

Factors associated with a low adherence to a Mediterranean diet pattern in healthy Spanish women before pregnancy

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Abstract

Objective: To analyse the factors associated with the level of adherence to a Mediterranean dietary pattern in healthy Spanish women before pregnancy.

Design: A prospective series of 1175 women. An FFQ validated in Spanish populations served to collect dietary data. The Mediterranean Diet Adherence Index was used to assess the level of adherence to a Mediterranean diet pattern. Polytomic regression was performed to identify the associated factors.

Setting: Catchment area of Virgen de las Nieves University Hospital, Andalusia, Spain.

Subjects: The women were invited to participate in the study at the 20th–22nd gestational week. The selection criteria were: Spanish nationality, 18 years of age or older, singleton pregnancy and absence of health problems that required modifying the diet or physical activity.

Results: An inverse relationship was found between women's age and level of adherence to a Mediterranean diet pattern, with a clear dose–response association: a younger age entailed worse adherence ($P < 0.001$). The habit of smoking and sedentary lifestyle had a positive relationship with low adherence, giving OR = 5.36 (95% CI 1.91, 15.07) for women who smoked >20 cigarettes/d and OR = 2.07 (95% CI 1.34, 3.17) for sedentary women. Higher age, higher educational level, and higher social class of the women were associated with a higher level of adherence to the Mediterranean diet ($P < 0.001$).

Conclusions: In our sample population, younger age, lower social class, primary educational level and elements of an unhealthy lifestyle such as smoking and lack of exercise were associated with low adherence to a Mediterranean diet.

Keywords
Mediterranean diet
Childbearing women
Healthy lifestyle

The Mediterranean diet is the typical dietary pattern of the Mediterranean countries. The first reference to this type of diet as such was in 1938, when Leland Allbaugh studied the inhabitants of the island of Crete and their eating habits. Later, in 1957, Ancel Keys developed the concept of the Mediterranean diet in the Seven Countries Study^(1,2). In that study, Keys *et al.* analysed the relationship between deaths from CHD and serum cholesterol in fifteen populations in seven countries, at the individual level and for the population as a whole. The Mediterranean diet is characterized by daily consumption of fruit, vegetables, wholegrain cereals and pulses; a high consumption of MUFA, primarily from olive oil; moderate consumption of fresh fish and dairy products (especially cheese and low-fat dairy products), poultry and eggs; a moderate daily consumption of alcohol, normally red wine with

meals; and a low consumption in frequency and quantity of red meats and sausages^(3–6). The basic characteristics of this dietary pattern are common to all countries of the Mediterranean basin, despite certain variations.

Diet is known to be a major determinant of an individual's health status and inadequate eating habits (excessive, deficient or both) are associated with numerous pathologies that may have high mortality rates. At present, a number of benefits of the Mediterranean diet are acknowledged, specifically with regard to mortality from all causes^(7,8), CVD^(9–12), type 2 diabetes mellitus^(13–15) and obesity^(4,6), as well as some types of cancer including breast, endometrial, ovary and prostate cancer^(16–19), according to the results of many epidemiological studies and clinical trials. In addition, there are known benefits of the Mediterranean diet on pregnancy outcomes^(20–22).

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Nevertheless, this healthy dietary pattern is on the wane in Southern European countries. In the population of Spain, a decrease in adherence to the Mediterranean diet was corroborated using FAO food balance sheets for two periods, 1961–1965 and 2000–2003⁽²³⁾. This decrease is associated with a trend towards more sedentary or unhealthy lifestyles^(6,23,24). The decrease in adherence to the Mediterranean diet affects all age groups. One particularly important group is women of fertile age: first because of the impact of diet on the health of the woman, the pregnancy and the newborn; and second because women of this age are more prone to accept advice regarding their health^(25–28). This indeed points to a need to promote the Mediterranean diet among pregnant women and women of childbearing age. We surmise that identifying the factors associated with decreasing adherence to the Mediterranean diet would be key in developing programmes aimed at improving the level of adherence. No previous studies look at this particular aspect of healthy diet promotion. The aim of our study was therefore to analyse the factors associated with low adherence to a Mediterranean dietary pattern in healthy Spanish women before pregnancy.

Experimental methods

We conducted a prospective series of 1175 pregnant women in the catchment area of Virgen de las Nieves University Hospital of Granada (southern Spain). This regional hospital has three units: a General Hospital, a Hospital of Orthopaedic Surgery and Rehabilitation, and a Maternity Hospital; it provides coverage for the northern half of the province of Granada, Spain, with a population of 400 000 and approximately 4000 births per year⁽²⁹⁾.

The reference population consisted of all the healthy pregnant women living in this area and attending their 20th gestational week visit at the hospital during the recruitment period, from June 2004 to March 2007. According to the Andalusian Maternal and Neonatal Health Programme, apart from routine prenatal visits to the primary health-care centre, all pregnant women should attend a prenatal visit at the hospital around the 20th week of gestation for ultrasound examination. The study was conducted according to the guidelines laid down in the Declaration of Helsinki. Ethical approval was given to the study by the Ethics Committee of the University of Granada and Virgen de las Nieves Hospital. All women signed a written consent form before participating.

The selection criteria were as follows: singleton pregnancy, Spanish nationality, 18 years of age or older, absence of complicated pregnancies that required rest, and absence of metabolic, chronic or acute diseases that might limit daily activities. From the original set of women, one in every five was systematically recruited,

selected according to the order of their hospital visit for the ultrasound examination at week 20–22 of gestation, with a mean of 21.0 (SD 3.7) weeks. During the recruitment period a total of 1222 women were selected from the reference population, although finally 1175 women fulfilled inclusion criteria and chose to take part in the study.

All the pregnant women were contacted by two previously trained interviewers just before the ultrasound examination. After agreeing to participate, each woman was interviewed face to face and a structured questionnaire was used to collect the information. A pilot sample of fifty women (not included in the present study) had previously been interviewed during a 2-month period to train the interviewers and check the consistency of the information gathered.

Information about sociodemographic, obstetric and lifestyle variables (tobacco, diet, alcohol and physical activity) was collected. The information on diet was gathered by means of an FFQ that had previously been translated, adapted and validated in a sample of 147 Spanish women aged 18–64 years⁽³⁰⁾ and used in other studies in Spanish populations^(31–34). Participants were asked about the frequency and amount of intake of 118 types of food during the year previous to the pregnancy; the frequency of intake of these foods (with reference to a table of equivalent portions) was then recorded as daily, weekly or monthly.

Dietary pattern was assessed using the Mediterranean Diet Adherence Index developed by Serra-Majem *et al.*⁽³⁵⁾. This index is based on Spanish dietary guidelines and includes the usual intake of fifteen food groups: (i) Fresh fruit and fruit juice; (ii) Vegetables, tomato juice (*gazpacho*) and lettuce; (iii) Nuts and olives; (iv) Fish and pulses; (v) Yoghurts and cheeses; (vi) Wine and cava; (vii) Olive oil; (viii) Other oils; (ix) Bread, pasta and rice; (x) Wholegrain bread, pasta and rice; (xi) Meats, sausages and cold cuts; (xii) Potatoes; (xiii) Baked goods, cookies and sweets; (xiv) Salty snacks; and (xv) Alcoholic beverage consumption and frequency. Dietary variables were energy-adjusted before scoring by using the residuals from the regression of nutrients *v.* total energy intake (residual method)⁽³⁶⁾.

We calculated the mean intake per day for each food group. Ratings were assigned to each based on the tertile of consumption and on whether or not the group is considered characteristic of the Mediterranean diet. For the healthy food groups (items 1 to 7, 9, 10 and 12 of the index), the woman received 1 point if she was in tertile 1 (lowest consumption), 2 points for tertile 2 and 3 points for tertile 3 (highest consumption). The computation was inverted for non-healthy food groups. Accordingly, the maximum score was 45 points (the most beneficial effects). Recording by tertiles allowed us to distinguish between women with a low, mid or high level of adherence to the Mediterranean diet.

Our physical activity questionnaire was based on the Paffenberger Physical Activity Questionnaire⁽³⁷⁾, which identifies the type, frequency and duration of different physical activities during leisure time, household tasks and care-giving, occupational and other activities (watching television, using a computer, driving, sleeping, going out with family and friends). We focused on leisure-time physical activity before pregnancy, assigning each kind of activity reported in the questionnaire a specific intensity score (metabolic equivalent of task; MET) based on Ainsworth's Compendium of Physical Activity. This information was converted into MET hours per day (MET-h/d) scores⁽³⁸⁾, divided into tertiles, and graded as minimal physical activity (tertile 1), medium physical activity (tertile 2) and maximum physical activity (tertile 3).

Current smokers were defined as those who smoked at least one cigarette daily, and the following categories were established for smoking habit: 0 cigarette/d, ≤ 20 cigarettes/d and > 20 cigarettes/d. The educational level of the woman was registered as: primary academic level (8 years or less of basic education); secondary (4 years of secondary education); and university, undergraduate or graduate studies. Social class was classified based on the classification of the Working Group of the Spanish Society of Epidemiology from lowest (V) to highest (I): Class I (managerial and senior technical staff and freelance professionals); II (intermediate occupations and managers in commerce); III (skilled non-manual workers); IV (skilled manual workers); and V (unskilled manual workers)⁽³⁹⁾. We collected information about occupation for both members of the couples and the social class category was determined by the highest class declared by either one of them. Previous pregnancies and miscarriages were also registered. BMI was calculated as weight (in kilograms) just before pregnancy divided by the square of height (in metres). Both weight and height were obtained from medical records of the women if possible, and self-reported if not. Cut-offs set by the WHO were used to determine overweight and obese women⁽⁴⁰⁾. Women with BMI ≥ 30 kg/m² were classified as obese, and those with BMI from ≥ 25 kg/m² to < 30 kg/m² as overweight.

We calculated the mean and standard deviation for the quantitative variables of study. The absolute and relative frequency distributions were estimated for qualitative variables. ANOVA was performed to compare the mean energy and Mediterranean Diet Adherence Index score for each of the independent variables. Significance was set at $P < 0.05$. Crude and adjusted odds ratios and 95% confidence intervals were computed by models of polytomous regression to identify factors associated with low or mid level of adherence to a Mediterranean diet. Epidemiological and statistical criteria were used to model variable selection. High level of adherence to the Mediterranean diet was taken as the reference category

for dependent variables. Analyses were performed using the statistical software package SPSS version 15.

Results

During the period of recruitment, the 1222 women who met the selection criteria were invited to participate in the study. Of these women, thirteen chose not to participate (1.06%), and nineteen did not complete the interview face to face, or by telephone at a later attempt (1.55%). Some basic information was lacking in fifteen cases. Therefore, 1175 (96.2%) of the eligible women were included in the analysis.

Table 1 shows the Mediterranean Diet Adherence Index score and its distribution in terms of demographic, social and obstetric variables. The lowest and highest values recorded were 20 and 36 points, respectively (45 points being the maximum score possible), and the mean obtained was 28.2 (SD 3.2) points. Figure 1 shows the mean number of daily servings for each of the fifteen food groups established. It is seen that the healthy food groups predominating are vegetables, bread and fruit, although the mean number of daily servings did not meet dietary recommendations. The most frequent unhealthy food groups were meat and sweets. The main source of dietary fat was olive oil, with very low use of other fats (sunflower oil, butter). Moderate consumption of red wine with meals was a relevant finding.

Table 2 shows the main variables considered depending on the level of Mediterranean diet adherence divided into tertiles: low, middle and high adherence. Greater age, higher educational level and higher social class of the woman were associated with a higher level of adherence to the Mediterranean diet ($P < 0.001$). On the contrary, sedentary lifestyle and smoking were associated with a lower level of adherence ($P < 0.001$). This relationship remained after adjusting for potential confounding factors (Table 3).

A direct relationship was found between age and degree of adherence to the Mediterranean diet; it was observed that as age increased, pregnant females' adherence increased, and in turn, the younger the age, the worse the adherence ($P < 0.001$). Smoking habit and sedentary lifestyle had a positive relationship with low adherence. Women smoking > 20 cigarettes/d showed a low adherence to the Mediterranean diet 5.36 times more often than women who had never smoked, OR = 5.36 (95% 1.91, 15.07). The frequency of low adherence was double for women with minimal physical activity, OR = 2.07 (95% CI 1.34, 3.17). This relationship was also seen for middle adherence and sedentary lifestyle. BMI was not associated with adherence to the Mediterranean diet in either the crude or the adjusted analysis. Factors associated with middle adherence were similar, although the force of association was minor in both the crude and adjusted analyses.

Table 1 Mediterranean Diet Adherence Index score⁽³⁵⁾ and total energy intake before pregnancy among healthy Spanish women (*n* 1175), Virgen de las Nieves University Hospital of Granada, southern Spain, June 2004 to March 2007

	<i>n</i>	Mediterranean diet index score (points)					<i>P</i>	Total energy intake (kJ/d)					<i>P</i>
		Mean	SD	Median	Minimum	Maximum		Mean	SD	Median	Minimum	Maximum	
Age (years)							0.000						0.000
≥40	17	30.4	2.2	31	24	33		9853	2684	9294	6488	15 345	
35–39	199	29.4	3.0	29	21	36		9618	2584	9333	4746	19 696	
30–34	436	28.4	3.1	28	20	36		9610	2681	9257	3869	20 418	
25–29	345	28.7	3.1	28	20	36		10 185	2971	9752	4320	19 971	
<25	178	27.0	2.9	27	21	36		11 474	3397	10 994	5606	19 837	
Smoking							0.000						0.007
>20 cigarettes/d	31	26.3	3.0	26	22	34		10 818	3484	10 166	5768	19 837	
≤20 cigarettes/d	398	27.6	3.0	28	20	36		10 377	3164	9824	3869	19 808	
0 cigarettes/d	746	28.6	3.2	29	20	36		9868	2768	9454	4115	20 418	
Physical activity							0.000						0.927
Tertile 1	373	27.8	3.1	28	20	36		10 036	3008	9541	4320	19 837	
Tertile 2	405	27.9	3.1	28	21	36		10 048	2796	9635	4115	19 971	
Tertile 3	397	28.9	3.2	29	20	36		10 112	3018	9599	3869	20 418	
Academic level							0.000						0.000
Primary	478	27.7	3.1	28	20	36		10 829	3081	10 443	4200	19 971	
Secondary	339	28.2	3.1	28	20	36		9803	2603	9444	4465	20 418	
University	358	28.8	3.1	29	20	36		9295	2800	8930	3869	19 696	
BMI							0.207						0.619
Normal weight	789	28.1	3.1	28	21	36		10 092	2995	9612	3869	20 418	
Overweight	268	28.5	3.3	29	20	36		10 099	2862	9537	4746	19 808	
Obese	118	27.9	3.2	28	20	36		9815	2725	9562	4635	17 879	
Social class							0.000						0.000
Class I	172	28.5	3.1	28	20	36		9206	2722	8835	3869	19 685	
Class II	144	29.0	3.2	29	20	36		9657	2667	9100	4200	13 272	
Class III	346	28.3	3.0	28	21	36		9706	2728	9404	4465	19 837	
Class IV	496	27.8	3.2	28	20	36		10 702	3082	10 280	4707	20 419	
Class V	17	27.9	2.6	27	24	33		10 980	3213	9993	5560	18 293	
Previous pregnancies							0.000						0.161
0	555	27.8	3.1	28	20	36		10 028	3033	9547	3869	19 837	
1	365	28.5	3.3	29	20	36		9891	2710	9514	4115	20 418	
2	168	28.4	3.0	29	21	35		10 228	3027	9665	4882	19 971	
3	61	29.3	2.8	29	23	36		10 611	3042	10 093	5305	17 469	
≥4	26	28.8	2.6	29	25	34		10 990	2948	10 195	5576	17 614	
Miscarriage							0.006						0.486
0	933	28.0	3.1	28	20	36		10 015	2901	9548	3869	20 418	
1	199	28.7	3.3	29	20	36		10 234	3162	9634	4732	19 971	
≥2	43	29.1	2.9	29	23	36		10 387	2660	10 017	5305	17 615	
Total	1175	28.2	3.2	28	20	36		10 066	2937	9577	3869	20 418	

Discussion

Our results show that Mediterranean diet adherence was poor among childbearing women in the northern part of the province of Granada, Spain. Low Mediterranean diet adherence was more frequent in younger women, and it was associated with unhealthy practices such as smoking or physical inactivity, as well as with other possible determinants of health such as social class and educational level.

To our knowledge, the present study is the first one performed in Spain to assess the factors associated with adherence to the Mediterranean diet in healthy young women using the index developed by Serra-Majem *et al.*⁽³⁵⁾. While the benefits of good adherence to the Mediterranean diet are well known in the general population, it is important to stress its importance among healthy women of childbearing age^(3–19,41,42).

Although we worked with Spanish childbearing women, our results for the Mediterranean dietary pattern

are in line with those of observational studies in populations of different characteristics or for other healthy dietary patterns in Spain^(3,35,43–49) and Europe⁽⁵⁰⁾. We found a marked protector effect for age: as age increased, the probability of Mediterranean diet adherence increased. Dietary habits among healthy childbearing women are worsening, mainly among younger women. In Spain, consumption of fat, red meat, eggs and dairy products is on the rise, while intakes of cereals, vegetables, pulses, fruits and seafood have decreased, especially in the younger population. Andalusia is no exception to the trend affecting most developed countries.

Sedentary lifestyle^(47,48), smoking habit^(47,48,50), low educational level and social class^(3,42,51,52) and low adherence to the Mediterranean diet are factors that often accompany unhealthy lifestyles. The positive association we detected between physical activity and Mediterranean diet adherence is noteworthy in this context, suggesting that public health or preventive interventions must

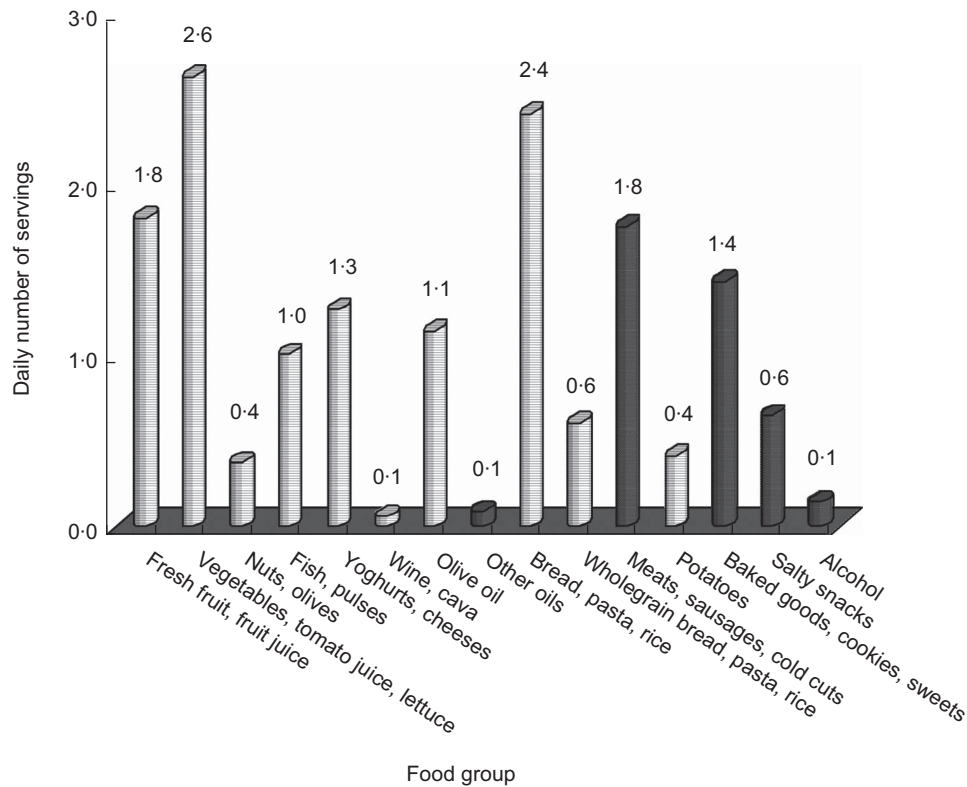


Fig. 1 Average daily number of servings of food groups (■, healthy food groups; ■, unhealthy food groups) of the Mediterranean Diet Adherence Index⁽³⁵⁾ before pregnancy among healthy Spanish women (*n* 1175), Virgen de las Nieves University Hospital of Granada, southern Spain, June 2004 to March 2007

address diet and physical activity in conjunction. Poor diet and sedentary lifestyle have been identified as the main risk factors for obesity and chronic diseases, the greatest health problems in our population^(53,54). Likewise, a number of previous studies show an association between smoking and unhealthy dietary pattern^(47,48,50), highlighting lower fruit and fresh vegetable intake.

We found no association between obesity and quality of the diet. Other authors underline this lack of association^(55,56), but in general it is assumed that the Mediterranean diet is associated with a lesser frequency of obesity^(4,6). This may be because trends in the overall population do not always appear at the individual level, as is the case in the association between diet and cholesterol levels⁽⁵⁷⁾, or there may be an information bias in the sense that overweight is associated with under-reporting of food intake. Such a bias is likely to be accentuated regarding unhealthy food intake, and must be acknowledged in view of our study design.

Finally, the association between lower socio-economic level, low adherence to a healthy diet and lower level of education (primary, secondary) supports previous findings: poor dietary habits, sedentary lifestyle and smoking are more common in lower socio-economic strata, reflecting considerable inequalities in the distribution of health determinants^(3,58,59).

As potential limitations of our study we should cite its observational nature, with dietary information recorded retrospectively (diet during the year previous to pregnancy self-reported at the 21st week of gestation). This would entail some memory bias, possibly strengthened by the social desirability of avoiding substantial intake of unhealthy foodstuffs. Such a bias would be differential, mostly affecting women with poor dietary habits, decreasing the variability of the sample and the probability of obtaining significant associations. On the other hand, we acknowledge that some confounding variables considered could be measured imperfectly and the likelihood of residual confounding cannot be ruled out. As advantages of our study we should underline that: (i) our sample is representative of all healthy women in the reference area of Virgen de las Nieves University Hospital (southern Spain), meaning that the results can be extrapolated to a greater population; (ii) questionnaires previously validated in Spanish populations were used to measure the physical activity⁽³⁷⁾ and food frequency⁽³⁰⁾; and (iii) trained interviewers collected the information. We opted to use a dietary quality index as a dependent variable for our study because we think it summarizes the quality of the diet better⁽²⁷⁾. Our understanding is that nutrition is derived from combinations of food and elements that interact^(45–47), and there is growing interest

Table 2 Sample description for each level of adherence to the Mediterranean diet before pregnancy among healthy Spanish women (*n* 1175), Virgen de las Nieves University Hospital of Granada, southern Spain, June 2004 to March 2007

	High adherence (<i>n</i> 397)		Middle adherence (<i>n</i> 476)		Low adherence (<i>n</i> 302)		Total (<i>n</i> 1175)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age (years)****								
<25	23	12.9	69	38.8	86	48.3	178	100
25–29	98	28.4	151	43.8	96	27.8	345	100
30–34	164	37.6	185	42.4	87	20.0	436	100
35–39	100	50.3	68	34.2	31	15.6	199	100
≥40	12	70.6	3	17.6	2	11.8	17	100
Smoking***								
0 cigarettes/d	290	38.9	294	39.4	162	21.7	746	100
≤20 cigarettes/d	101	25.4	175	44.0	122	30.7	398	100
>20 cigarettes/d	6	19.4	7	22.6	18	58.1	31	100
Physical activity (MET-h/d)***								
Tertile 1 (≤0.57)	97	26.0	169	45.3	107	28.7	373	100
Tertile 2 (0.58–2.19)	132	32.6	150	37.0	123	30.4	405	100
Tertile 3 (≥2.20)	168	42.3	157	39.5	72	18.1	397	100
Academic level***								
University	175	48.9	135	37.7	48	13.4	358	100
Secondary	108	31.9	148	43.7	83	24.5	339	100
Primary	114	23.8	193	40.4	171	35.8	478	100
BMI								
Normal weight	264	33.5	321	40.7	204	25.9	789	100
Overweight	96	35.8	109	40.7	63	23.5	268	100
Obese	37	31.4	46	39.0	35	29.7	118	100
Social class***								
Class I	85	49.4	70	40.7	17	9.9	172	100
Class II	61	42.8	60	41.7	23	16.0	144	100
Class III	124	35.8	133	38.4	89	25.7	346	100
Class IV	125	25.2	204	41.1	167	33.7	496	100
Class V	2	11.8	9	52.9	6	35.3	17	100
Previous pregnancies								
0	168	30.3	236	42.5	151	27.2	555	100
1	141	38.6	134	36.7	90	24.7	365	100
2	56	33.3	70	41.7	42	25.0	168	100
3	25	41.0	24	39.3	12	19.7	61	100
≥4	7	26.9	12	46.2	7	26.9	26	100
Miscarriage								
0	303	32.5	385	41.3	245	26.3	933	100
1	78	39.2	72	36.2	49	29.6	199	100
≥2	16	37.2	19	44.2	8	18.6	43	100

MET, metabolic equivalent of task.

Differences between low, middle and high adherence groups were significant: ****P* < 0.001.

†Minimum age 18 years, maximum age 45 years, arithmetic mean age 29.81 (sd 5.14) years.

in using dietary quality indices to evaluate whether adherence to a certain dietary pattern lowers the risk of disease.

On the other hand, the Mediterranean Diet Adherence Index used⁽³⁵⁾ is dependent on the mean intake of people in the sample, which impedes comparison with other populations. That is, women in the lower Mediterranean diet adherence tertile may show better Mediterranean diet adherence than other populations. Notwithstanding, dietary pattern must be appraised in a cultural context, planning health-care interventions in view of the population, tradition and the availability of certain foods.

The prevalence of sedentary lifestyle and low adherence to the Mediterranean diet in our study population was high, in particular in younger women. This suggests that Mediterranean diet adherence could be decreasing. Our results urge that measures be taken to promote

healthier lifestyles and that physical activity and nutritional education should be key components of maternal and child health-care programmes. In our particular setting, Andalusia, recommendations should be set forth to enhance awareness of healthy diet and lifestyle among childbearing women within the framework of a regional nutrition and health policy. Knowledge of the factors associated with low adherence to a Mediterranean diet is crucial for the design and implementation of health promotion and prevention programmes to improve the health status of the population in general, and childbearing women in particular. Modifying dietary habits is a socially and politically difficult task, calling for structural and individual interventions⁽³⁵⁾.

Childbearing women could be an excellent target group for intervention; such preventive action would have a dual effect, present and future, meaning better

Table 3 Factors associated with low and middle adherence to the Mediterranean diet before pregnancy among healthy Spanish women (*n* 1175), Virgen de las Nieves University Hospital of Granada, southern Spain, June 2004 to March 2007

	Low adherencet				Middle adherencet			
	Crude OR	95% CI	Adjusted OR‡	95% CI	Crude OR	95% CI	Adjusted OR‡	95% CI
Age (years)								
<25	Reference		Reference		Reference		Reference	
25–29	0.26*	0.15, 0.44	0.44*	0.24, 0.78	0.51*	0.30, 0.87	0.68	0.39, 1.19
30–34	0.14*	0.08, 0.24	0.31*	0.17, 0.56	0.37*	0.22, 0.63	0.58	0.33, 1.02
35–39	0.08*	0.04, 0.15	0.16*	0.08, 0.32	0.22*	0.12, 0.39	0.33*	0.18, 0.61
≥40	0.04*	0.00, 0.21	0.11*	0.02, 0.59	0.08*	0.02, 0.32	0.14*	0.03, 0.58
Smoking								
0 cigarettes/d	Reference		Reference		Reference		Reference	
≤20 cigarettes/d	2.16*	1.56, 2.99	1.62*	1.13, 2.31	1.70*	1.27, 2.29	1.48*	1.08, 2.02
>20 cigarettes/d	5.37*	2.09, 13.79	5.36*	1.91, 15.07	1.15	0.38, 3.46	1.13	0.36, 3.58
Physical activity (MET-h/d)								
Tertile 3	Reference		Reference		Reference		Reference	
Tertile 2	2.17*	1.50, 3.14	2.29*	1.53, 3.44	1.21	0.88, 1.67	1.21	0.87, 1.69
Tertile 1	2.57*	1.74, 3.80	2.07*	1.34, 3.17	1.86*	1.33, 2.59	1.64*	1.16, 2.32
Academic level								
University	Reference		Reference		Reference		Reference	
Secondary	2.80*	1.82, 4.30	1.59	0.97, 2.61	1.77*	1.27, 2.48	1.49*	1.01, 2.19
Primary	5.46*	3.67, 8.13	2.18*	1.30, 3.65	2.19*	1.59, 3.03	1.48	0.97, 2.25
BMI								
Obese	Reference		Reference		Reference		Reference	
Overweight	0.69	0.39, 1.21	0.67	0.36, 1.24	0.91	0.54, 1.52	0.94	0.55, 1.61
Normal weight	0.81	0.49, 1.34	1.00	0.58, 1.72	0.97	0.61, 1.55	1.10	0.67, 1.79
Social class								
Class V	Reference		Reference		Reference		Reference	
Class IV	0.44	0.08, 2.24	0.41	0.07, 2.18	0.36	0.07, 1.70	0.34	0.07, 1.63
Class III	0.23	0.04, 7.74	0.39	0.07, 2.13	0.23	0.05, 1.12	0.29	0.06, 1.44
Class II	0.12*	0.02, 0.66	0.28	0.04, 1.63	0.21	0.04, 1.05	0.31	0.06, 1.58
Class I	0.06*	0.01, 0.35	0.19	0.03, 1.14	0.18*	0.03, 0.87	0.33	0.06, 1.69
Energy intake§	0.99	0.97, 1.01	1.06*	1.03, 1.09	0.99	0.98, 1.01	1.03*	1.01, 1.06

MET, metabolic equivalent of task.

Association was significant: **P* < 0.05.

†Reference category: high adherence to the Mediterranean diet.

‡Adjusted for age, smoking status, physical activity and academic level.

§Energy intake was introduced as a continuous variable. The OR indicates the increase for each 418 kJ (100 kcal) increment in daily energy intake.

health for the mother in future pregnancies and for her offspring. The childbearing years can thus be seen as an ideal time to introduce some stimulus to modify behaviour in a positive way, taking advantage of the motivational factor^(25,60). In conclusion, despite the well-known benefits of the Mediterranean diet, certain factors are contributing to its demise. To design adequate interventions in the future, we must take into account that younger age, low social class, primary educational level and the presence of unhealthy lifestyles, including smoking and lack of physical activity, are associated with low adherence to the Mediterranean diet.

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J.G.F and C.A.P collected the information, analysed the data and wrote the first draft of the manuscript. J.M.M. and A.B.-C. participated in the design of the study and critically reviewed the manuscript. J.J.J.-M. coordinated the study and is the main author responsible for the study design and drafting of the manuscript. All authors have seen and approved the content and contributed to the work. *Acknowledgements:* The authors thank Jean Sanders for improving the use of English in the manuscript.

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