prevention of fractures of key importance

Fractures
1 in 2 women > 50 Y
1 in 5 men > 50 Y

Osteoporosis: loss of bone density with age

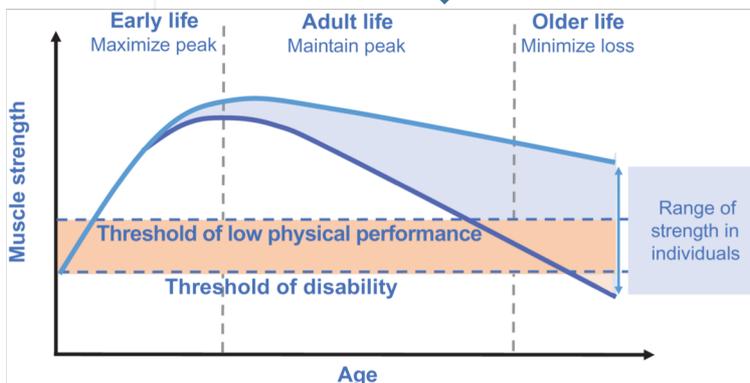
NORMAL & OSTEOPOROTIC BONE



¹ALFONSO J. CRUZ-JENTOFT Age and Ageing **2010**; Revised **2018**

The life course & bone density, skeletal muscle mass and strength

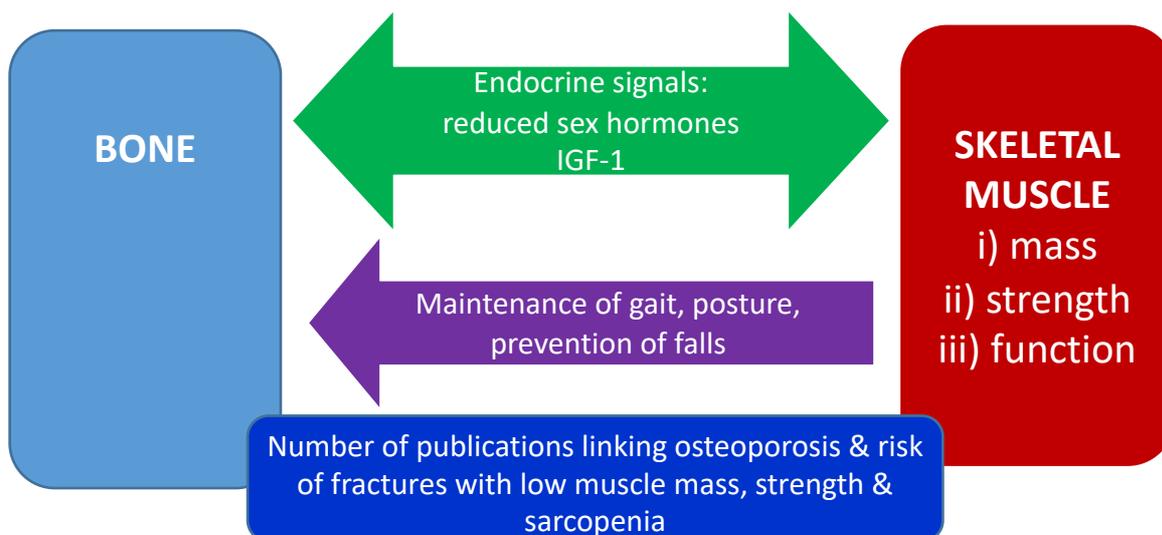
Prevention



- Loss of bone density, skeletal muscle mass & strength with age
- Continuum: gradual from age 30Y. Acceleration after 50Y
- Gender differences. Women steep decline at menopause
- Muscle - cross-sectional > 50 Y:
mass between 1-2%/Y
force/strength 1%-3%/Y
- Metabolic consequences of skeletal muscle loss: blood glucose control, energy expenditure (Welch A, Proc. Nut Soc, 2014)

¹ALFONSO J. CRUZ-JENTOFT Age and Ageing **2010**; Revised **2018**

Links between skeletal muscle & bone – two way interactions



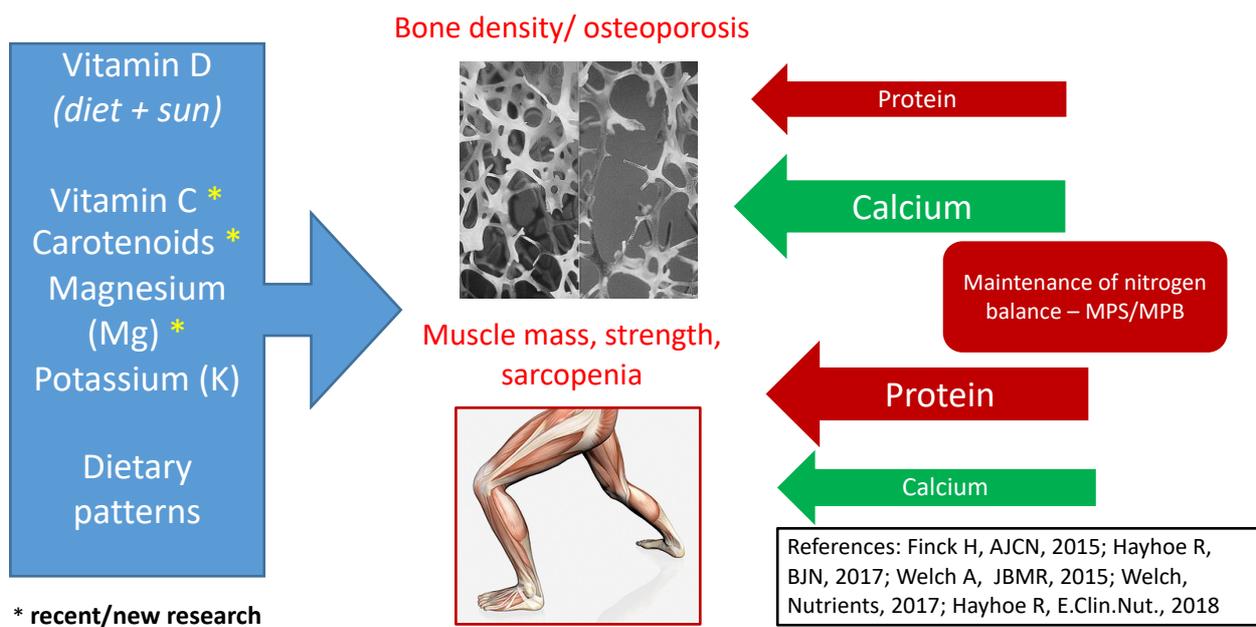
Tagliaferri C, Aging Res. Rev. 2015, Girolamo, DJ, JBMR, 2013, Curtis E, J Cell Physiol, 2015:

Prevalence & costs of osteoporosis, sarcopenia, frailty & fractures

- Sarcopenia prevalence:
 - community 1%-29% those > 60Y
 - long term care 14%-33% (Cruz-Jentoft AJ, Age Aging 2014; Ethgen O Calcif. Tiss. Int. 2017)
- Costs \$18.5B - 2004 (Kilsby A, Drug Aging 2017)
- Sarcopenia is a risk factor for onset of frailty
- Frailty 25% in those > 80Y. 19.1% community - older adults, physically frail (Verlaan S, JAMDA, 2017)
- ~ 50% walk unaided after hip fracture. Pain.



Diet: shared modifiable lifestyle factor for muscle & bone



Overview

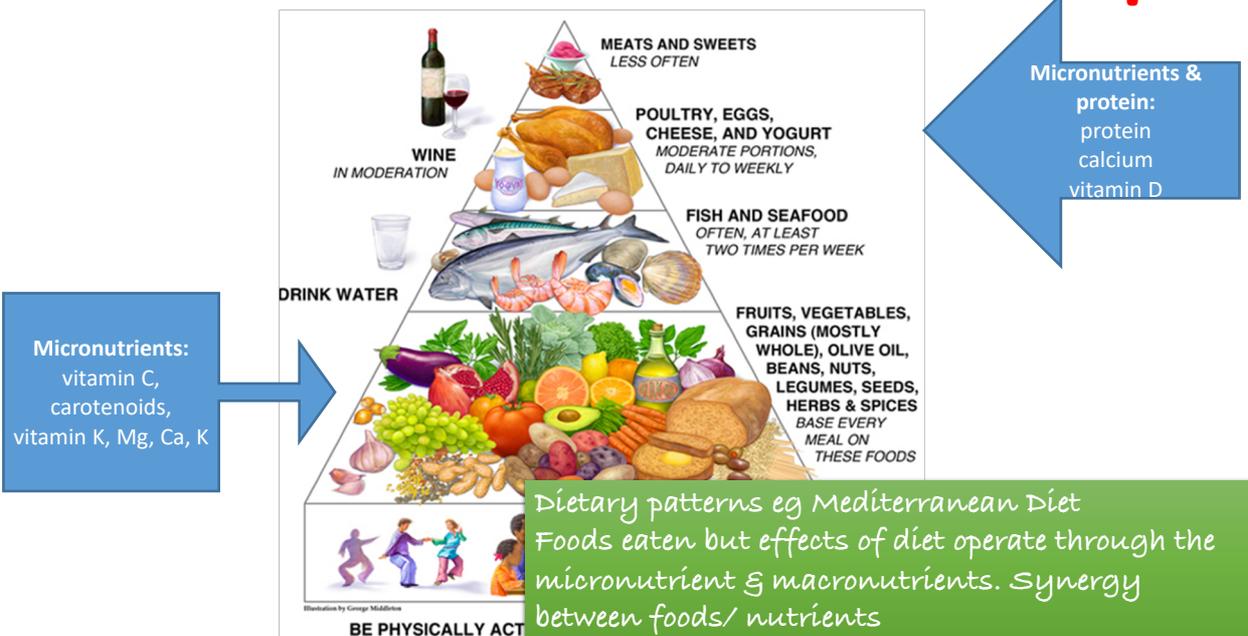
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Mediterranean Diet & musculoskeletal health



Mediterranean Diet Scores used in epidemiology

Scores based on an original score devised by Antonia Trichopoulou (NEJM, (2003). Consists of 9 components:

- vegetables
- fruit
- legumes
- cereals
- fish
- meat
- dairy
- fat used in cooking/food preparation
- alcohol

Median intake for the population calculated

- +ve 1 point if above the median
- -ve 0 points if above the median for meat & dairy
- Alcohol 1 point:
 - Men 10g-50g/d
 - Women 5g-25g/d

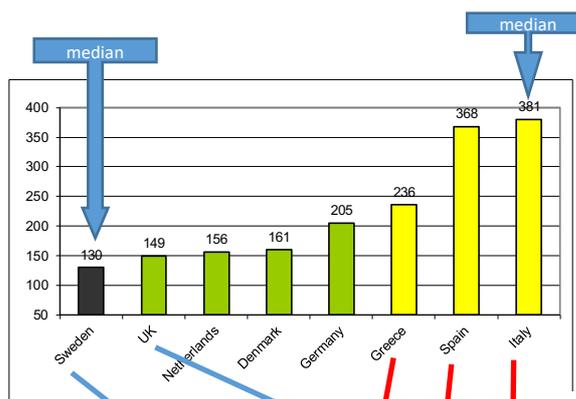
Other scores have been derived since

Variability in food intake: north to south variation



EPIC (European Prospective Investigations into Cancer and Nutrition) (Agudo et al, PHN, 2002)

Vegetable intake across Europe



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Study design matters

Important to understand the true relationship between diet & diseases
 Impacts on the results from published studies

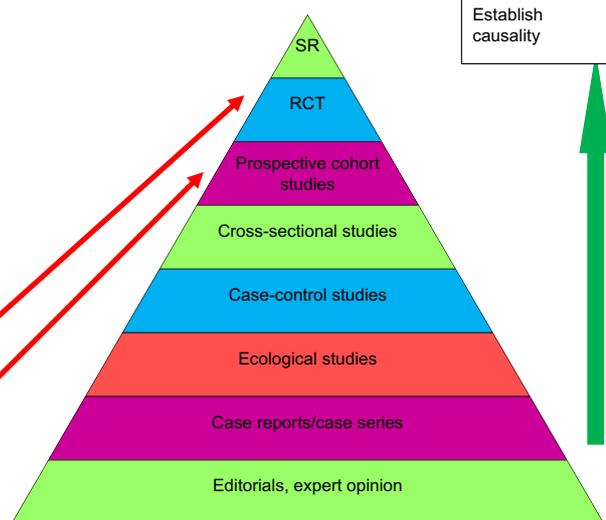
Bias/measurement error

For evidence for policy & practice:

- Randomised Controlled Trials (RCT)
- Prospective: measures: exposure at beginning & follow up outcomes with time

Generate hypotheses

Establish causality



The relationship between the Mediterranean Dietary Pattern and musculoskeletal health in children, adolescents & adults

- Systematic review (Craig J, et Al, Nutrition Reviews, 2017). Results + update more recent studies
- Reviewed skeletal & bone outcomes in:
 - children
 - adolescents
 - adults
- Reviewed to April 2016
- Study design: RCTs & prospective cohort studies
- We reviewed the Mediterranean Dietary Pattern scores – complex scoring system with large variability in use (Ruiz HR, Nut Hosp, 2015)
- A priori scores
- Antonia Trichopoulou (NEJM, 2003)
 - 8 core food categories:
 - Alcohol not core
 - Details in paper

Outcomes included in the systematic review

Muscle/sarcopenia

- Sarcopenia, dynapenia, myopenia incidence
- Direct measures of:
 - Skeletal muscle mass
 - Plus strength or physical performance



Bone/skeletal

- Fracture incidence
- Fracture risk score
- Osteoporosis/osteopenia incidence
- BMD, BMC
- Bone turnover markers

Reviewed 26 scores for assessing MD adherence

	No. scores	Variation
Fruit	26	fruit/ +nuts/ +fruit juices
Veg	26	veg/ +legumes/ +potatoes/ -potatoes/ +starchy root cooked & raw
Fat	26	oo/ +olives & olive marg/ virgin oo/ animal fats/ butter, marg, cream/ SFA/ MUFA:SFA/ PUFA:SFA/ MUFA+PUFA:SFA
Meat	25	meat & products/+ poultry/ + eggs/ red & processed/ preference white/ hamburger
Fish	25	fish/ fish & seafood/ not breaded/
Legume	24	legumes/ +nuts & seeds/ +nuts & olives
Cereal	24	cereals/ wholegrain/ refined & wholegrain/ bread & rice
Dairy	21	dairy/ whole fat/ yoghurt & cheese/ cheese
Alcohol	21	wine/ red/ ethanol/ +beer & spirit
Other		nuts (7), pastries or sweets (6), eggs (3), sweet or carbonated beverages (3), coffee (1), water (1), cholesterol (1), lifestyle (new)

High variability in the scoring system /construction of scores.
Vegetables – different combinations.
Dairy scored positive or negative/ selected components /not scored.

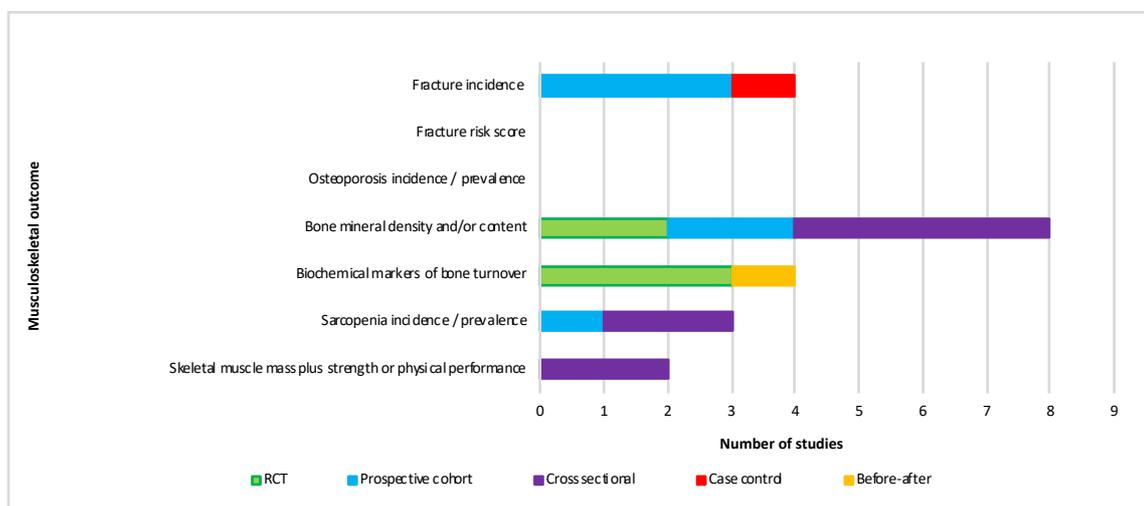
A priori decision

aMED (Alternative mediterranean eating pattern)

Results

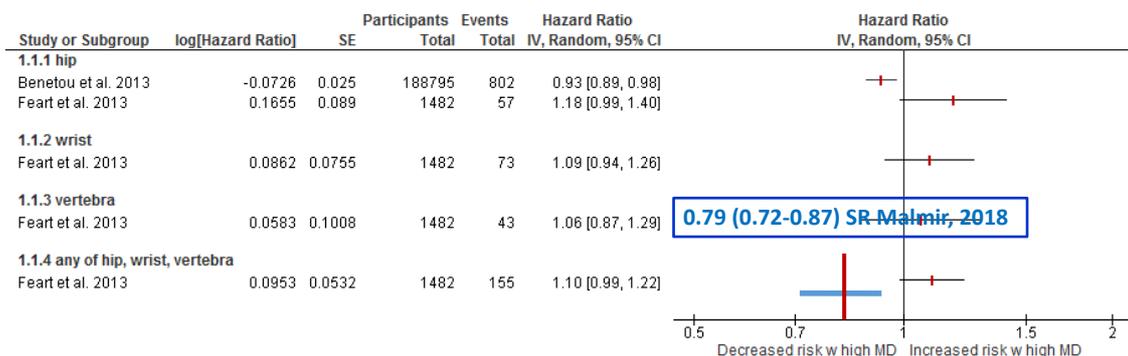
- N = 1738 papers searched & screened
- Found very few studies. Therefore, included an evidence map to show all the available evidence
- Number of studies
 - 15 evidence map
 - 2 studies met criteria for fracture risk
- 1 incident sarcopenia. Hong Kong (Chan R et al 2016)
 - Prospective cohort study. 4 year follow up (N=2948, > 65Y)
 - HR incidence per 1 unit increase in MD adherence:
 - Men - 0.98 (90.06-1.10), P=0.8.
 - Women – 0.96 (0.83-1.11, P=0.6) i.e. not significant
- No studies in children

Number of studies and nature of study designs for the outcomes in the SR or evidence map N=18



Some studies reported > 1 outcome

Forest plot of most adjusted hazard ratios for first fracture incidence associated with a 1 unit increment in MD adherence (on scale of 0-9), by fracture site (some 2 studies)



More recent SR (Malmir H E J Nutr 2018) quoted RR for Hip fractures in meta-analysis of 4 studies, RR 0.79 (0.72-0.87) ie reduction of 21%. However of the 5 studies identified, the study by Feart was omitted from the meta-analysis (it showed no associations with the MD)

Relationship between the MD & risk factors for sarcopenia in women UK Twin cohort aged 18-79 years

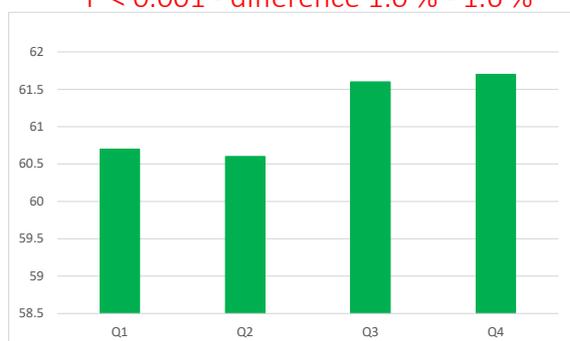
- Investigated risk factors for sarcopenia and the MD
- Cross-sectional study in women 18-79Y
- Investigated the association between the MD & skeletal muscle mass (DXA) (fat free mass), grip strength & leg explosive power (LEP)
- Fat free mass as percentage FFM% (fat free mass/body weight)*100
- Food Frequency Questionnaire (FFQ)
- Quartiles – MDS score (Q1 0-3, Q2 4, Q3 5, Q4 6-9)
- Robust cluster regression. Adjusted for: age, physical activity, smoking habit & other specific covariates. Plus protein intake



Fat free mass and leg explosive power in women by quartiles of the Mediterranean Diet Score (MDS)

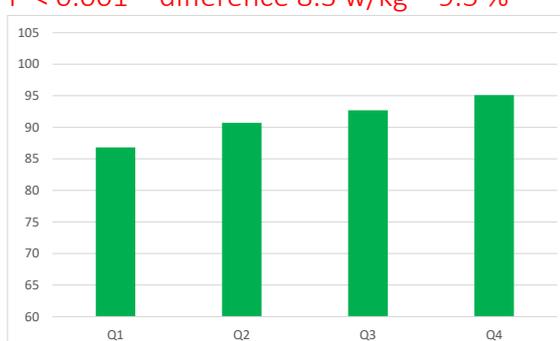
Fat free mass - percentage

$P < 0.001$ - difference 1.0 % - 1.6 %



Leg explosive power - w/kg

$P < 0.001$ – difference 8.3 w/kg – 9.5 %



Mediterranean Diet Score: Q1 0-3 Q2 4 Q3 5 Q4 6-9

Adjusted values

Kelaiditi E et al, OI 2016

Further studies on the MD and musculoskeletal outcomes (since 2016)

BONE DENSITY: **1** Finland F 65-71Y, cross-sectional, no effect (Erkkila A, PHN, 2017).

1 China M + F. Association MD with hip BMD. 2.6% increase Q5 vs Q1 (Chen GD, Scientific Rep, 2016)

FRACTURES: **2** *prospective studies*. **1** Sweden M + F (71,333). 6% decrease in hip fracture with 1 unit increase in MED score (Byberg, JBMR, 2016). **1** Greece, Sweden and US (CHANCES Study) M + F (Benetou V, OI, 2018). 4% decrease in hip fracture with 2 unit increase in MD. NB same Swedish cohorts included in both studies. Dairy classified positively in 'Byberg study' and negatively in 'Benetou Study'

SARCOPENIA OR RISK FACTORS: **1** China 40-75Y, cross-sectional (Tian H-Y, BJN, 2017). Increase in ALM with MD + 2.7% men, +1.1% women.

M – men, F - women

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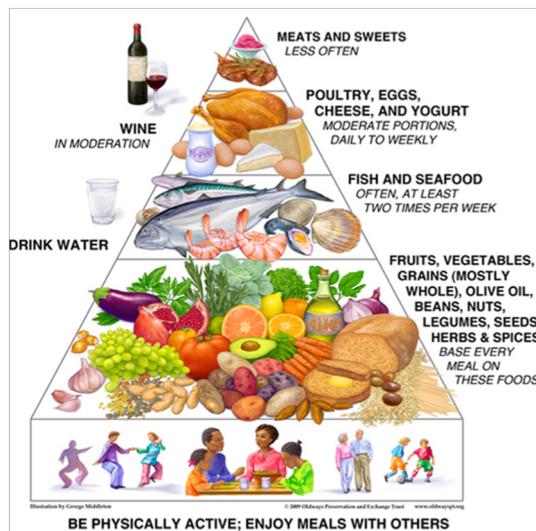
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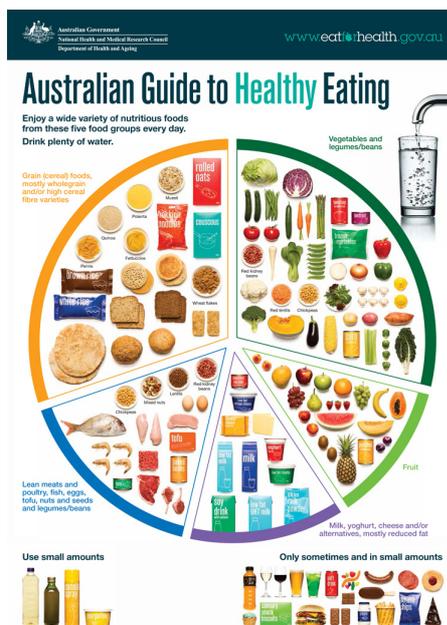
Summary: Mediterranean diet & musculoskeletal health

- As yet, insufficient evidence for beneficial effects of MD on risk of fractures and osteoporosis
- Even less evidence for sarcopenia
- More evidence needed for all age groups particularly children & adolescents
- The MD used in epidemiology is a very variable pattern due to regional differences in food intakes. This impacts on intakes of the nutrients within the pattern and so affects the findings from studies using the MD pattern
- Scoring of the MD may impact on protein and calcium intakes



Conclusions

- Need RCTs to determine the effect of the MD
- Healthy balanced diet important for bone & muscle health at all life stages, and for preventing fractures
- Physical activity. Encourage individuals & population approaches to keep active and maintain physical activity
- Encourage healthy eating patterns & follow healthy eating guidelines for bone & skeletal muscle health



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- a.welch@uea.ac.uk



Thank you for
listening



A Mediterranean diet supplemented with dairy improves blood pressure in 'at-risk' men and women: Outcomes of the MedDairy Study

Dr Karen Murphy, PhD, APD

*Senior Lecturer and Accredited Practicing Dietitian, Sports Dietitian
Mediterranean Dietary Patterns Team*

On behalf of the MedDairy Study Team

Alexandra Wade, Courtney Davis, Kate Dyer, Jonathan Hodgson¹,
Richard Woodman², Hannah Keage.

¹Edith Cowan University, WA.

²Flinders University, SA.



Mediterranean diet - a cure-all pattern?

Umbrella review of meta-analyses in 12.8 million subjects

- **Overall mortality** →
- **Cardiovascular diseases** →
- **Coronary heart disease** →
- **Myocardial infarction** →
- **Cancer incidence** →
- **Neurodegenerative diseases** →
- **Diabetes** →



MedLey Study

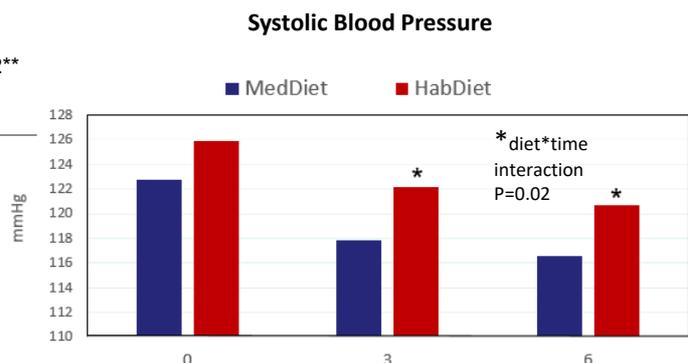
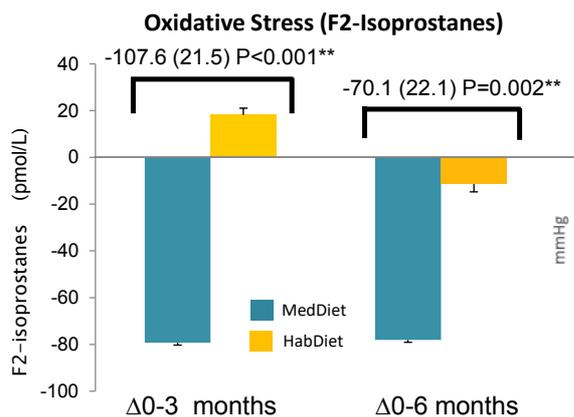
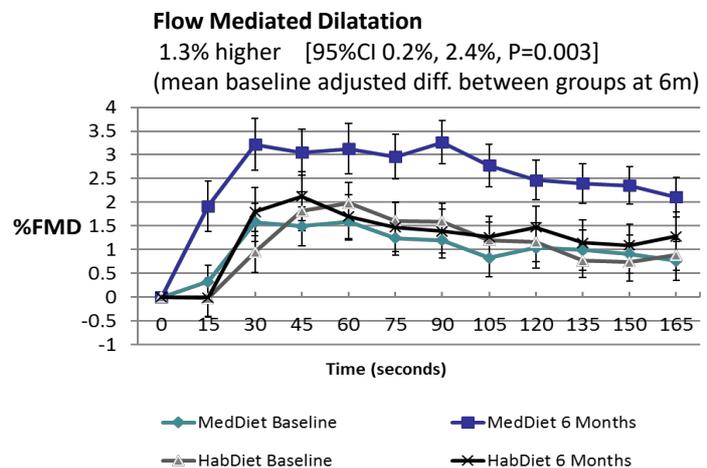
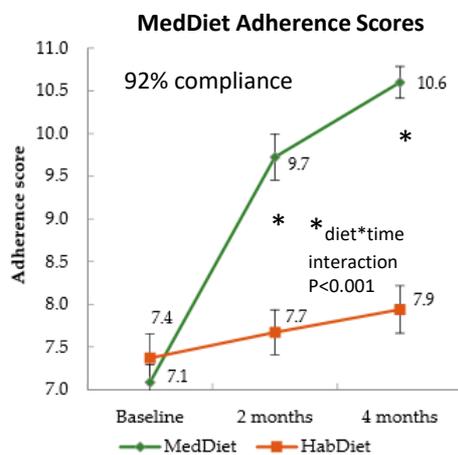


Mediterranean diet (MedDiet) for cognition and cardiovascular health in the elderly

NHMRC #1050949

- 166 men and women aged 71 years (range 64-86 years)
- 6 month dietary intervention trial comparing MedDiet with habitual diet
- Dietitian led RCT, intervention delivered by dietitians, recipes and key foods were supplied
- CVD risk factors, weight and cognitive performance measured at the beginning and after 3 and 6 months

Protocol papers: Davis CR et al. BMC Nutrition 2015, Knight A et al. BMC Geriatrics 2015



Where to next?

MedLeY showed us that Australians can follow a traditional MedDiet for 6 months

- feasible
- older population
- significant CVD risk reduction

It doesn't meet the NRV for calcium for Australians

Would this affect adoption of the pattern as a healthy dietary pattern?

Could it impact osteoporosis rates?



Dairy Foods and Calcium Recommendations

	Dairy foods (serves/day)	Calcium (mg/day)	
Mediterranean Diet Foundation	2	700-820	
NHMRC	3-4	W: 1000 – 1300 M: 1000 – 1300	(≤ 50yr - ≥ 51yrs) (≤ 70yr - > 70yrs)
Australian Intakes		W: 741 / 674 M: 781 / 726	51-70yrs/≥71yrs

4.74 million Australians have poor bone health of which 22% have osteoporosis and 78% have osteopenia.

MedDairy Study

Aim: to determine whether a Mediterranean diet supplemented with dairy foods can improve markers of cardiovascular health in an Australian population at risk of cardiovascular disease

A Mediterranean diet, supplemented with dairy foods (milk, cheese and yoghurt) to meet Australian dairy and calcium recommendations, was compared with a low-fat control diet on measures of cardiovascular risk.

Primary outcome: Home measured systolic blood pressure

Secondary outcomes: clinic measured blood pressure, fasting lipids, glucose, insulin, CRP, body composition, BMI and waist-to-hip ratio

Wade AT et al Am J Clin Nutr 2018; Wade AT et al Nutrients 2017 (Protocol).

Inclusion Criteria

Inclusion Criteria:

45-75 years with SBP >120mmHg, not taking antihypertensive medication plus **2** of the following risk factors for CVD:

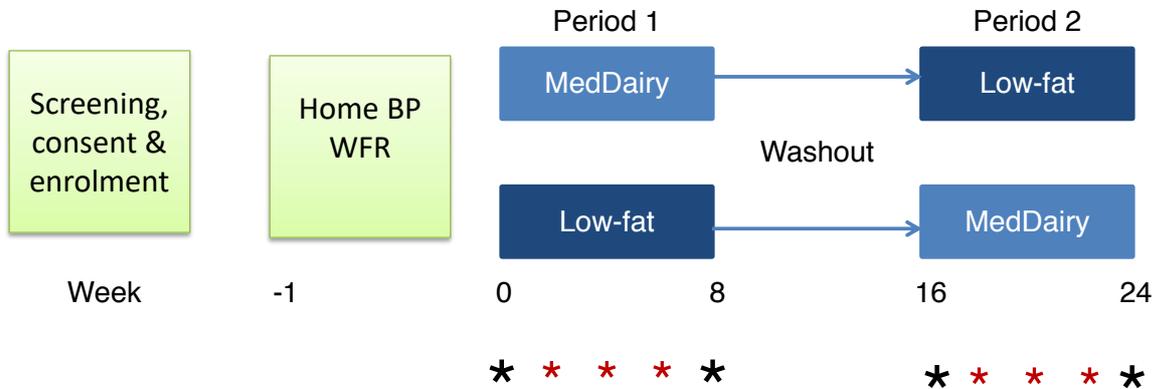
- BMI $\geq 25\text{kg/m}^2$
- Abdominal adiposity - WC
 - >94cm for men
 - >80cm for women
- TC $\geq 5.5\text{mM}$
- TAG $\geq 2.0\text{mM}$
- LDL $\geq 3.5\text{mM}$
- HDL ≤ 0.9 for men
 - ≤ 1.0 for women
- Glucose 6.1-7.8mM
- Family History of CVD or T2DM

Exclusion Criteria:

- Smoker
- Medical condition (CVD, angina, current or recent malignancies, renal, GI, respiratory disease, T2DM)
- Dietary intolerance or allergy impeding diet intervention adherence
- Taking medicinal levels of calcium
- Taking >1g n-3 LCPUFA

Methods

Design: Dietitian led, randomised, parallel crossover design (n=41)

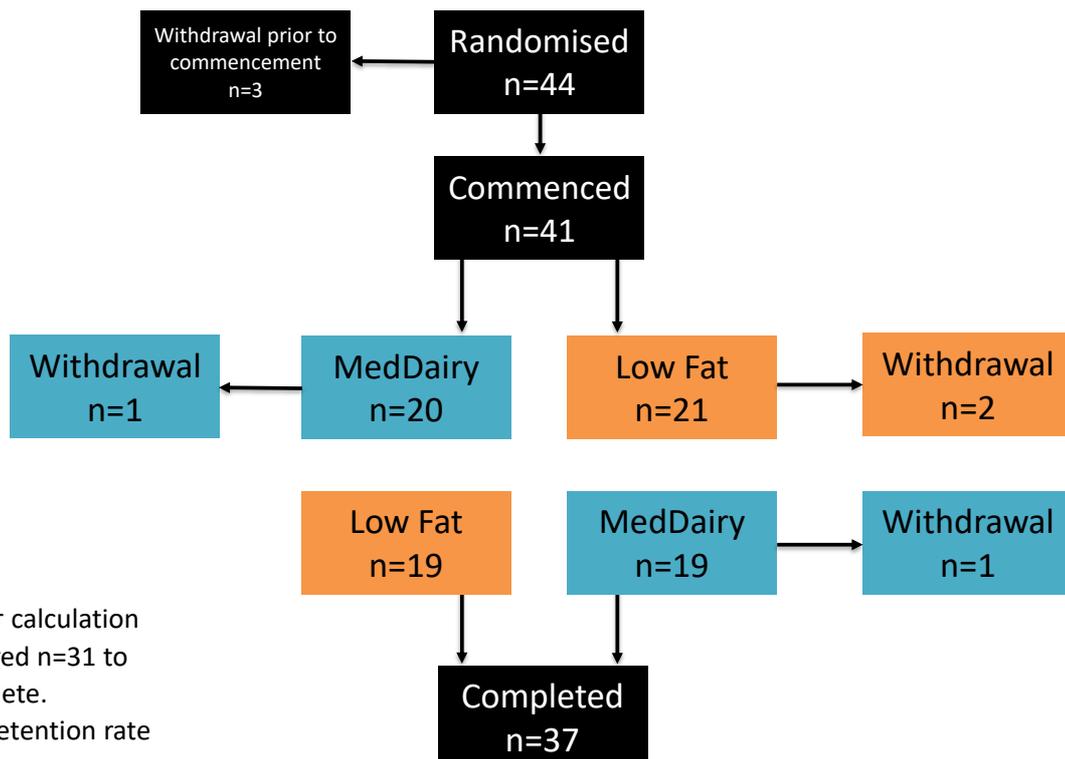


Screening: questionnaire, BP, BMI, WC, fasted lipids, fingerprick glucose, MedDiet score
 BP recorded at home week prior to intervention (3 measures x morning, afternoon, before bed)

*Outcomes measured

* Fortnightly 30' visit with dietitian, collect foods, diet adherence scores, checklists, weight

Consort



Power calculation required n=31 to complete.
 90% retention rate

MedDairy Intervention

- 3 - 4 serves of dairy foods (e.g. milk, cheese, Greek yoghurt, custard) per **day**.
- Abundant use of extra virgin olive oil, **MINIMUM** of 1 tablespoon per **day**
- ≥ 3 serves of vegetables per **day**
- $\geq 2 - 3$ serves of fresh fruit including 100% natural juices per **day**
- ≥ 3 serves of legumes per **week**
- ≥ 5 serves of nuts/seeds per **week**
- Select white meats (poultry with no skin) instead of red meat or processed meats
- Cook minimum twice per **week** with tomato, garlic and onion (Sofrito sauce)
- Usual drinkers have no more than 2 standard drinks per **day**
- *Ad libitum* consumption of nuts, eggs, fish, seafood, cheese, wholegrain cereals, wholegrain rice, pasta and bread, couscous
- Limit to \leq once per **week** cured ham, red meat, chocolate
- Avoid refined carbohydrate including white rice, white bread, white flour
- Eliminate or drastically limit discretionary foods like: cream, spreads, cold meats, pate, duck, sugary beverages –baked goods, fried foods, takeaway foods, confectionary.

Adapted from PREDIMED diet as described by Estruch R et al 2018, N Engl J Med. 2018 Jun 21;378(25):e34.

Food Hamper- MedDairy Group



Each fortnight:

- 1-2 bottles EVOO
- 14 tubs yoghurt
- 2 x 95g tins tuna
- 2 x 95g tins salmon
- 2 x 400g tins legumes
- 180g (6 x 30g) walnuts+ almonds+hazelnuts (2:1:1)
- Cheese

Kind donations from Cobram Estate, Fonterra Group, Chobani, Simplot (Edgell & John West), Almond Board of Australia.

Dietary Adherence Questionnaires

14-item of Mediterranean Diet Questionnaire

For MedDairy group only

Foods and frequency of consumption		
1.	Do you use olive oil as your main culinary fat? (please circle Y or N)	Y / N
2.	How much olive oil do you consume in a given day including oil used for frying, salads, out-of-house meals, etc.? (Please answer in tablespoon (1Tb= approximately 20mL))	
3.	How many vegetable servings do you consume per day? (1 serving= ½ cup cooked or 1 cup salad or 1 tomato)	
4.	How many fruit units (including pieces of fruit and natural 100% fruit juices) do you consume per day?	
5.	How many servings of red meat, hamburger, or meat products (ham, sausage etc.) do you consume per day? (1 serving = 100-150g)	
6.	How many servings of butter, margarine or cream do you consume per day? (1serving=1 tablespoon (20g) of butter or margarine / 2tablespoon (40g) of cream)	
7.	How many sweet or carbonated beverages do you drink per day?	
8.	How much wine do you drink per week? (200ml wine is 2 standard drinks but this is 1 glass for most Australian wines)	
9.	How many servings of legumes do you consume per week? (1 serving = 150g)	
10.	How many servings of fish or shellfish do you consume per week? (1 serving = 100-150g fish or 4-5 units or 200g shellfish)	
11.	How many times per week do you consume commercial sweets or pastries (not homemade), such as cakes, cookies, biscuits?	
12.	How many servings of nuts (including peanuts) do you consume per week? (1 serving = 30g)	
13.	Do you preferentially consume chicken, turkey or rabbit meat instead of veal, pork, hamburger/steak or sausage?	Y / N
14.	How many times per week do you consume vegetables, pasta, rice or other dishes seasoned with a home-made tomato sauce (made with onion, leek, garlic simmered with olive oil - Sofrito sauce)?	

Score: / 14

Low-fat diet Questionnaire

For Low-fat group only

Foods and frequency of consumption		
1	How much olive oil do you consume in a given day (including oil used for frying, salads, out of house meals, etc.)? (Please answer in tablespoon (1Tb= approximately 20mL))	
2	Do you remove visible fat (or the skin) of chicken, duck, pork, lamb or veal meats before cooking and the fat of soups, broths and cooked meat dishes before consumption (please circle Y or N)?	Y / N
3	How many servings of fat-rich meats, hamburger, commercial ground meat, sausage, cold meat, cured ham, bacon, salami, or offal do you consume per week? (meat serving: 100g; salami or bacon:30g)	
4	How many servings of butter, margarine, lard, mayonnaise, milk cream, or milk-based ice cream do you consume per week? (spread fat: serving:12 g; ice cream:100g)	
5	Do you exclusively consume low-fat dairy products? (please circle Y or N)	Y / N
6	How many times per week do you prepare rice, pasta, potato, or legume dishes by using "Sofrito" sauce (based on olive oil), bacon, salami, or fatty meats such as pork or lamb ribs?	
7	How many times per week do you consume fatty fish or fish or seafood canned in oil?	
8	How many servings of commercial sweets or industrial bakery products (not homemade), such as cakes, cookies, biscuits or custard do you consume per week? (cake serving: 80g; 6 biscuits: 40g)	
9	How many times per week do you consume nuts (including peanuts), potato chips, French fries, or commercial snacks?	

Score: / 9

Estrech R et al 2018, N Engl J Med. 2018 Jun 21;378(25):e34.

Results – Baseline characteristics of groups

TABLE 1

Demographic and clinical characteristics of the study sample at baseline, according to first dietary intervention¹

	Group 1 (n = 20)	Group 2 (n = 21)	Total (n = 41)
Age, y	60.8 ± 6.3	59.6 ± 7.6	60.2 ± 6.9
Gender, n			
Men	6	7	13
Women	14	14	28
Education, y	15.6 ± 2.9	16.9 ± 4.3	16.2 ± 3.7
Home SBP average, mm Hg	130.2 ± 17.3	126.1 ± 15.5*	128.1 ± 16.5
Home DBP average, mm Hg	78.1 ± 11.4	78.2 ± 12.0	78.1 ± 11.7
Home HR average, mm Hg	71.7 ± 13.3	70.8 ± 25.0	71.2 ± 20.1
Clinic SBP, mm Hg	133.9 ± 16.0	131.6 ± 12.9	132.7 ± 14.3
Clinic DBP, mm Hg	86.6 ± 12.0	88.9 ± 10.0	87.8 ± 11.0
Clinic HR, bpm	68.2 ± 10.6	68.0 ± 9.1	68.1 ± 9.7
Insulin, mU/L	14.5 ± 7.5	11.6 ± 6.4	13.1 ± 7.0
Glucose, mmol/L	5.9 ± 0.6	5.4 ± 0.5*	5.7 ± 0.6
Total triglycerides, mmol/L	1.7 ± 1.2	1.4 ± 0.5	1.5 ± 0.9
Total cholesterol, mmol/L	5.9 ± 1.1	5.6 ± 1.1	5.7 ± 1.1
HDL cholesterol, mmol/L	1.5 ± 0.4	1.5 ± 0.4	1.5 ± 0.4
LDL cholesterol, mmol/L	3.7 ± 1.0	3.5 ± 0.9	3.6 ± 0.9
Cholesterol:HDL cholesterol	4.4 ± 1.6	4.0 ± 1.0	4.1 ± 1.3
Weight, kg	87.7 ± 16.8	86.2 ± 12.1	86.9 ± 14.4
Height, m	1.7 ± 0.1	1.7 ± 0.1	1.7 ± 0.1
BMI, kg/m ²	30.7 ± 4.0	30.9 ± 3.7	30.8 ± 3.8

¹ Values are means ± SDs. Group 1 received the MedDairy intervention first; group 2 received the LF intervention first. *Different between groups, $P < 0.05$. bpm, beats per minute; CRP, C-reactive protein; DBP, diastolic blood pressure; HR, heart rate; LF, low-fat; MedDairy, Mediterranean diet with 3–4 daily servings of dairy foods; SBP, systolic blood pressure.

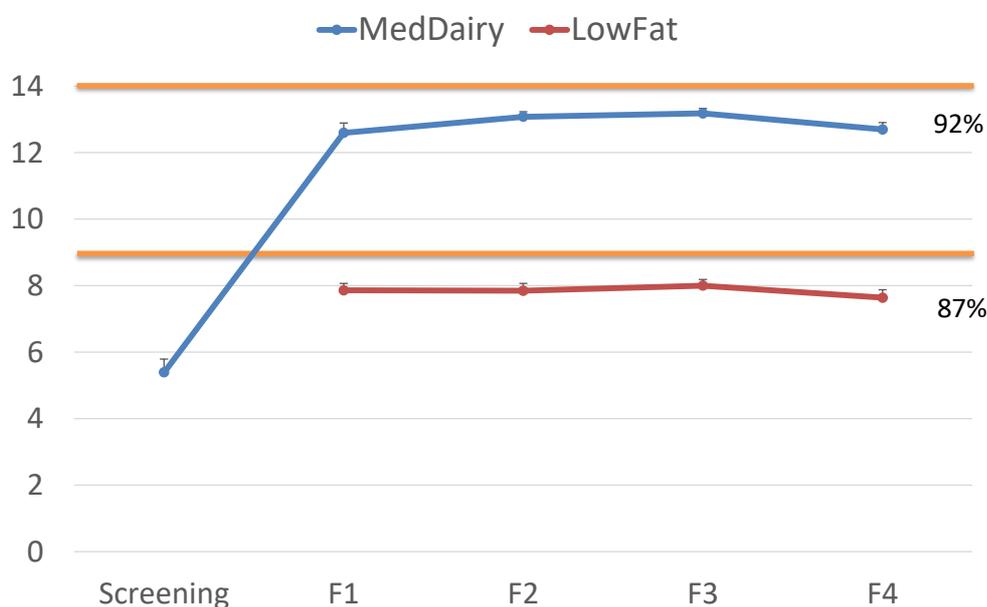
Energy and macronutrient intake (Mean±SEM)

	MedDairy		LowFat		Diet*Visit	Mean difference in 8 wk change (95% CI)
	Wk 0	Wk 8	Wk 0	Wk 8		
Energy (MJ)	9.5±0.3	8.9±0.3	9.3±0.3	8.1±0.3	0.01	0.8 (0.2, 1.4)
%enCHO	38±1	34±1	38±1	42±1	<0.001	-8.5 (-11.5, -5.3)
%enPTN	18±1	20±1	19±1	21±1	0.3	-0.8 (-2.4, 0.7)
%enFat	35±1	37±1	35±1	27±1	<0.001	9.6 (6.6, 12.6)
%enSFA	12±0.7	12±0.7	13±0.7	10±0.7	<0.01	2.6 (0.8, 4.4)
%enPUFA	5.9±0.3	6.0±0.4	5.4±0.3	4.9±0.4	0.01	1.1 (0.2, 2.0)
%enMUFA	14±0.6	17±0.7	14±0.6	10±0.7	<0.001	6.7 (4.9, 8.4)
MUFA:SFA	1.3±0.1	1.6±0.1	1.2±0.1	1.1±0.1	<0.001	0.5 (0.3, 0.7)
%enAlcohol	5.4±0.9	4.6±0.9	4.6±0.9	5.2±0.9	0.48	-0.6 (-2.1, 1.1)

Mean±SEM; Weighed food record data.

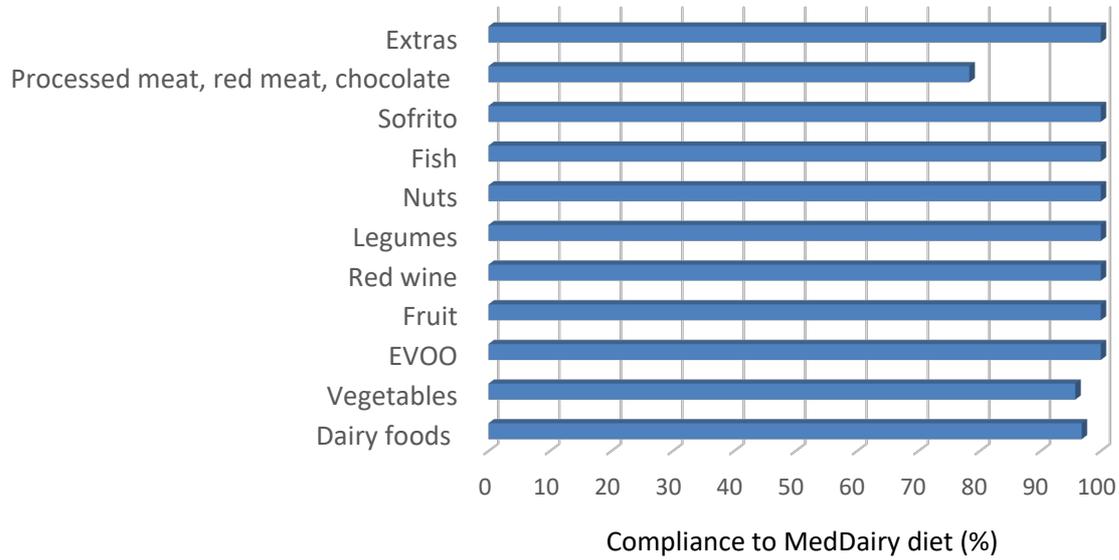
Results – Dietary Compliance (Mean±SEM)

Dietary compliance measured fortnightly using 14-point MedDiet adherence tool and 9-point LowFat adherence score (adapted from Estruch et al. 2013)



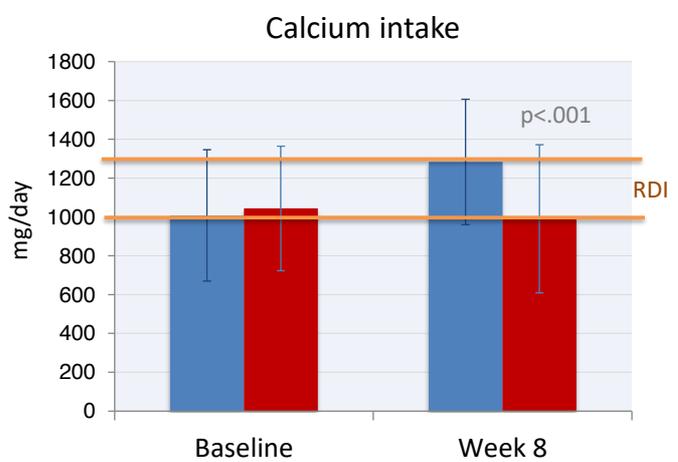
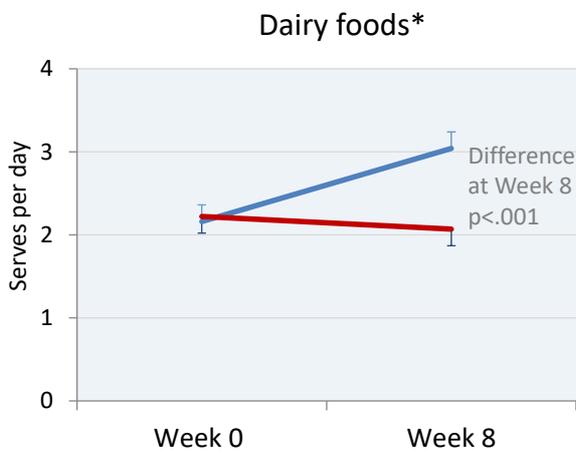
Results – Average MedDairy compliance (%)

Dietary compliance to MedDairy diet measured using daily checklist



Dairy food and calcium intake

MedDairy
Low fat



*sum of milk, yoghurt, cheese; Weighed food record data.

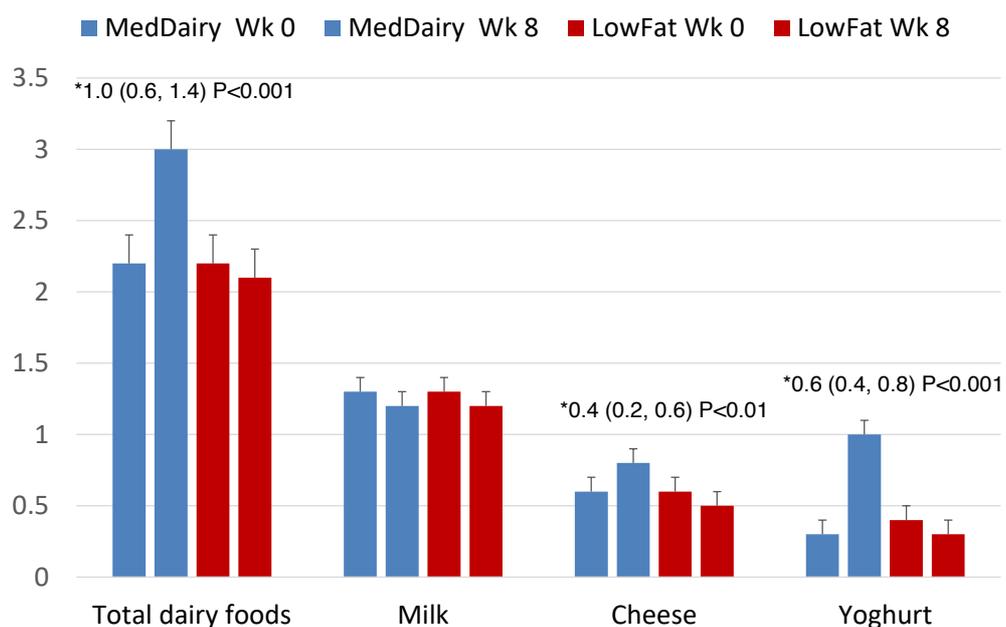
NRV Calcium:
 Women <50 and men <70: 1000mg
 Women ≥50 and men ≥70: 1300mg

Distribution of daily serves of dairy foods at week 8

Serves of dairy food per day	Frequency	% of participants
1	1	2.9
2	9	25.7
3	13	37.1
3.5	7	20.0
4	4	11.4
4.5+	1	2.9

n=35; weighed food record data.

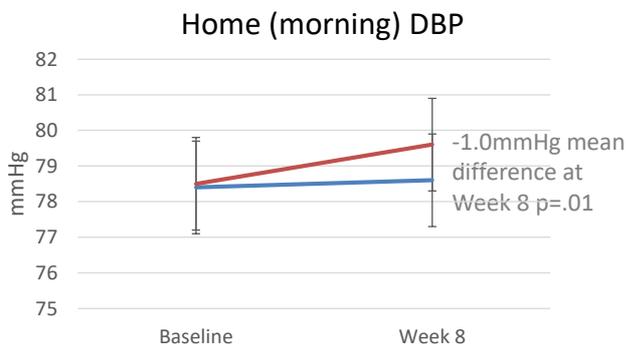
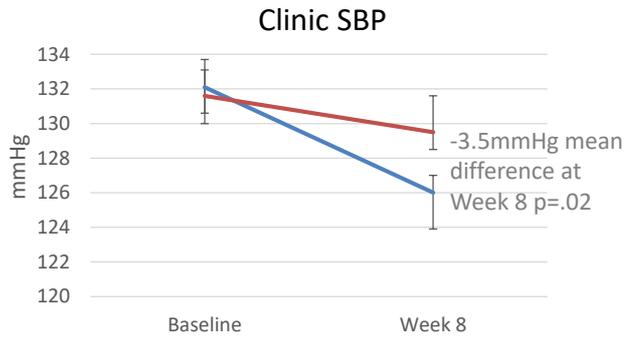
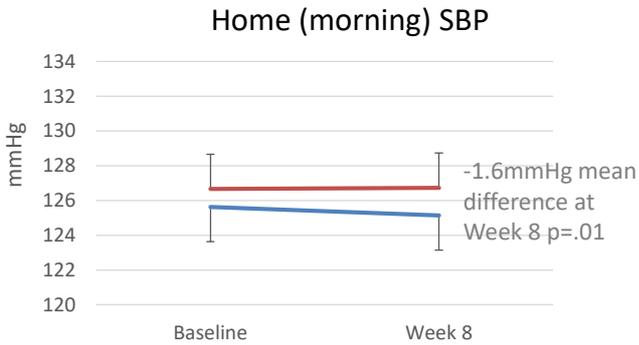
Dairy consumption (serves/day)



n=35; weighed food record data;

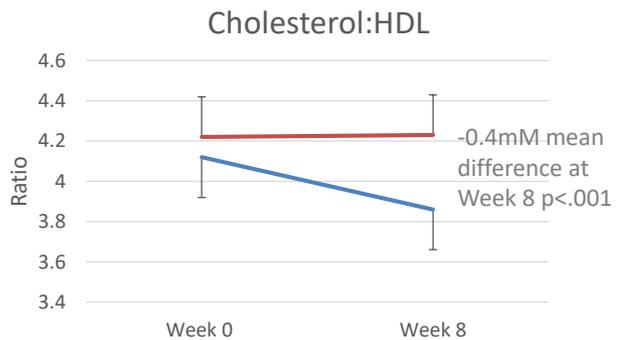
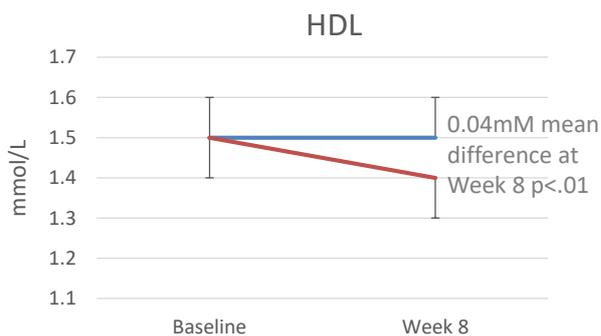
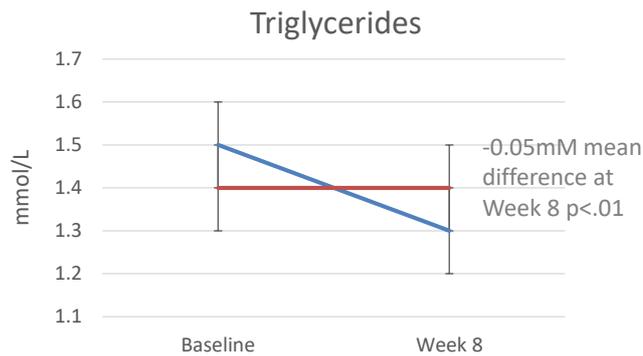
*mean difference in 8 week change, (95% CI), diet*visit.

Results: Blood pressure



Wade et al. (2018) *Am J Clin Nutr*

Results: Lipids & Lipoproteins



Wade et al. (2018) *Am J Clin Nutr*

Comment – MedDiet, BP and lipids

MedDiet, BP & lipids^{1,2}

PREDIMED³, 1yr n=235 (85% HTN), 24h ABPM

-MedDiet+EVOO: 4.0 and 1.9mmHg,

-MedDiet+nuts: 4.3 and 1.9mmHg lower SBP and DBP than low fat diet group

PREDIMED⁴, 4yr follow-up n=7447

-MedDiet+EVOO: -1.53mmHg

-MedDiet+nuts: -0.65mmHg lower DBP than low fat diet group

SUN⁵ n=9408

Spanish MedDiet related to small reductions in BP 6yr after follow-up; suggesting adherence to a MedDiet could help attenuate/reduce age-related changes in BP

MedLey⁶

n=137, significant reduction in SBP compared with HabDiet group, 6 mo

EPIC-Florence⁷ n=13,597, 35-64yr

Italian MDS negatively correlated with SBP and DBP

¹De Pergola & D'Alessandro 2018, ²Lee et al 2018, ³Domenech et al 2014, ⁴Toledo et al 2013, ⁵Nunez-Cordoba et al 2008, ⁶Davis et al 2017, ⁷Bendinelli et al 2018

Comment - MedDiet, dairy and BP

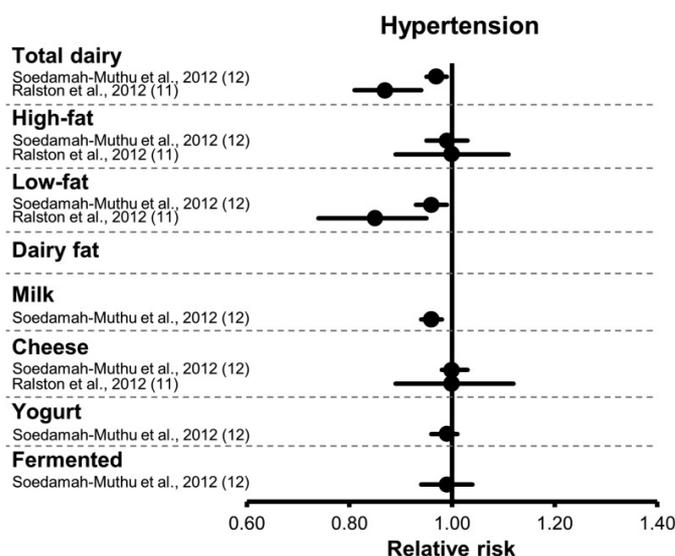
Dairy and risk of HTN (mod-high quality evidence) of association between total dairy, low-fat dairy, milk and lower risk of HTN¹

PREDIMED n=1868

20-28% RR of MetS (low fat dairy, yoghurt, milk)²

Framingham n=2636

Total dairy, low fat dairy, milk & yoghurt, attenuated rise in SBP and lower risk of projected HTN³



¹Drouin-Chartier J-P et al 2016, ²Babio et al 2015, ³Wang et al 2015.

Conclusion

A Mediterranean diet with 3 daily serves of dairy:

- Feasible to follow for 8 weeks (92% adherence)
- Meets calcium requirements of Australians
- Improves blood pressure, heart rate and lipid profiles

Provided further information that supports the consumption of a MedDiet for health:

- In different population groups (at-risk population)
- Feasible in a non-Mediterranean population

Practice Tips – MedDiet is both diet AND lifestyle

1. Use EVOO as main culinary fat – dress salad, vegetables, pasta, you can cook with it
2. Have vegetables and salad at every main meal – frozen, fresh, canned ok
3. Choose 3-4 serves of dairy foods daily- mix of low fat and regular fat, go for Greek yoghurt and flavor with honey, spices or nuts
4. Swap meat for legumes twice a week – canned or dried ok
5. Fish and seafood twice a week – oily is preferable, canned or fresh is ok
6. Have red meat less often and choose white meat over red meat
7. Choose wholegrain or sourdough breads
8. 2 pieces of fresh fruit daily – canned in juice, frozen or dried is ok
9. 30g unsalted nuts daily
10. Moderate consumption of alcohol – choose red wine, no more than 2 standard drinks a day, enjoy with meals and friends
11. Be mindful of portion size
12. Eat until you are $\frac{3}{4}$ full
13. Be active instead of sedentary
14. Be mindful of stress, rest and relax, sleep well



Thank you.

Acknowledgements:

Mediterranean Dietary Patterns Team
Dietitian Connection



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A Mediterranean diet supplemented with dairy foods improves markers of cardiovascular risk: results from the MedDairy randomized controlled trial

Alexandra T Wade,¹ Courtney R Davis,¹ Kathryn A Dyer,² Jonathan M Hodgson,^{3,4} Richard J Woodman,⁵ and Karen J Murphy²

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Summary



Little is known the relationship between the Mediterranean Dietary Pattern and muscle and bone health in children, adolescents and adults.

The Mediterranean Dietary Pattern may be adapted so that it meets Australian calcium recommendations and still leads to significant improvements in cardiovascular health.

- Visit dairyhealth.com.au for resources and education materials for healthcare professionals and patients

Links to images used

https://www.google.com.au/search?q=image+of+mixed+almonds+walnuts+hazelnuts&tbm=isch&source=iu&ictx=1&fir=7iY9Kn5UCa-I9M%253A%252CdiLqkr2sAw0jEM%252C_&usg=AI4_-kTTsLfGIta9HLkCmem4CTWQSBEGkw&sa=X&ved=2ahUKEwjE7YGm383eAhWOb30KHU9BBdMQ9QEwBXoECAYQDg#imgrc=fUb8Z3jMjfh1FM:

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