



Table 4-A-I-3. Overview: Body Weight and Obesity

Author, Year Quality Rating Study Design	Sample Size Location / Duration Dietary Assessment	Population Age / Gender Weight Status / Cohort	Exposure Index / Score	Results: Intermediate BW, BMI, WC	Results: Endpoint Overweight or Obesity Incidence
Mediterranean Dietary Pattern					
Estruch et al, 2006 Positive RCT	Initial N=772 Final N= 769 Spain Three months FFQ (137 items)	50 years to 80 years 50% to 60% women 90% Ow or Ob PREDIMED	Consumption of Mediterranean foods (olive oil, vegetables, fruits, wine, shellfish, nuts, legumes, tomato sauce), as well as non-Mediterranean foods (red meats, butter, carbonated beverages, pastries)	<p>↑ Adh MDS (+OO):</p> <ul style="list-style-type: none"> Drop in BW: -0.19kg (CI: -0.46 to 0.07) Drop in BMI: -0.12kg/m² (CI: -0.24 to 0.06) Drop in WC: -0.82cm (CI: -1.80 to 0.14) <p>↑ Adh MDS (+nuts):</p> <ul style="list-style-type: none"> Drop in BW: -0.26kg (CI: -0.59 to 0.08) Drop in BMI: -0.09kg/m² (CI: -0.24 to 0.05) Drop in WC: -0.29 cm (CI: -0.95 to 0.37) <p>All were considered not significant.</p>	Not reported
Buenza et al, 2010 Positive Prospective Cohort	N=10,376 Spain Six years FFQ (136 items)	Mean: 38±11 years 54% women BMI range: 23±3 to 24±3kg/m ² SUN	MDS: (+) Vegetables, fruit and nuts, legumes, cereals, fish, MUFA/SFA (+) Alcohol (-) Meat, dairy	<p>↑ Adh MDS: Drop in BW -0.059kg per year; (CI: -0.111 to -0.008); P_{trend}=0.02</p> <p>↑ Adh MDS: Drop in risk higher than 5kg weight gain at four-year follow-up; OR=0.76 (CI: 0.64 to 0.90)</p>	No association with a rise in Adh MDS and incidence of Ow or Ob (BMI >25kg/m ²) in participants' normal weight (BMI <25kg/m ²) at baseline
Lassale et al, 2012 Positive Prospective Cohort	N=3,151 France 13 years Multiple 24-hour diet records	Mean: 51.7±4.6 years 47% Women BMI (%) : 61.8% Normal; 32.0% Ow; 6.25% Ob SU.VI.MAX	MDS rMED MSDPS DQI-I DGAI PNNS-GS	<p>Rise in Adh MDS, rMED, DQI-I, PNNS-GS associated with a drop in ↓BW in normal BW ♂; P_{trend}<0.05</p> <p>MSDPS not significant ♀ not significant</p>	<p>Rise in Adh MDS, rMED, DQI-I, PNNS-GS by one SD drop in odds of becoming Ob:</p> <p>OR=0.63 (CI: 0.51 to 0.78) for DGAI to OR=0.72 (CI: 0.59 to 0.88) for MDS in non-Ob ♂</p> <p>MSDPS not significant ♀ not significant</p>
Mendez et al, 2006 Positive Prospective Cohort	N=27,827 Spain Three years Computerized 600-item diet history	29 years to 69 years 62% women Normal and Ow (numbers not specified) EPIC-Spain	MDS: (+) Vegetables, fruit, legumes, cereals, fish, MUFA/SFA (+) Alcohol (-) Meat; dairy and nuts were not included in scores, but were analyzed separately	Not reported	<p>↑ Adh MDS: Ow ->Ob</p> <p>OR=0.69 (CI: 0.54 to 0.89) ♀ OR=0.68 (CI: 0.53 to 0.89) ♂</p> <p>↑ Adh MDS: Normal ->Ob, NS</p> <p>Components: ↑ Ob incidence, ♀ who consumed more meat Ob incidence, ♂ who consumed more cereal</p>



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Romaguera et al, 2010 Positive Prospective Cohort	N=373,803 10 European countries Five years Dietary questionnaires were country-specific	25 years to 60 years 72% Women Baseline weight reported by gender for each country: ♂ BMI: 24.2 to 28.4kg/m ² ♀ BMI: 22.9 to 28.6kg/m ² EPIC- PANACEA	rMED: (+) Whole grains, vegetables, fruit/nuts/seeds, legumes, fish and OO (+m) Alcohol (-) Meat and processed meat, dairy	↑ Adh rMED: Gained less weight in five years -0.16kg (CI: -0.24kg to -0.07 kg)	↑ Adh rMED: Normal ->Ow / Ob OR=0.90 (CI: 0.82 to 0.96) Meta-analysis: OR scores of 10 EPIC countries showed a rise in Adh rMED of two patients associated with a 3% (CI: 1% to 5%) drop in odds Ow or Ob over five years
Rumawas et al, 2009 Positive Prospective Cohort	N=2,730 United States Seven years FFQ (Harvard semi-quantitative)	Mean: 54 years 55% Women Mean BMI: 26.3 to 27.0kg/m ² across quintiles Framingham Offspring and Spouse (FOS)	MSDPS: Whole-grain cereals, fruit, vegetables, dairy, wine, fish, poultry, olives/legumes/ nuts, potatoes, eggs, sweets, meat and OO	↑ Adh MSDPS: Drop in WC; P _{trend} =0.001	Not reported
Tortosa et al, 2007 Neutral Prospective Cohort	N=3,497 Spain Six years FFQ (136 items)	Not reported BMI <30 kg/m ² SUN	MDS: (+) Vegetables, fruit and nuts, legumes, cereals, fish, MUFA/SFA (+m) Alcohol (-) Meat, dairy	↑ Adh MDS: Drop in WC , -0.05cm per six years; P _{trend} =0.038	Not reported
Woo et al, 2009 Neutral Prospective Cohort	N=732 Hong Kong Five years to nine years FFQ (seven categories)	Mean: 45 years 53% women ♂: 232 Ow (BMI ≥23kg/m ²); 115 normal BMI range ♀: 222 Ow; 163 normal BMI range	MDS: (+) Vegetables, fruit and nuts, legumes, cereals, fish, MUFA/SFA (+m) Alcohol (-) Meat, dairy DQI-I: Four groups of components*	Not reported	Adh to MDS or DQI-I was not significantly associated with risk of becoming Ow. OR=1.35 (CI: 0.94 to 1.93) and 1.32 (CI: 0.92 to 1.89) for MDS and DQI-I, respectively [Defined by Asian criteria (BMI >23kg/m ²)]

Lassale et al, 2012, and Woo et al, 2008, described above, also assessed dietary-guidelines related indices.



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Dietary Guidelines - Related Patterns					
Berz et al, 2011 Positive Prospective Cohort	N=2,327 United States 10 years Three-day diet record each exam year	9 years to 10 years 100% girls Baseline weight not reported Prospective National Growth and Health Study	DASH Food Group Score: Fruits, vegetables, low-fat dairy, total and whole grains, lean meats and nuts/seeds/legumes	↑ Adh DASH score: Drop in BMI 24.4kg/m ² vs. 26.3kg/m ² (P<0.05) Components: Total fruit (BMI 26.0 vs. 23.6 for <1 vs. ≥2 servings per day, P<0.001) Low-fat dairy (BMI, 25.7 vs. 23.2 for <1 vs. ≥2 servings per day, P<0.001) Whole grain weakly, but beneficially associated with BMI.	Not reported
Cheng et al, 2010 Positive Prospective Cohort	N=222 Germany Followed to onset of pubertal growth spurt (Age at Take-Off was ATO) Parents kept three-day food records.	Mean: 7.4 years 54% girls BMI Z-score by NOI tertiles: -0.2 (-0.7, 0.4) 0.2 (-0.5, 0.8) 0.3 (-0.4, 0.7) P=0.2 DONALD study	Revised Children's (RC) DQI: (+) Vegetables, fruits, total and whole grains, dairy, LA and ALA, DHA and EPA, iron, E balance (-) Sugar, total fat	↓ Adh RC-DQI: Drop in BMI and fat mass index (FMI) Z-scores at baseline (P<0.01), not at ATO	Not reported
Gao et al, 2008 Positive Prospective Cohort	N=5,516 United States 18 months FFQ (120 items)	Mean: 63 years 53% women Mean BMI: 28.2kg/m ² ; <i>White:</i> 27.7; <i>Chinese:</i> 24.0; <i>Black:</i> 30.0; <i>Hispanic:</i> 29.4 MESA study	HEI-1995/05: (+) Vegetables, fruits, grains, meat, milk, variety (-) Total fat, SFA, cholesterol, sodium	↑ Adh HEI scores: Drop in BMI and WC (P<0.001)	↑ Adh HEI scores: Drop in risk of obesity (N->Ob) only for whites (P<0.05)
Kesse-Guyot et al, 2009 Positive Prospective Cohort	N=3,531 France Six years 24-hour food records	45 years to 60 years 45% women BMI (%) : 60.4% Normal; 33.0% Ow; 6.6% Ob SU.VI.MAX	PNNS-GS: <i>12 nutritional components:</i> Fruit and vegetables, starchy foods, whole grains, dairy products, meat, seafood, added fat, vegetable fat, sweets, water and soda, alcohol and salt One physical activity component	Rise in one PNNS-GS unit associated with drop in weight gain (P=0.004), drop in WC gain (P=0.01), drop in waist-to-hip ratio gain (P=0.02) and drop in BMI gain (P=0.002)	Rise in one PNNS-GS unit associated with drop in probability of becoming Ow (including Ob), OR=0.93 (95% CI: 0.88 to 0.99) Drop in one PNNS-GS unit associated with a drop in probability of becoming Ob; OR=0.89 (95% CI: 0.80 to 0.99)



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Zamora et al, 2010 Positive Prospective Cohort	N=4,913 United States 20 years Quantitative diet history	Mean: 25.4±3.4 years 55% women Mean BMI: <i>Black</i> : 25.3kg/m ² ; <i>White</i> : 23.7kg/m ² Percent <i>Ob</i> : <i>Black</i> : 24.5%; <i>White</i> : 21.4% Percent <i>Ob</i> : <i>Black</i> : 16.8%; <i>White</i> : 6.8% CARDIA study	DQI-2005: (+) Vegetables, fruit, whole grains, low-fat milk (-) Total fat, SFA, cholesterol, sodium, sugar, alcohol	Overall, having a high (compared with low) diet quality was associated with a 25% lower risk of major weight gain (HR=0.75, 95% CI: 0.65 to 0.87) ↑ Adh DQI score (DQI higher than 70): 20-year weight change of +19.4kg for blacks and +11.2kg for whites vs. a drop in Adh DQI score (<50) of +17.8kg for blacks and +13.9kg for whites (P<0.05).	A 10-point ↑ in DQI score: 10% drop in risk of gaining 10kg in normal-weight whites, but a 15% rise in risk in obese blacks (P<0.001)
Other Scores					
Jacobs et al, 2008 Positive RCT	Initial N=219 Final N=187 Norway One year FFQ (180 items)	Mean: 45 years 100% Men BMI: 28.6±3.4kg/m ² Subjects with metabolic syndrome	<i>A priori</i> score A total of 35 food components**	Weight change: -3.5kg per 10-point change in diet score (P<0.0001)	Not reported