diabetes has been observed both in Europe and elsewhere.[4] Our study period of 11 years was too short to provide an accurate analysis of any time trend in incidence. In fact, there seemed to be a non-linear, epidemic type variation, with a possible outbreak in 1985 and around the year 1991. It has recently been pointed out that IDDM is a rather atypical chronic disease in that its "epidemics" are evident and relatively common.[5]

In our study a typical seasonal variation in incidence was established.

Since the pathological process leading to IDDM may start years before the clinical onset, the epidemic variation, as well as the seasonal one, probably reflects the activity of triggering factors rather than aetiological factors.

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Alcohol consumption and obesity in the adult population of Spain

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Although diverse research has shown that alcoholics tend to have lower body weights, the relationship between alcohol consumption and adiposity in the general population has not been well established: studies have yielded varied and inconsistent results, reporting positive, negative, or no clear associations.[1] We examined the relationship between regular drinking, including the consumption of different kinds of alcohol, and obesity in the Mediterranean population of Spain.

Methods: We studied 10 645 men and 11 193 women aged 20–64 years interviewed in the Spanish national health survey carried out in 1987.[2] Obesity was determined by calculating the Quetelet index (QI) (defined as weight (kg)/height (m^2)) using self reported weight and height. Subjects were considered obese if their QI was $\geqslant$85th centile for age group and gender.

Alcohol consumption was measured by a quantity-frequency index adapted to the pattern of alcoholic beverage consumption in Spain. Information was gathered on the usual frequency of consumption and the quantity consumed for each type of beverage studied during the year before the interview. Subjects were classified by alcohol consumption in accordance with previous studies.[3] The proportions in each drinking category were: 36·9% non-drinkers, 49·5% moderate drinkers, 6·9% heavy drinkers, and 4·9% excessive drinkers. To measure the association between alcohol consumption and obesity, we calculated the odds ratios (OR) for men and women using non-conditional logistic regression.[4] Several variables were taken into account because of their potential confounding effect: age, education, size of community, smoking, leisure time physical activity, consumption of any medication for hypertension and heart conditions over the previous two weeks, and, current weight loss diet or any other special diet. We checked for the presence of a dose-response relationship by carrying out a weighted linear regression analysis of the ORs.

Results: The crude and adjusted ORs for obesity for different types of alcoholic drinks and at different levels of consumption in Spanish men and women are shown in the table. For total alcohol intake, the adjusted OR in men increases between occasional drinkers and excessive drinkers, from 0·92 to 1·17. This positive tendency was statistically significant ($p=0·011$). In women, the observed effect was just the reverse, ORs <1 that decreased significantly as the amount of alcohol consumption rose were seen. This trend was also statistically significant ($p<0·001$).

With regard to wine, the ORs tend to be >1, especially in heavy and excessive drinkers, suggesting a positive association. The most important association for wine consumption and obesity was observed in women; their adjusted OR was substantial (1·75) in excessive drinkers and statistically significant in heavy drinkers (1·46, 95% CI = 1·05, 2·03) who showed a dose-response relationship that was close to statistical significance ($p=0·066$).

Discussion: This paper describes the relationship between regular alcohol consumption and obesity in the Spanish population. Findings for men and women are opposed – that is, there is a weak positive association in men and a weak negative association in women. Other studies on the same subject have provided similar results.[5] The negative relationship detected in women is one of

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Crude and adjusted odds ratios (OR) along with their respective 95% confidence intervals (CI) for obesity among men and women at different levels of beer, wine, spirits, and total alcohol intake.

	Men				*Women*			
	OR	*(CI 95%)*	*Adj OR**	*(CI 95%)*	*OR*	*(CI 95%)*	*Adj OR**	*(CI 95%)*
Beer								
Non-drinker	1†		1†		1†		1†	
Moderate drinker	0·96	0·84,1·10	0·97	0·80,1·18	0·84	0·84,1·10	0·99	0·83,1·19
Heavy drinker	1·03	0·88,1·21	0·94	0·75,1·18	0·57	0·88,1·21	0·80	0·54,1·18
Excessive drinker	1·02	0·77,1·35	0·86	0·61,1·23	0·92	0·77,1·35	1·73	0·75,4·00
Two side p value for linear trend‡	0·279		0·211		0·483		0·989	
Wine								
Non-drinker	1†		1†		1†		1†	
Moderate drinker	0·92	0·80,1·05	0·96	0·81,1·13	0·80	0·71,0·90	1·01	0·84,1·21
Heavy drinker	1·10	0·94,1·30	1·07	0·87,1·32	1·02	0·78,1·34	1·46	1·05,2·03
Excessive drinker	1·22	1·00,1·50	1·06	0·78,1·43	1·02	0·62,1·67	1·75	0·96,3·20
Two side p value for linear trend‡	0·069		0·308		0·222		0·066	
Spirits								
Non-drinker	1†		1†		1†		1†	
Moderate drinker	0·95	0·84,1·08	1·01	0·87,1·17	0·70	0·60,0·82	0·89	0·74,1·07
Heavy drinker	1·14	0·95,1·37	1·10	0·87,1·39	0·54	0·25,1·18	0·78	0·32,1·87
Excessive drinker	1·29	0·93,1·79	1·18	0·79,1·77	1·13	0·47,2·71	1·15	0·36,3·74
Two side p value for linear trend‡	0·043		0·022		0·724		0·759	
Total alcohol								
Non-drinker	1†		1†		1†		1†	
Occasional drinker	0·91	0·67,1·23	0·92	0·66,1·28	0·89	0·76,1·05	0·96	0·81,1·15
Moderate drinker	0·96	0·81,1·13	1·03	0·86,1·23	0·74	0·66,0·84	0·89	0·78,1·02
Heavy drinker	1·08	0·87,1·33	1·11	0·88,1·40	0·64	0·38,1·07	0·81	0·47,1·42
Excessive drinker	1·24	1·00,1·55	1·17	0·91,1·51	0·61	0·28,1·33	0·74	0·33,1·66
Two side p value for linear trend‡	0·020		0·011		0·027		<0·001	

* Odds ratio adjusted by non-conditional logistic regression controlling for age, education, size of community, smoking, leisure time physical activity, consumption of medication for hypertension, heart conditions, weight loss and other diets.
† Reference category.
‡ Two side p-value for linear trend of the odds ratios for obesity and the level of alcohol and alcoholic beverages consumption.

the most consistent findings in the numerous studies in the field.[1]

When interpreting these data, various aspects of the methodology should be taken into account. Self reported measurements of height and weight may have biased the results. However, the resulting misclassification is moderate, according to estimates of sensitivity and specificity of obesity determined via self reported height and weight.[6] Moreover, the cross sectional study design may have influenced the results, given a possible self selection bias on the part of drinkers. Although it was not possible to control for all relevant predictors of obesity, the results present a sufficiently valid description of the association between alcohol consumption and obesity in this population.

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