Summer School: Take Care of Children

Alba 16-18 settembre 2016

Dieta mediterranea e gravidanza: outcome fetale e neonatale

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Dieta Mediterranea

Modello nutrizionale ispirato alla tipica alimentazione della popolazione mezzogiorno italiano e della Grecia.

Alimenti derivati da:
agricoltura, pastorizia, pesca e olio di oliva

Piccole porzioni per cause di necessità
La quantità è il parametro più importante nella maggior parte delle diete

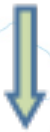
Ampia variabilità

Cibi minimamente processati, prodotti di stagione e freschi

Dieta Mediterranea

Seven Country Study

(Ansel Keys)

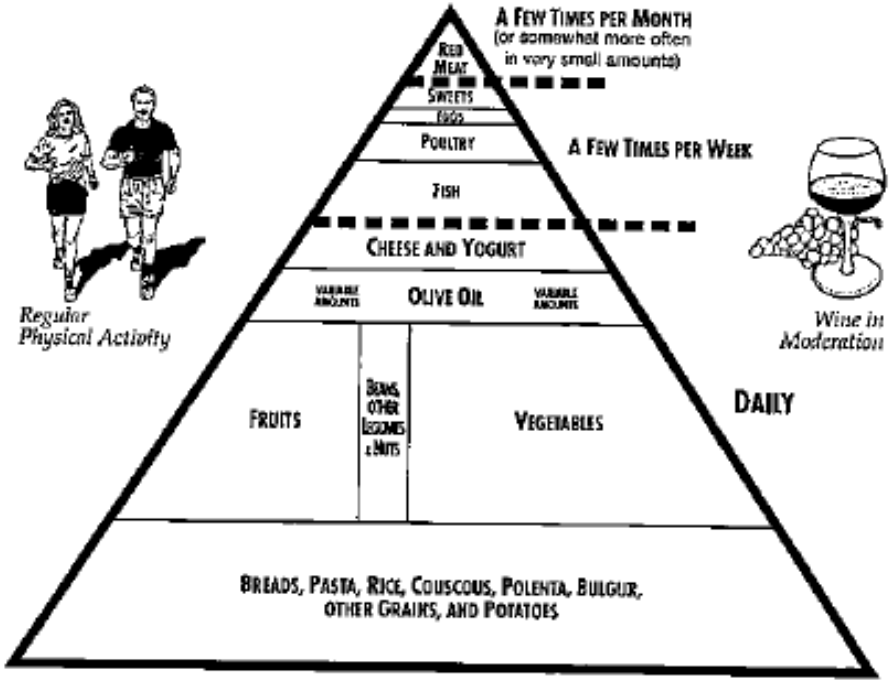


Molteplici evidenze che correlavano lo stato di salute con l'alimentazione tipica dei paesi affacciati sul Mar Mediterraneo

QUALE MODELLO NUTRIZIONALE?

Mediterranean diet pyramid: a cultural model for healthy eating[1,2]

Walter C Willett, Frank Sacks, Antonia Trichopoulou, Greg Drescher, Anna Ferro-Luzzi, Elisabet Helsing, and Dimitrios Trichopoulos



1) Adult life expectancy for populations in these areas was among the highest in the world, and rates of coronary heart disease, certain cancers, and some other diet-related chronic diseases were among the lowest in the world in the early 1960s (2, 3), despite limitations of existing medical services.

2) Data on food availability and dietary intake in the Mediterranean region describe dietary patterns with many common characteristics.

3) Dietary patterns sharing many of these common characteristics have been associated with low rates of chronic diseases and high adult life expectancy in numerous epidemiologic studies conducted throughout the world

In addition, certain lifestyle factors are of particular interest: the social support and sense of community that accompanies sharing food with family and friends; lengthy meals that provide relaxation and relief from daily stress; delicious meals, carefully prepared, that stimulate enjoyment of healthy diets; and postlunch siestas (afternoon naps) that also provide an opportunity for rest and relaxation.

Am J Clin Nutr 1995;61(suppl):1402S–6S.

Nuova piramide Mediterranea

MedEatResearch
Centro di Ricerche Sociali
Sulla Dieta Mediterranea

EXPO 2015

Dieta Mediterranea e Salute

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1. Social support and ambulatory blood pressure in older people.
Sanchez-Martínez M, López-García E, Guallar-Castillón P, Cruz JJ, Orozco E, García-Esquinas E, Rodríguez-Artalejo F, Banegas JR.
J Hypertens. 2016 Oct;34(10):2045-2052.
PMID: 27584797
Similar articles

2. Nutrigenomics of extra-virgin olive oil: A review.
Piroddi M, Albini A, Fabiani R, Giovannelli L, Luceri C, Natella F, Rosignoli P, Rossi T, Taticchi A, Servili M, Galli F.
Biofactors. 2016 Sep 1. doi: 10.1002/biof.1318. [Epub ahead of print] Review.
PMID: 27580701
Similar articles

[Bad results obtained from the current public **health** policies and recommendations of hydration].

Results by year

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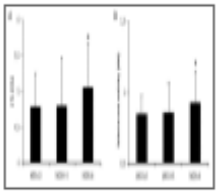
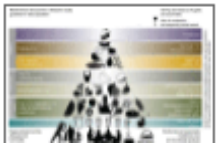
PMC Images search for *mediterranean diet and health*



Componenti bioattive della dieta mediterranea

Fibra

MUFA, FA saturi

Vitamine, antiossidanti

Polifenoli

PUFA, Omega 3

Vitamina D

Controllo/riduzione del peso corporeo

Effetti cumulativi e di interazione tra I nutrienti

Effetti della dieta mediterranea su parametri di rischio metabolico

Molteplici studi

Outcome diversi

Risultati variabili

Review

The Effect of the Traditional Mediterranean-Style Diet on Metabolic Risk Factors: A Meta-Analysis

Nutrients **2016**, *8*, 168; doi:10.3390/nu8030168

A description of the included studies can be found in Table 1. Analysis of 29 reports shows that out of 4133 participants, 72% were female with a mean age of 46.93 (SD = 8.30). A majority of the studies were conducted in Europe (55.9%) and published in English (96.9%). Studies varied in design: 33.3% had a non-MedSD comparison group and 58.9% of studies were crossover or pre-/post-test only design. The mean publication year was 2009 (SD = 2.90) with a 12-year range from 2003 to 2015. The mean intervention length was 35.3 (SD = 50.71) weeks with a range from four to 208 weeks.

Med-Style Diet

Outcome	*k*	d_+ (95% CI)		Homogeneity of *d*'s		
		Fixed-Effects	Random-Effects	*Q*	I^2 (%)	*p*-Value
WC	39	−0.44 (−0.48 to −0.41) *	−0.54 (−0.77 to −0.31) *	390.1	96.39	<0.0001
HDL	27	0.15 (0.09 to 0.21) *	0.19 (−0.07 to 0.46)	294.6	93.95	<0.0001
TG	25	−0.34 (−0.40 to −0.28) *	−0.46 (−0.72 to −0.21) *	231.06	93.74	<0.0001
FBG	23	−0.37 (−0.42 to −0.33) *	−0.50 (−0.81 to −0.20) *	281.18	96.69	<0.0001
SBP	25	−0.74 (−0.78 to −0.70) *	−0.72 (−1.03 to −0.42) *	320.11	97.00	<0.0001
DBP	25	−0.99 (−1.06 to −0.93) *	−0.94 (−1.45 to −0.44) *	2263.05	98.42	<0.0001

La tradizionale Dieta Mediterranea ha effetti benefici significativi su 5/6 parametri di rischio metabolico.
Effetti proporzionali con la durata della DM

Review

The Effect of the Traditional Mediterranean-Style Diet on Metabolic Risk Factors: A Meta-Analysis

Nutrients **2016**, *8*, 168; doi:10.3390/nu8030168

Study Limitation and Strengths

- Esclusi gli studi che includono l'attività fisica, per analizzare l'effetto della sola dieta
- Non è stato possibile considerare il peso e le sue variazioni come possibile modificatore di effetto
- Possibili "ecological fallacy" bias nell'assegnare all'individuo i dati del gruppo
- Validità del metodo statistico utilizzato che permette di stimare la misura dell'effetto e "tradurlo" in valore clinico
- Effetti sui parametri metabolici proporzionali alla durata della dieta.

Dieta mediterranea e gravidanza

Effetti a breve termine (materno-fetali)

- Riduzione del rischio di parto prematuro
- Crescita fetale, peso alla nascita
- Diabete gestazionale
- Ipertensione in gravidanza
- Preeclampsia

Effetti a lungo termine nei figli

- Asma, allergie, atopia
- Obesità/sovrappeso, adiposità centrale
- Patologie metaboliche e cardiovascolari

Dieta mediterranea e parto pretermine

Mediterranean-type diet and risk of preterm birth among women in the Norwegian Mother and Child Cohort Study (MoBa): a prospective cohort study

Acta Obstetricia et Gynecologica. 2008; 87: 319–324

Dieta Mediterranea

Min 5 porzioni/giorno

Condimento e pr ibi:

Max 2 por

Min 2 porzioni/settimar

olio di oliva o colza

Max 2 tazze/giorno

Table II. Association of Mediterranean-type diet on preterm delivery for women in MoBa.

	Preterm birth (<37 weeks' gestation) odds ratio	Early preterm birth (<35 weeks' gestation) odds ratio	Late preterm birth (35–36 weeks' gestation) odds ratio
5 versus 0 criteria			
n (cases)	728 (36)	702 (10)	718 (26)
Crude	0.71 (0.34, 1.51)	1.12 (0.24, 5.33)	0.62 (0.26, 1.45)
Adjusted†	0.73 (0.32, 1.68)	0.93 (0.16, 5.37)††	0.66 (0.25, 1.69)†††
5 versus 1–4 criteria			
n (cases)	25,966 (1174)	25,264 (472)	25,494 (702)
Crude	1.01 (0.68, 1.51)	0.77 (0.38, 1.55)	1.18 (0.73, 1.90)
Adjusted†	1.06 (0.71, 1.58)	0.80 (0.40, 1,62)	1.24 (0.77, 2.0)

Non associazione tra aderenza alla dieta tipo-mediterranea e il parto pretermine

Am J Obstet Gynecol. 2005 Oct;193(4):1292-301.

Effect of a cholesterol-lowering diet on maternal, cord, and neonatal lipids, and pregnancy outcome: a randomized clinical trial.

Studio RCT , 290 donne primipare, non fumatrici

Gruppo di intervento: dieta ricca in frutta verdura, fibra, e ridotto contenuto di grassi

Gruppo di controllo: nessuna variazione alla dieta abituale

Risultati: riduzione significativa delle LDL materne e della frequenza di parti pretermine

Effetto preventivo dei fattori di rischio cardiovascolare su preeclampsia, GDM, e basso peso neonatale per età gestazionale

Smith GC. Lancet 2001; 357:2002-6

Sattar N. BMJ 2002;325:157-60

Association between a Mediterranean-type diet and risk of preterm birth among Danish women: a prospective cohort study

Acta Obstetricia et Gynecologica. 2008; 87: 325–330

METHODS:
The Danish National Birth Cohort assessed diet in mid-pregnancy by food frequency questionnaires (FFQ). Women consuming MD were those who ate fish twice a week or more, used olive or rape seed oil, consumed 5+ fruits and vegetables a day, ate meat (other than poultry and fish) at most twice a week, and drank at most 2 cups of coffee a day.

RESULTS:
Of **35,530 non-smoking women**, 1,137 (3.2%) fulfilled all MD criteria, and 540 (1.5%) none.
OR for preterm birth in MD women = 0.61 (0.35-1.05)
OR early preterm birth in MD women = 0.28 (0.11-0.76)

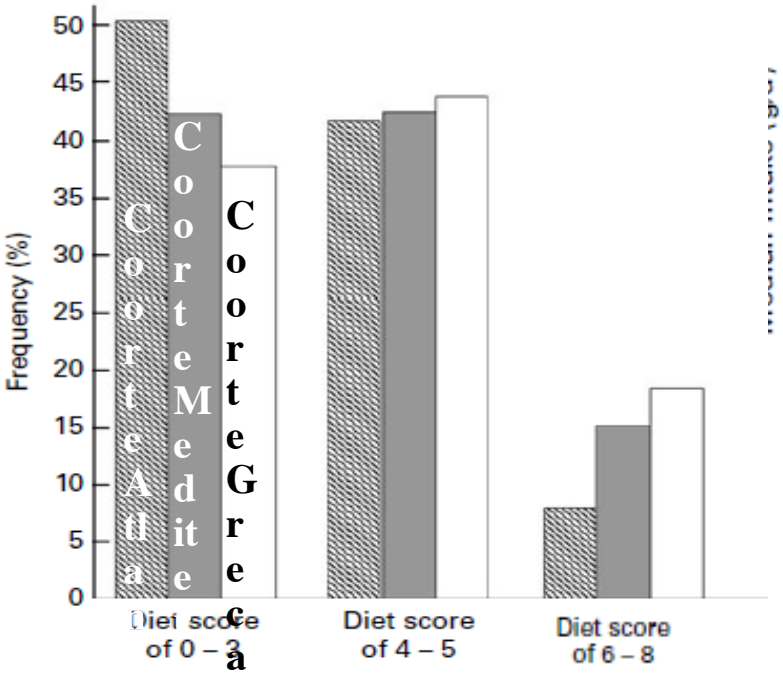
CONCLUSION:
Shifting towards a **MD during pregnancy may reduce the risk of early delivery** in Danish women.

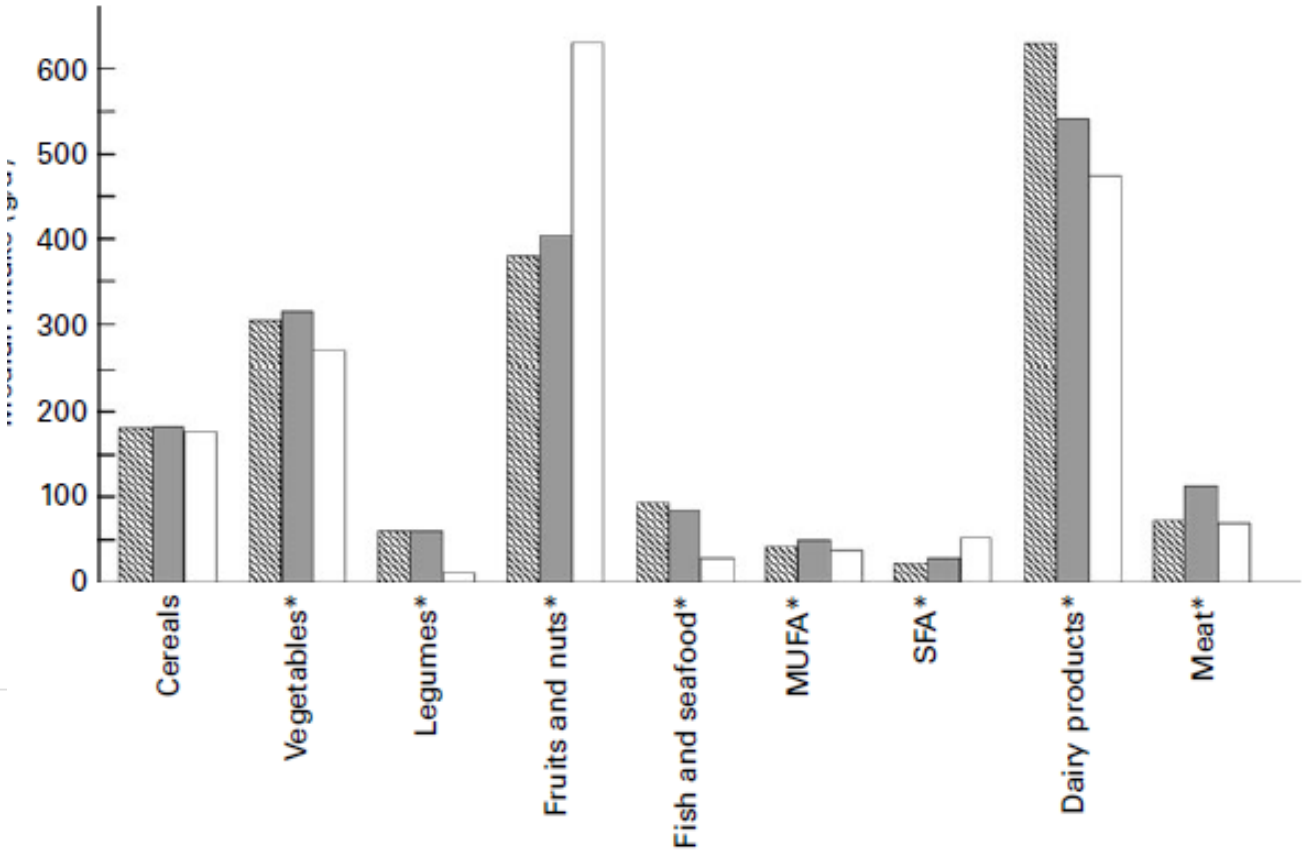
Dieta mediterranea e crescita fetale

British Journal of Nutrition 2012;107:135–145

Mediterranean diet adherence during pregnancy and fetal growth:
INMA (Spain) and RHEA (Greece)
mother–child cohort studies

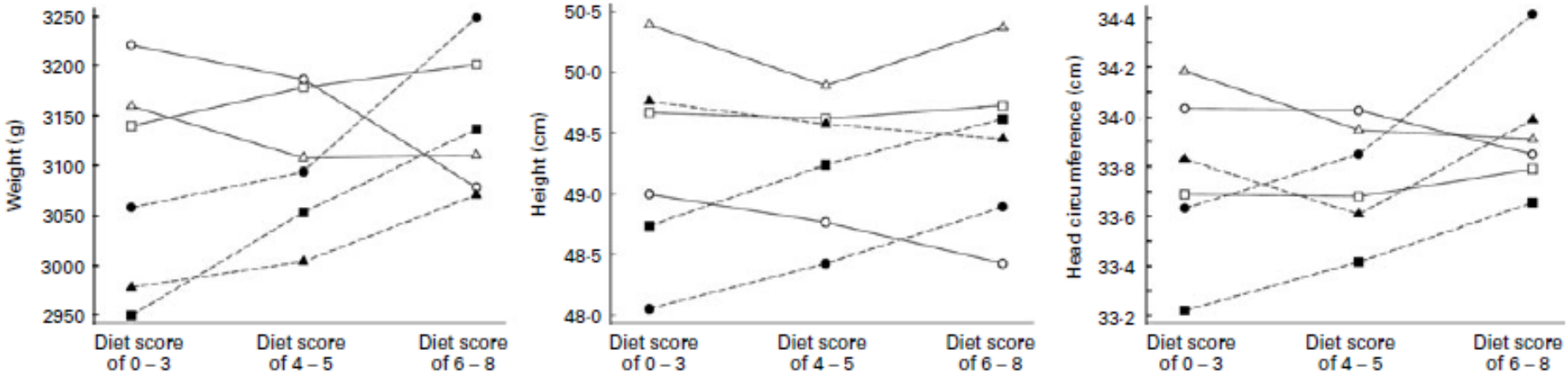
Food Frequency Questionaire; 2461 (Spain), 889(Greece) pregnant women
MD Adherence Score: 0-3 Low, 4-5 Medium, 6-8 High





British Journal of Nutrition 2012;107:135–145

Mediterranean diet adherence during pregnancy and fetal growth: INMA (Spain) and RHEA (Greece) mother–child cohort studies



Risultati non uniformi nelle 3 coorti:

rischio di FGR nelle donne con aderenza alla DM (Coorte Mediterranea Spagna)

Significativo del peso neonatale nelle donne fumatrici

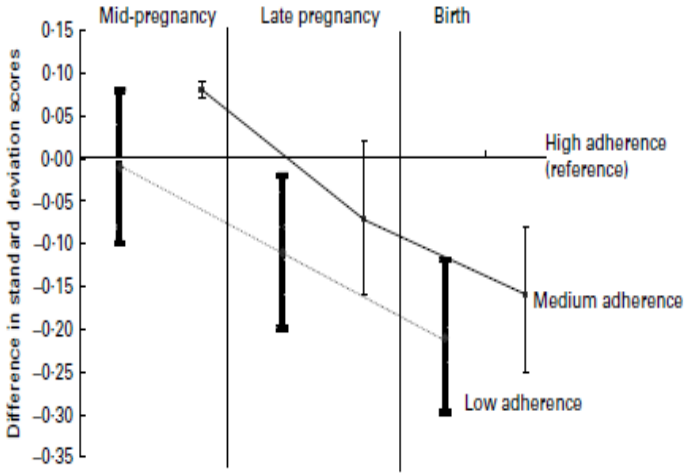
British Journal of Nutrition (2012), **108**, 1399–1409
doi:10.1017/S000711451100691X

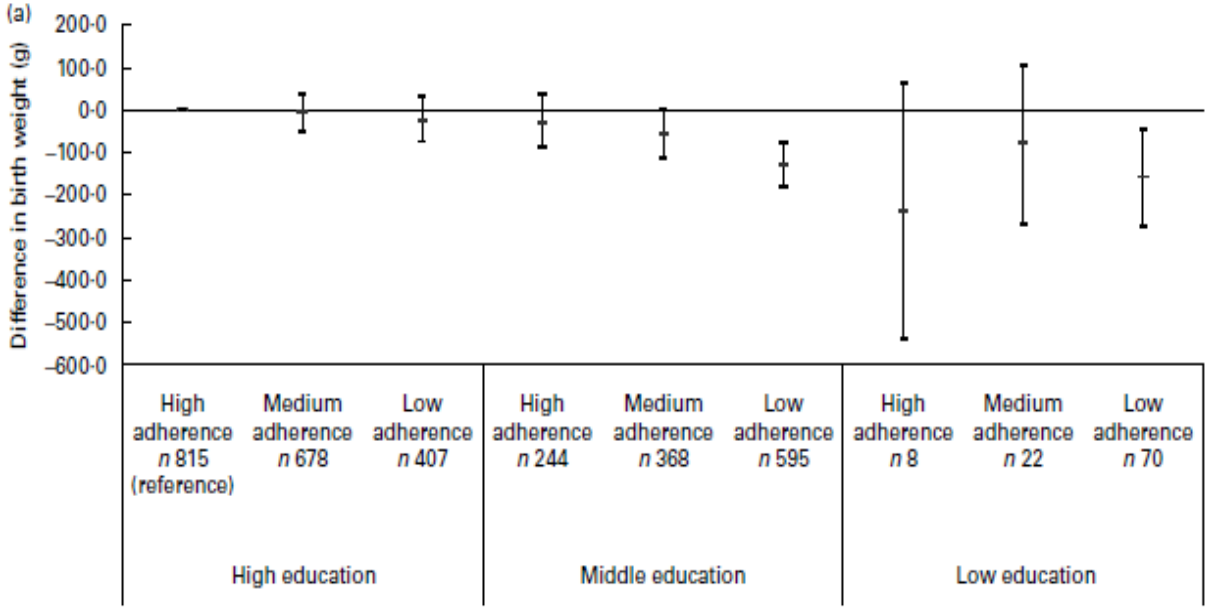
The Mediterranean diet and fetal size parameters: the Generation R Study

3207 donne olandesi, età gestazionale < 18 settimane; FFQ

MD = elevato consumo di frutta e verdura, oli vegetali, pesce, pasta e riso e ridotto consumo di carne, patate, salse grasse

Associazione significativa tra scarsa aderenza alla dieta mediterranea e ridotta crescita fetale e ridotto peso neonatale e placentale alla nascita.
Correlazione positiva con i livelli di vit B12 e folati e inversa con omocisteina e PCR.





Paediatric and Perinatal Epidemiology

Effect of a Mediterranean Diet during Pregnancy on Fetal Growth and Preterm Delivery: Results From a French Caribbean Mother–Child Cohort Study (TIMOUN)

Paediatric and Perinatal Epidemiology, 2014, **28**, 235–244

Background: Recent studies suggest that a Mediterranean dietary pattern during pregnancy may influence pregnancy outcomes. The aim of this study was to evaluate the effect of adherence to a Mediterranean diet (MD) during pregnancy on fetal growth restriction (FGR) and preterm delivery (PTD) in a French Caribbean island where the population is largely of African descent and presents dietary patterns similar to MD.

Methods: Using data from the TIMOUN Mother–Child Cohort Study conducted in Guadeloupe (French West Indies) between 2004 and 2007, we analysed data for 728 pregnant women who delivered liveborn singletons without any major congenital malformations. Degree of adherence to MD during pregnancy was evaluated with a semi-quantitative food frequency questionnaire based on nine dietary criteria. Multiple logistic regression models were used to analyse birth outcomes while taking potential confounders into account.

Results: Overall there was no association between MD adherence during pregnancy and the risk of PTD or FGR. However, pre-pregnancy body mass index was a strong effect modifier, and MD adherence was associated with a decreased risk of PTD specifically in overweight and obese women (adjusted odds ratio 0.7, 95% confidence interval 0.6, 0.9) (P heterogeneity <0.01).

Conclusions: These results suggest that Caribbean diet during pregnancy may carry some benefits of MD and may contribute to reduce the risk of PTD in overweight and obese pregnant women.

Table 3. Odds ratios of preterm delivery per unit of Mediterranean Diet Score, stratified for pre-pregnancy BMI and infant sex ($n = 728$)

	N	PTD cases	Unadjusted OR	95% CI	Adjusted OR	95% CI	*P-value*[a]
Non stratified model[b]	728	107	0.9	0.8, 1.1	0.9	0.8, 1.0	
Model stratified for BMI[c]							<0.01
Underweight/normal	429	56	1.1	0.9, 1.3	1.1	0.9, 1.3	
Overweight/obesity	299	51	0.7	0.6, 0.9	0.7	0.6, 0.9	
Model stratified for infant sex[b]							0.20
Male	370	58	1.0	0.8, 1.2	1.0	0.8, 1.2	
Female	358	49	0.9	0.7, 1.0	0.8	0.7, 1.0	

Dieta mediterranea e ipertensione in gravidanza

Major dietary patterns and blood pressure patterns during pregnancy: The generation R study.

Am. J. Obstet. Gynecol. 2011, 205, 337.e1–337.e12.

Prospective cohort study, researchers showed that low adherence to a Mediterranean-style dietary pattern and high adherence to a traditional dietary pattern during pregnancy were **positively associated with higher blood**

Dieta mediterranea in gravidanza e allergie, asma, atopia nei figli

Dieta mediterranea e asma, allergie, atopia

Dieta mediterranea efficace nel ridurre i le manifestazioni cliniche di rinite allergica, asma e atopia nei soggetti affetti

Chatzi L. Thorax 2007;62:677–83.

Garcia-Marcos L. Thorax 2007;62:503–8.

Correlazione nota tra riduzione dei sintomi di allergia o asma con singoli alimenti o nutrienti nella dieta materna:

- Livelli plasmatici di selenio nel sangue del cordone ombelicale
- Livelli materni di vit E e D
- Elevati apporti di PUFA n-3 (pesce)

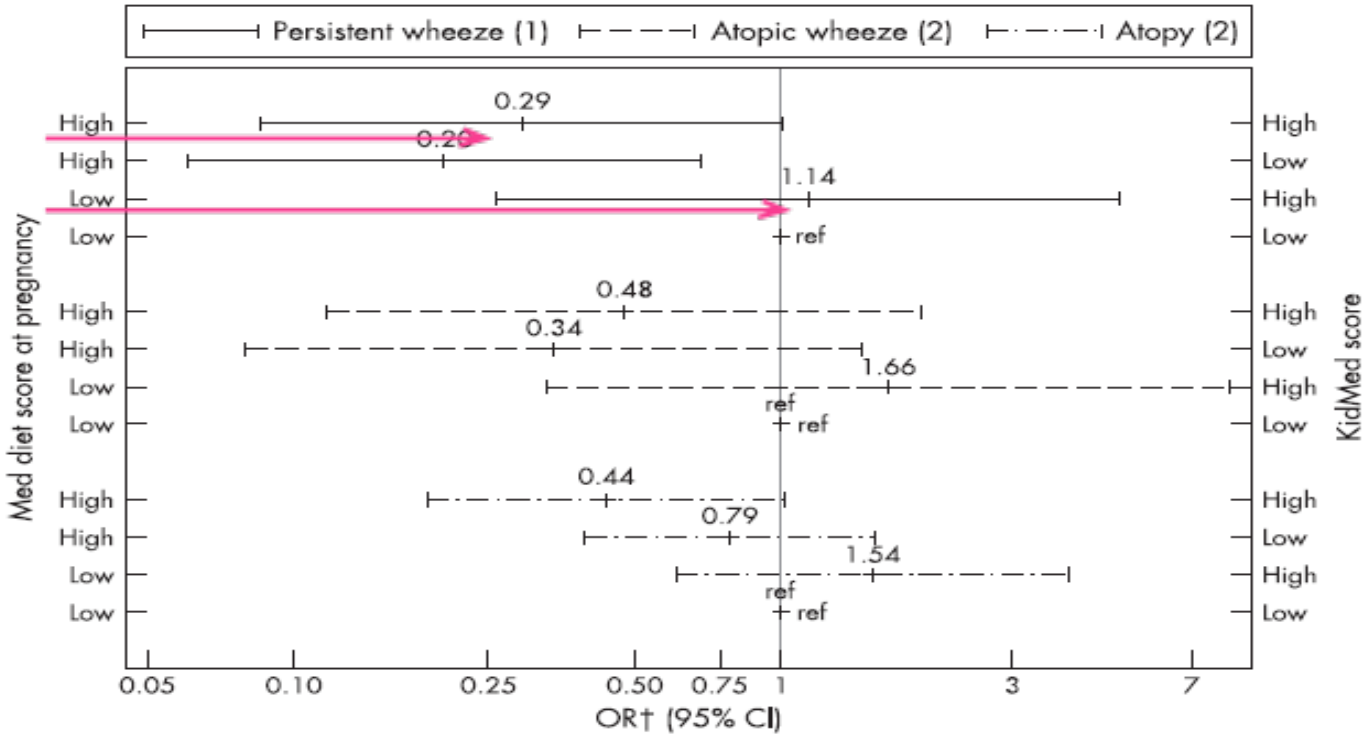
Interazione ed effetto cumulativo e sinergico degli alimenti parte della dieta mediterranea

Mediterranean diet in pregnancy is protective for wheeze and atopy in childhood

L Chatzi,[1] M Torrent,[2] I Romieu,[3] R Garcia-Esteban,[4] C Ferrer,[4] J Vioque,[5] M Kogevinas,[1,4] J Sunyer[4,6]

Coorte di gestanti spagnole (Minorca) e relativi 460 bambini analizzati a 6.5 anni

	Maternal high Med Diet Score	
	OR (95% CI)	OR‡ (95% CI)
Persistent wheeze at 6.5 years* (n = 37)	0.23 (0.09–0.60)	0.22 (0.08–0.58)
Atopic wheeze at 6.5 years† (n = 20)	0.34 (0.12–0.97)	0.30 (0.10–0.90)
Atopy† (n = 70)	0.55 (0.32–0.97)	0.55 (0.31–0.97)



Does maternal diet during pregnancy and lactation affect outcomes in offspring? A systematic review of food-based approaches

Nutrition 30 (2014) 1225–1241

Food type or dietary pattern	Outcome				
	Eczema	Asthma	Wheeze	Hay fever/ rhinitis	Sensitization
Fruit and vegetables	Total studies: 1 [47] ↓ risk: 1 [47]	Total studies: 1 [52]	No studies	No studies	Total studies: 2 [47,53] ↓ risk: 1 [47]
Vegetables	Total studies: 3 [54,67,69] ↓ risk: 1 (green & yellow) [69]	Total studies: 2 [58, 67]	Total studies: 2 [58,64]	No studies	Total studies: 3 [54,56,76] ↓ risk: 2 (>8 servings/wk) [56] (potato) [76] ↑ risk: 1 (celery, raw sweet pepper) [54]
Fruit	Total studies: 2 [54,69] ↓ risk: 1 (apple, citrus) [69]	Total studies: 2 [55, 58] ↓ risk: 1 (apple) [55]	Total studies: 2 [58,64] ↓ risk: 1 (fruit juice) [64]	No studies	Total studies: 4 [54,56,70,76] ↑ risk: 2 (citrus; citrus intake vs inhalants [70]; total vs inhalants) [54]
Cereal	No studies	No studies	Total studies: 2 [56,64]	Total studies: 1 [55]	Total studies: 4 [56,63,70,76]
Fish	Total studies: 9 [53–55,61, 65,67,71,72,74] ↓ risk: 5 [53–55,65,72]	Total studies: 5 [48, 58,65,67,73]	Total studies: 3 [58,64,74]	No studies	Total studies: 7 [49,53,54,56,63,65,76] ↓ risk: 1 [49]
Meat	Total studies: 2 [61,71] ↑ risk: 1 [71]	Total studies: 1 [73]	Total studies: 2 [61,64] ↓ risk: 1 [61]	No studies	Total studies: 1 [56]
Eggs	Total studies: 2 [54,71]	Total studies: 1 [58]	Total studies: 2 [58,64]	No studies	Total studies: 1 [54]
Cow's milk and dairy products	Total studies: 3 [54,68,71]	Total studies: 3 [50, 58,73] ↓ risk: 1 [50]	Total studies: 3 [58,64,68] ↓ risk: 1 [68]	No studies	Total studies: 5 [54,56,59,63,76] ↑ risk: 1 (birch) [76]
Butter	Total studies: 1 [54]	Total studies: 1 [73]	Total studies: 2 [55,64]	No studies	Total studies: 3 [49,54,76] ↑ risk: 1 (wheat) [76]
Margarine	Total studies: 1 [54] ↑ risk: 1 [54]	Total studies: 1 [73]	Total studies: 1 [64]	No studies	Total studies: 3 [49,54,76] ↑ risk: 1 (wheat & birch) [76]
Vegetable oil	Total studies: 1 [54] ↑ risk: 1 [54]	Total studies: 1 [73]	No studies	No studies	Total studies: 1 [54]
Seeds	Total studies: 1 [54]	No studies	No studies	No studies	Total studies: 1 [54]
Nuts	Total studies: 1 [54]	Total studies: 1 [58] ↑ risk: 1 (daily vs. rarely) [58]	Total studies: 2 [58,64] ↑ risk: 1 (daily vs. rarely) [58]	No studies	Total studies: 2 [54,56]
Fast food	No studies	No studies	Total studies: 1 [64] ↑ risk: 1 [64]	No studies	No studies
Dietary patterns	Total studies: 3 [62,66,75]	Total studies: 3 [57, 62,66]	Total studies: 5 [57,62,64,66,75] ↓ risk: 2 ↓ risk (Medit & olive oil [64]; Western [75])	Total studies: 2 [57,62] ↓ risk: 1 (Medit diet) [57]	Total studies: 3 [56,62,76] ↓ risk: 2 (Medit [56], traditional [62]) ↑ risk: 1 (health conscious & vegetarian) [62]
Vitamin D from food	Total studies: 1 [60]	Total studies: 1 [60] ↓ risk: 1 [60]	Total studies: 1 [51] ↓ risk: 1 [51]	Total studies: 1 [60] ↓ risk: 1 [60]	No studies

Dieta mediterranea in gravidanza e malformazioni

Minor rischio di malformazioni fetali nelle donne con buona aderenza a dieta tipo-mediterranea:

- Vujkovic, M. The maternal mediterranean dietary pattern is associated with a **reduced risk of spina bifida** in the offspring. **BJOG 2009, 116, 408–415.**

- De Kort, C.A. Relationship between maternal dietary patterns and **hypospadias.**

  Paediatr Perinat Epidemiol. 2011, 25, 255–264.

- Vujkovic, M. Maternal Western dietary patterns and the risk of developing a **cleft lip with or without a cleft palate.** **Obstet. Gynecol. 2007, 110, 378–384.**

- Sotres-Alvarez D. The National Birth Defects Prevention Study.

Dieta mediterranea in gravidanza e sovrappeso/obesità nei figli

Fattori predisponenti lo sviluppo di sovrappeso/obesità in età infantile:

- Incremento ponderale in gravidanza
- Il peso neonatale
- La rapida crescita postnatale e il diabete gestazionale
- Assenza o breve durata dell'allattamento al seno
- Eccesso ponderale materno

Effetto della dieta durante la gravidanza

- Indiretto attraverso la modificazione dei fattori di rischio

ORIGINAL ARTICLE European Journal of Clinical Nutrition (2014) **68**, 8–13

Relation of the Mediterranean diet with the incidence of gestational diabetes

1076 donne in 10 paesi mediterranei; FFQ somministrati durante OGTT (24-32 sett di gestazione)

Table 3. Comparison of plasma glucose values, total and incremental area under the glucose curve during the OGTT and incidence of GDM between subjects with low (poor adherence) and high (good adherence) Mediterranean Diet Index

	MedDiet Index low (poor adherence) (4.3 ± 0.05)	*MedDiet Index high (good adherence) (8.5 ± 0.05)*	P *(two-tailed)*
Fasting plasma glucose (mmol/l)	4.6 ± 0.1	4.5 ± 0.1	0.169
Plasma glucose 1 h post-load (mmol/l)	8.0 ± 0.1	7.7 ± 0.1	0.016
Plasma glucose 2 h post-load (mmol/l)	6.8 ± 0.1	6.6 ± 0.1	0.066
Incremental glucose area (mmol*min)	270.0 ± 7.8	255.6 ± 5.4	0.034
Total glucose area (mmol*min)	823.1 ± 10.0	793.3 ± 7.0	0.016
Incidence of GDM_ADA	12.3%	8.0%	0.030 Odds ratio = 0.618 CI (0.401–0.950)
Incidence of GDM_IADPSG	32.8%	24.3%	0.004 Odds ratio = 0.655 CI (0.495–0.867)

Correlazione negativa tra Mediterranean Diet Index e:

- Incidenza di GDM
- tolleranza glicidica nelle donne non GDM (glicemia e AUC)

Dieta mediterranea in gravidanza e sovrappeso/obesità nei figli

Fattori predisponenti lo sviluppo di sovrappeso/obesità in età infantile:

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- La rapida crescita postnatale e il diabete gestazionale
- Assenza o breve durata dell'allattamento al seno
- Eccesso ponderale materno

Effetto della dieta durante la gravidanza

- Indiretto attraverso la modificazione dei fattori di rischio
- Diretto (effetto dei nutrienti):
- Iperinsulinemia fetale – alimenti ad elevato indice glicemico
- Infiammazione placentare – elevato apporto di grassi
- Ridotta sensibilità alla leptina – dieta "western"

Mediterranean dietary pattern in pregnant women and offspring risk of overweight and abdominal obesity in early childhood: the INMA birth cohort study

Pediatr Obes. 2016 Jan 13. doi: 10.1111/ijpo.12092. [Epub ahead of print]

Objective: The aim of this study was to evaluate associations between adherence to the Mediterranean diet (MD) during pregnancy and childhood overweight and abdominal obesity risk at 4 years of age.

Methods: We analysed 1827 mother–child pairs from the Spanish 'Infancia y Medio Ambiente' cohort study, recruited between 2003 and 2008. Diet was assessed during pregnancy using a food frequency questionnaire and MD adherence by the relative Mediterranean diet score (rMED). Overweight (including obesity) was defined as an age-specific and sex-specific body mass index ≥85th percentile (World Health Organization referent), and abdominal obesity as a waist circumference (WC) >90th percentile. Multivariate adjusted linear and logistic regression models were used to evaluate associations between pregnancy rMED and offspring overweight and abdominal obesity.

Table 2 Association between maternal rMED in pregnancy and BMI (*z*-score) and WC (cm) at 4 years of age

		T_1	T_2	T_3		2 units increase
	Range:	(1–7)	(8–9)	(10–15)	*P* for	
rMED			β (95% CI)	β (95% CI)	trend	β (95% CI)
BMI[1] (*n* = 1827)						
	Model 1	Ref	0.00 (−0.11, 0.12)	−0.01 (−0.13, 0.10)	0.827	0.01 (−0.03, 0.04)
	Model 2	Ref	−0.02 (−0.13, 0.10)	−0.07 (−0.20, 0.05)	0.255	−0.01 (−0.05, 0.03)
	Model 3	Ref	−0.06 (−0.17, 0.05)	−0.09 (−0.20, 0.02)	0.113	−0.02 (−0.06, 0.01)
WC[2] (*n* = 1398)						
	Model 1	Ref	0.13 (−0.42, 0.69)	−0.05 (−0.53,−0.64)	0.806	0.12 (−0.07, 0.30)
	Model 2	Ref	−0.26 (−0.73, 0.20)	−0.57 (−1.07,−0.07)	0.024	−0.15 (−0.31, 0.00)
	Model 3	Ref	−0.34 (−0.78, 0.11)	−0.62 (−1.10,−0.14)	0.009	−0.18 (−0.33,−0.03)

[1]Model 1: Crude model. General linear regressions with no adjustments.
Model 2: General linear regressions adjusted for child sex, region, child age, maternal total energy intake and child height.
Model 3: General linear regressions adjusted for child sex, region, child age, maternal total energy intake, child height, educational level, smoking status, maternal physical activity, maternal pre-pregnancy BMI, weight gain during pregnancy, child birth weight and rapid growth from birth to 6 months and breastfeeding duration.

Le scelte alimentari dei bambini

- La capacità di percepire I sapori comincia in utero.
  1° trimestre sviluppo dei recettori e delle strutture nervose gustative e olfattive

- Il liquido amniotico e il latte materno contengono molecole provvenienti dalla dieta materna

- Imparare a riconoscere I gusti dei cibi comincia in epoca fetale e nella primissima infanzia

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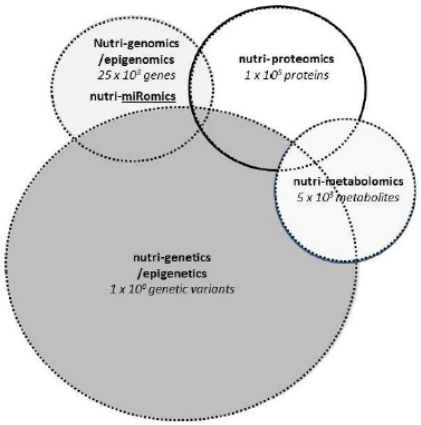
Il futuro

nutrients

MDPI



Review

Nutritional Genomics and the Mediterranean Diet's Effects on Human Cardiovascular Health

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Abstract: The synergies and cumulative effects among different foods and nutrients are what produce the benefits of a healthy dietary pattern. Diets and dietary patterns are a major environmental factor that we are exposed to several times a day. People can learn how to control this behavior in order to promote healthy living and aging, and to prevent diet-related diseases. To date, the traditional

physiopathological conditions. The nutritional genomics field is quickly advancing but a great deal of effort is yet required from the scientific community, in different disciplines, to establish the subjacent mechanisms linked to the nutritional genomics of the healthy benefits of Mediterranean diet on cardiovascular diseases. The integration of OMICS, both at a single-OMICS level or preferably at a multi-OMICS one, will be crucial to better understand the inter-individual mechanisms behind the conferred protection of the traditional Mediterranean diet as well as to gain greater knowledge with respect to personalized nutrition. An integrative approach is necessary to extract conclusions from large-scale data. Further nutritional genomics research, at all levels, will be necessary to evaluate optimal "doses" of this dietary pattern, from an early stage *in utero* gestation until later adult life, to control diet-related disease, and to promote healthy living and aging.

Conclusioni

- La dieta mediterranea è il pattern dietetico più studiato
- L'aderenza alla DM offre benefici ad ampio spettro per la salute delle madri e dei figli
- Massima espressione degli effetti della DM in condizioni non fisiologiche e se intesa e applicata globalmente
- Personalizzazione delle indicazioni dietetiche secondo le caratteristiche dell'individuo

Grazie della vostra attenzione