Prevalence, risk factors, and impact of knee pain suggesting osteoarthritis in Spain

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Abstract

Objective

To estimate the point prevalence of knee pain suggesting osteoarthritis (OA) in the adult Spanish population. Secondary objectives were to examine the distribution of associated factors, as well as to assess the impact of knee pain on quality of life and function in the general population.

Methods

A population survey was conducted in year 2000 for which 2,192 subjects over 20 years of age were selected by stratified polystage cluster sampling from the censuses of 20 towns. Trained rheumatologists administered structured interviews that permitted them to rule out the presence of rheumatic symptoms, and which included validated instruments to measure function and quality of life. We used the definition of clinical symptomatic knee OA of the American College of Rheumatology.

Results

The estimated prevalence of knee pain suggesting OA in the general adult population is 10.2% (95% confidence interval: 7.9-12.5). Elderly women with fewer studies and from the lower social class, as well as those subjects involved in physically demanding jobs are more frequently affected. Obesity is also an important determinant for knee pain suggesting OA. Knee pain is associated to a significant decrease in functional ability and quality of life, even after adjustment for age, sex, and comorbidity.

Conclusions

The prevalence of knee pain suggesting OA in the general Spanish population is higher than expected, mainly related to a high rate of knee pain in women over 55. The proportion of very old persons and of those obese are important factors to take into account when comparing the rate of knee OA between populations.

Key words
Osteoarthritis, knee, epidemiology, prevalence.

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**A list of the group members appears in an Appendix.*

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Introduction

Osteoarthritis (OA) is one of the leading causes of disability in the elderly of the developed world. The epidemiological study of OA is complex, as prevalence varies greatly depending on the location of OA, the definition criteria utilized, and the sample selection. Studies from many countries have estimated the prevalence of OA at several body sites by radiographic criteria (1). However, a radiographic definition of OA for epidemiological purposes may magnify the problem, since there is an uncoupling between radiological and clinical findings in OA (2). In this way, many patients presenting with intense pain and disability may hardly show any finding in plain x-ray, while others with clear signs of joint derangement on radiology, may have few or no symptoms (3, 4). The strongest determinant for knee replacement, a highly meaningful outcome for Public Health, is the degree to which pain and disability affect the lives of patients, and not merely the radiographic status of the knee (5). However, few studies focus on the prevalence of symptomatic knee OA, for which valid classification criteria exist (6, 7).

Known risk factors for radiographic knee OA include age, female gender, obesity, and joint overuse (8, 9). There may also be some genetic and nutritional determinants for generalized OA (10, 11). However, the association of these risk factors with the presence of symptomatic OA, not only with radiographic OA, has been less studied.

The Spanish Society of Rheumatology saw the need for a comprehensive study on the burden of selected musculoskeletal conditions in the adult general population. The EPISER study was carried out under the spirit of the Bone and Joint Decade, and its major strength relies on the unbiased sampling of the participants, a highly representative sample of the general population.

Subjects and methods

The sample in the EPISER study was selected at random from 20 city censuses in sex and age strata that were proportional to those of the general Spanish population. The selection of cities and towns was made by polystage cluster sampling with the following sampling scheme. The territory of Spain was divided into 8 homogeneous strata of known population. Each stratum consisted of at least four Spanish provinces with geographical and historical bounds – the Canary Islands, located too far from any peninsular region, were included in the less inhabited stratum. Two to three provinces were randomly selected within each stratum, as well as one city or village within each province, up to a total of 20 towns. Figure 1 shows the actual places from where the sample was drawn. The selection process observed the proportion rural/urban 25:75 present in Spain, considering a city as having over 10,000 inhabitants.

Large health surveys are infrequent in our environment. Besides, EPISER involved the healthy population moving to a health service facility in order to complete the interview and the examinations. For these reasons, most of the study resources were directed towards achieving an acceptable participation rate. Recruitment strategies included up to three consecutive letters (a first one informing about the survey, a second one to set an appointment, and a third one used as a recall a week before the interview), news at local newspapers, television, and radio, telephone calls, and locally oriented approaches. Twenty-one regionally based rheumatologists were instructed by a social psychologist and by an epidemiologist in recruitment strategies and were responsible for the complete process. All interviewers successfully passed a standardization course, a pilot study, and in-site audits.

The interviews were performed at available local Primary Care facilities, after permission was provided from local authorities. The interview was structured as follows. The subjects were first asked about their current health status, by questions on chronic diseases and on current medications, and then completed the Spanish validated version of the SF-12 questionnaire (12). The SF-12 evaluates health related quality of life (HRQoL) and produces two scores, physical and mental, that represent the two main aspects of HRQoL, both

ranging from 0 to 100, from worst to best (12, 13). The subsequent questions inquired about rheumatic symptoms and about functional ability by means of the Spanish validated version of the Health Assessment Questionnaire (HAQ)(14). The HAQ was created as a generic instrument to measure physical ability and function in a semi-continuous score from 0 to 3, representing "no disability" to "complete disability". At present, the HAQ is mainly used in rheumatoid arthritis, although it may be used to examine function in any musculoskeletal disease (14-17). The last part of the interview inquired about women issues, such as menopause and whether menses were regular, and also about bone fractures after the age of 45 and site of previous fractures, social class, educational level, and physical demand of daily activities. All subjects with positive screenings of rheumatic diseases underwent a standardized physical examination aimed to confirm classification criteria. A complete interview plus the examinations took from 20 minutes to an hour, as measured specifically in the pilot study. Those subjects not willing to participate in the survey in its complete form were asked a short questionnaire over the phone to assess differences with participants.

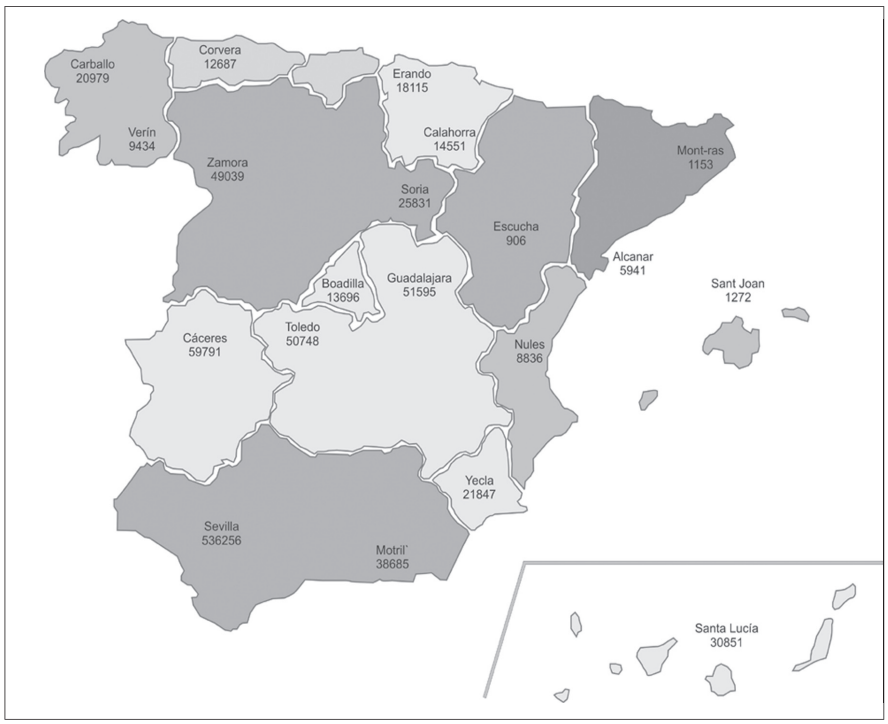

Fig. 1. Map of Spain with sites selected in EPISER. Each area in the same color represents a stratum. Under the name of the city or village selected, the number of eligible members of the population (over 20 years of age) is displayed.

Case definition and variables

The American College of Rheumatology (ACR) has a definition of knee OA by Clinical Criteria (6) which was used in our survey for the ascertainment of cases. A person was thus classified as having knee pain suggesting OA if he answered affirmatively to "Have you had pain on either knee for most of the time in the previous month?" and also presented four or more of the following criteria: 1) age over 50, 2) morning stiffness shorter than 30 minutes, 3) knee crepitus on active joint motion, 4) pain when making pressure at bony margins of the joint, 5) bony joint enlargement, and 6) absence of clear signs of inflammation. These ACR clinical criteria have previously shown good operational properties, with a sensitivity of 84% and a specificity of 89% for identifying OA (6).

The type of job was selected from the National Catalogue of Occupations (18). Obesity was defined by the WHO/NIH criteria, as a body mass index greater than 29 kg/m^2 (19). The social class was assigned depending on the main occupation of the respondent, as indicated by the Spanish Society of Epidemiology (20).

Statistical issues

Predetermined sample size (2,998) allowed an estimation of the prevalence of OA if around or over 8% ± 2% (alpha error 0.05, beta error 0.20) and took into account both an expected "no response" of 30% and a design effect of 20%. Sampling was done without replacement. Prevalence estimates with 95% confidence intervals (CI) accounted for the design effect, as they were obtained with the *survey* commands in Stata (21) adjusting the CI by the stratum, by the primary sampling unit (city census), and by a weight obtained from the probability of each subject of being selected. There is no need to standardize the prevalence by sex and age, as the distribution of these characteristics was purposely proportional to the existing ones in the general population. The association of variables with prevalent knee pain suggesting OA was tested by the *Chi*-square test in contingency tables and measured by odds ratios obtained from multivariate logistic regression models in order to control for confounders. The effect of having knee pain suggesting OA on function (HAQ score) and on HRQoL (SF-12 score) was tested by the Student's *t* test (bivariate) as well as by multiple lineal regression models to adjust for covariates.

The study was reviewed and approved by the Ethical Committee of the Principal Investigator (Hospital de la Princesa), and the dataset used for the random sampling and for the location of participants was registered at the Official Agency for Data Protection, according to Spanish regulations.

Results

Recruitment

A total of 2,998 informative letters were sent to the selected subjects, from an eligible population of 972,545 (the complete adult population of the 20 sites). A complete interview was possible in 2,192 subjects (73% response rate). Participation was poorer among men and

among subjects who were 70 years old or older and was higher in villages than in cities (response rate 83.8% versus 69.7%), although the composition of the final sample was very representative of the Spanish general population (See Table I). The main obstacles to a complete recruitment were, above all, errors in census data, which were confirmed in 203 cases and suspected in another 390, as the localization of these latter subjects was unsuccessful after repeated attempts via letters or telephone calls. Only (213) 7% rejected to participate after contact (Fig. 2). The short questionnaire made to these latter over the phone revealed that neither sex, nor age, nor study level, nor self-perceived general health, nor employment status were significantly different in subjects who rejected participation compared to those who agreed to participate in the survey. The only significant difference was that 96.5% of these 213 persons lived in large cities compared to 72.3% of the participants. A detailed description of the participants is shown in Table I.

Table I. Description of the participants in the EPISER study and of the general Spanish population.

	EPISER		Spanish Population (over 20 years of age)	
Variable	n=2,192		n=31,003,000	
	n	%	n	%
Women	1,178	53.7	16,068,178	51.12
Persons by age group (>20)				
20-29	463	21.1	6,449,463	20.8
30-39	439	20.0	6,293,439	20.3
40-49	371	16.9	5,271,371	17.0
50-59	326	14.9	4,433,326	14.3
60-69	313	14.3	3,937,313	12.7
70-79	205	9.4	3,100,205	10.0
> = 80	75	3.4	1,488,075	4.8
Persons living in cities	1,584	72.3	22,943,584	74.0
Persons by study level				
No studies	271	12.4	4,588,271	14.8
Primary studies	953	43.7	14,230,953	45.9
Secondary studies	398	18.2	4,805,398	15.5
Higher studies	560	25.6	6,479,627	20.9
Persons by type of job				
Agriculture	193	12.0	4,166,803	8.4
Industries	344	21.4	6,262,606	20.2
Construction	107	6.7	3,007,291	9.7
Services	964	60.0	1,912,885	61.7
Persons by social class				
Low	588	26.8	(not comparable data)	
Medium	778	35.5		
High	237	10.8		
Unspecified	589	26.9		
Working status				
Employed	1,132	51.6	12,959,254	41.8
Unemployed	74	3.4	2,790,270	9.0†
Students	107	4.9	1,581,153	5.1‡
Retired	483	22.0	(undetermined)	
Housewives	60	2.7		
Disabled	107	4.9		
Others or unspecified	15	0.7		

*Data from the Institute of National Statistics, 1999 or 1997(18)
†The difference could be explained in that many of the people studying in Spain sign up at the employment offices as "without a job", while in EPISER, a person who was studying could not register as "unemployed".
‡Obtained from dividing the number of students registered at universities and professional schools by the number of persons over 20.

Prevalence estimates

A total of 310 (14.1%) interviewed subjects referred having knee pain on prevalence day. Of these, 205 (66.1%) were classified as knee pain suggesting OA after applying the ACR clinical criteria (See Table II to know the frequency of each criteria among subjects with knee pain). Eighteen additional cases did not have pain on interview day, but had presented it for the most part of the previous month and fulfilled the rest of the clinical criteria, being classified as knee OA as well. The estimated prevalence of knee pain suggesting OA in the general Spanish adult population is 10.2% (95% CI: 7.9-12.5). Table III shows the distribution of knee pain suggesting OA by sex and age group. As previously reported, knee pain suggesting OA is more frequent in women and older age groups (p<0.001), with a prevalence peak of 33.7% in the 70-79 age interval. There is a lower rate of reported symptoms in the age group over 80, compared to the slightly younger groups (See Table III). No subject referred specifically as having been previously diagnosed of knee OA, as OA is not a common language term in Spain, nor it is reinforced its use by general physicians. Subjects referred to the diagnosis of any rheumatic problem as the wider term "rheumatism" ("*reuma*").

OA determinants

Knee pain suggesting OA appears more frequently in women, in the elderly, in people with less than 8 years of formal education, in subjects from a low social class, in obese, and in those with physically demanding jobs. Table IV shows the odds ratios of having knee pain suggesting OA depending on several sociodemographic variables, before and after controlling for the rest of the variables in a logistic regression model. Most of the associations that appeared in the bivariate analysis (column 2 in Table IV) could be explained by the sex and the age of the subjects, as it was confirmed by the logistic regression analysis (column 3 in Table IV), except for the association of knee pain suggesting OA with obesity. Obesity remained as a strong associated factor even after adjustment. There was a modest association between living

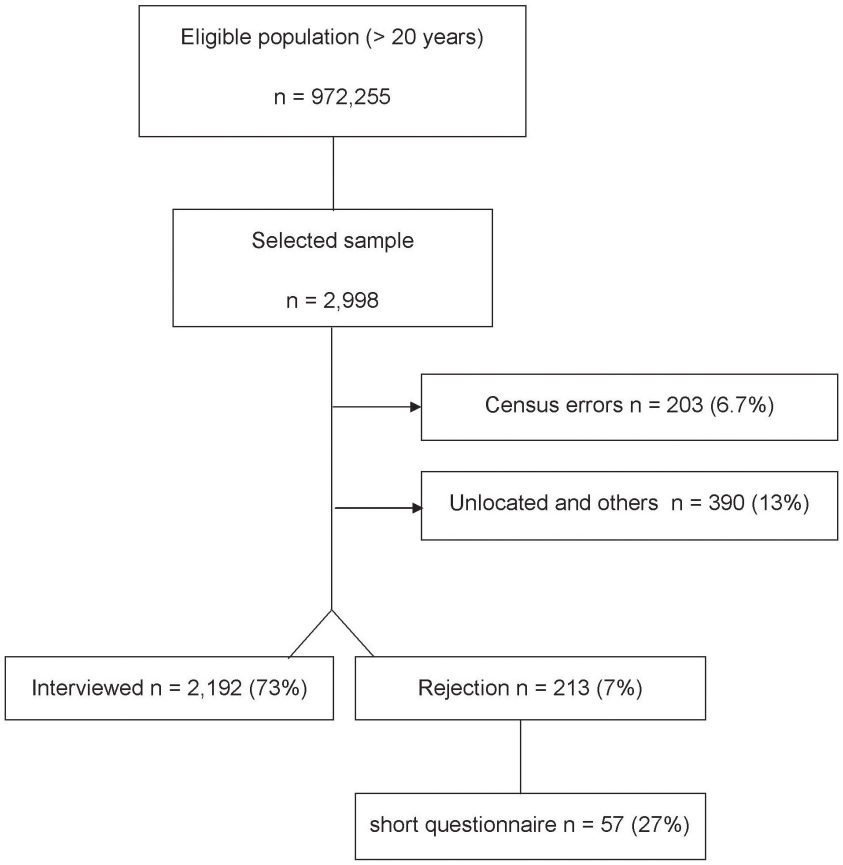

Fig. 2. Recruitment outcome and response rate to the EPISER Health Survey.

Table II. Prevalence of knee pain in the general population and prevalence, among persons with knee pain, of individual criteria from the American College of Rheumatology Classification Criteria for Knee Osteoarthritis (6).

	n	Percentage and 95% confidence interval
Pain criteria*		
Knee pain (*as of prevalence or in previous month*)	310	14.1 (12.7-15.6)
Knee pain (*prevalence day*)	284	13.0 (10.3-15.6)
Rest of criteria†		
Age over 50	228	73.5 (68.6-78.5)
Morning stiffness less than 30 minutes	173	60.9 (55.2-66.6)
Crepitus on active joint motion	200	74.4 (65.1-75.8)
Bony tenderness	137	48.2 (42.4-54.1)
Bony joint enlargement	131	46.1 (40.3-51.9)
Absence of clear signs of inflammation	215	75.7 (70.7-80.7)

*Estimate in the general population.
†Estimate in the population with knee pain.

in an urban residence and having knee pain suggesting OA, which appeared only once the rest of variables had been adjusted for, not in the bivariate analysis. Although the type of job that the subject had performed for most of his life or was currently performing was associated to knee pain suggesting OA in the bivariate analysis, this could not be confirmed after adjustment.

Disability

The percentage of people receiving disability compensations among those with knee pain suggesting OA was 5% (12/223). The estimated mean HAQ score in the general population of Spain is 0.22 (95% CI: 0.19-0.25). The mean HAQ score of the 223 persons with knee pain suggesting OA was 0.65 (95% CI: 0.54-0.76), and it was significantly worse than the HAQ of persons without knee pain. After adjustment for covariates that interfere with HAQ – these are age, sex, educational level, and the presence of comorbidities – as well as for the sampling scheme, in a multiple regression model, the mean HAQ score of the persons with knee pain suggesting OA was still significantly higher than those without (0.45 [95% CI: 0.36-0.55] *vs*. 0.24 [95% CI: 0.21-0.27]; $p<0.001$). Regarding specific items of the HAQ, 30% of the persons with knee pain suggesting OA reported high difficulty or inability to climb up five steps. The same percentage of participants with knee pain suggesting OA found very difficult or impossible to reach up things from the floor. Table V shows the proportion of people older than 50 years, by levels of disability. Most people in this age group without knee pain suggesting OA (67.4%) show HAQ scores under 0.5. On the contrary, most people in this age group with knee pain suggesting OA (72.0%) show HAQ scores over 0.5.

Quality of life

Over two thirds of the persons classified as having knee pain suggesting OA reported a poor or just fair general health status (66.8%), versus only 22.9% in the rest of the sample. The unadjusted mean SF-12 physical score of the persons with knee pain suggesting OA was 38.7 (95% CI: 35.34-42.17), significantly worse (25% less) than the mean score of the persons without knee pain suggesting OA, 51.5 (95% CI: 50.49-52.45). The difference between the scores in the mental component of the SF-12 was smaller, 8% (46.1 [95% CI: 43.39-48.76] *vs*. 50.1 [95% CI: 48.82-51.33]; $p<0.05$) (see Table VI). After adjustment for age, sex, educational level, and the presence of non-rheumatic comorbidities, the reduction in the scores remained statistically significant in the physical subscale (mean 42.19 [95% CI: 38.90-45.47] *vs*. 51.06 [95% CI: 50.0-52.12]; $p<0.01$), but not in the mental subscale (mean 47.75 [95% CI: 45.55-49.96] *vs*. 49.89 [95% CI: 48.54-51.24]; $p=0.08$). Stratifying by age over 50, the differences in HRQoL remain statistically significant (Table VI). Adjusting

Table III. Absolute and relative frequency of knee pain suggesting osteoarthritis in the general adult population of Spain, by age and sex group.

	Men		Women		Total	
Age interval	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)
20-29	-	-	2	0.9 (0.0-2.3)	2	0.6 (0.0-1.4)
30-39	2	1.0 (0.0-2.3)	1	0.4 (0.0-1.4)	3	0.7 (0.0-1.4)
40-49	4	2.4 (0.1-4.6)	9	4.4 (1.5-7.3)	13	3.5 (1.5-5.5)
50-59	8	5.5 (0.8-10.1)	24	13.3 (6.8-19.8)	32	9.8 (4.8-14.9)
60-69	27	18.1 (7.6-18.7)	61	37.2 (27.6-46.8)	88	28.1 (19.2-37.1)
70-79	13	16.7 (7.0-25.9)	56	44.1 (35.9-52.3)	69	33.7 (27.2-40.3)
80+	4	14.3 (2.7-26.0)	12	25.5 (13.9-37.2)	16	21.3 (12.1-30.5)
Total*	58	5.8 (3.5-9.1)	165	14.0 (11.7-16.3)	223	10.2 (7.9-12.5)

Table IV. Determinants of knee pain suggesting osteoarthritis, before and after adjustment by confounders.

	OR (95%CI)	
Variable	before adjustment	after adjustment
Female sex	2.64 (1.93-3.60)†	2.14 (1.41-3.26)†
Age over 50	18.95 (11.74-30.59)*	10.71 (5.94-19.30)†
Urban residence	0.88 (0.64-1.20)	1.74 (1.09-2.77)*
Primary school or less	6.88 (4.52-10.45)†	1.61 (0.88-2.94)
Physically demanding jobs	3.18 (2.11-4.79)†	1.55 (0.92-2.60)
Farmers	2.92 (1.94-4.40)†	1.21 (0.74-1.96)
Low social class	2.72 (1.92-3.83)†	1.20 (0.77-1.84)
Obesity	3.46 (2.59-4.62)†	2.18 (1.47-3.24)*
Non rheumatic comorbidities	4.29 (3.04-6.05)†	1.35 (0.86-2.11)

*p<0.001
†p<0.05

Table V. Proportion of persons older than 50 years with and without knee pain suggesting osteoarthritis, by levels of disability, expressed as intervals in HAQ scores.

	Persons >50 without knee OA (n=714)			Persons >50 with knee OA* (n=205)		
HAQ score	n	%	Cumulative %	n	%	Cumulative %
Over 2.5	15	2.10	2.10	1	0.49	0.49
Between 1.5-2.5	22	3.08	5.18	21	10.24	10.73
Between 05.-1.5	196	27.45	32.63	127	61.95	72.05
Below 0.5	481	67.37	100.00	56	27.32	100.00

*All differences reach a p<0.001

Table VI. Mean and 95% confidence interval of the SF-12 score, components physical and mental, in persons with and without knee pain suggesting osteoarthritis (OA). Stratification by age over 50.

	All persons		Persons over 50	
	Knee OA (n=218)	No Knee OA (n=1,935)	Knee OA (n=199)	No Knee OA (n=704)
SF 12 physical	38.7 (35.3-42.2)	51.5 (50.5-52.5)*	38.5 (36.9-40.1)	48.8 (48.1-49.5)*
SF 12 Mental	46.1 (43.4-48.8)	50.1 (48.8-51.3)*	46.1 (44.5-47.1)	49.4 (48.6-50.2)*

*p<0.001

not only by age, but also by sex, social class and comorbidity, HRQoL remains statistically poorer in persons with knee pain suggesting OA *vs*. persons without, but only in the physical component of the SF-12.

Discussion

One of the strongest points of the EPISER survey is the representativeness of the sample drawn. The sampling sites were randomly selected and located all over the geography of Spain, and the sample was extracted directly from city censuses without replacement. The persons interviewed do not differ soundly from those of the general population, as shown by the comparison of the EPISER sample to National Statistics (22), and were selected in age and sex strata proportional to the Spanish general population, what makes results adjusted to age and sex without the need of standardization.

Comparison of the prevalence of OA between studies is difficult, mainly due to different case definitions and also to the different age distribution of the study participants (23). Most of the studies that estimate the prevalence of OA use radiographic rather than clinical criteria and draw samples of elderly participants. Among the studies that have estimated the prevalence of knee pain suggesting OA, the EPISER study has the highest estimate, 10%, versus the 2 to 6% in the Framingham OA study (24), 6.6% in Greece (25), or 5.4% in a recent Italian study (26).

The use of clinical and not radiographic criteria for the definition of knee OA in the EPISER study was justified, in part, by the geographic scope of the survey, which covered some districts with no easy access to x-ray facilities. It would have been of interest to know the percentage of persons with radiographic knee OA who actually have symptoms in our setting. In other populations, symptoms appear in about 30% of the people with radiographic OA (27). If this were true for the Spanish population and extrapolating from our results, the prevalence of radiographic knee OA would be around 34% of the population above 20 years of age, higher than the prevalence shown in previous studies.

In Framingham, the prevalence of radiographic knee OA in persons older than 60 years was around 34% and 31% in women and men, respectively. In this latter age group, in EPISER, the prevalence of knee pain suggesting OA was 38.2% in women and 17.5% in men, a threefold prevalence in women with respect to men and much higher than expected.

Despite OA symptoms may wear and tear with time, and also despite other conditions different from knee OA may present with knee pain, still the point prevalence of symptomatic OA that is, by the ACR clinical criteria – or knee pain suggesting OA, as we have referred to throughout the text – remains a good surrogate of what the real burden of knee OA might be. As a matter of fact, and from the Public Health point of view, the relevant measure is the point prevalence of symptomatic OA, and not the point prevalence of radiographic OA. It is symptoms what drives persons with knee OA to use health resources (physicians visits, antiinflammatory drugs, and knee replacement surgery), and not the x-ray changes. The annual rate of total knee replacements in Spain, estimated from the National Health System Database of Hospital Discharges (CMBD,1997), is 105 per 100,000 women and 30 per 100,000 men (28), a very high rate that is in accordance with the results obtained from the EPISER study.

A few authors even go further than us and advocate knee pain, not OA, as the relevant outcome in Public Health (29-31). Of note, the proportion of women over 55 with knee pain in EPISER is much higher than in previous knee pain studies: 37.2% in EPISER versus 27.6% in a knee pain study at Bristol (30), and 22.3% in the Rotterdam study (27), results which underscore the high prevalence that we have found in Spain.

Some authors are skeptical about ACR clinical criteria for knee OA, because of their low sensitivity, which would lead to low prevalence estimates (32), which is not truly the case in our study. Furthermore, two studies have shown a good interrater agreement for these criteria (33) and an important association of knee pain with the presence of definite OA (34), what reinforces the utility of clinical criteria in epidemiological studies. In EPISER, we did not find clear differences between prevalence rates by observer, except for a higher prevalence found in the Canary Islands (20.6%). If the Canary Islands were deleted from the study, the prevalence would still be high, 9.4%. A local study is being undertaken at this moment in this geographic area to confirm the unexpected high results.

The high prevalence of OA obtained in EPISER, is in consonance with previous Spanish cross-sectional studies. In 1990, Ballina *et al*., in a representative sample of 702 adult Asturians, found a prevalence of rheumatic symptoms in the knee of 15.8% (95% CI: 13.6-18.2), close to the 14% obtained in EPISER, and a prevalence of OA in any location of 23.8% (35). Previously, in the 70s, Paulino *et al*., in an unselected sample of 825 people, aged 10 and over, from a small village in La Mancha, found a prevalence of peripheral OA of 7.5%, and an interesting 8.5% of radiographic OA at any location without any clinical manifestation (36). These estimates are very high if one takes into account the age range of the studied populations, thus supporting our results.

Regarding risk factors, the strongest determinant for knee pain suggesting OA in our study is obesity. Obesity and changes in weight are known predictive factors for prevalent and incident knee pain, respectively (37-41). In EPISER, 38% of the women and 28% of the men older than 55 were found to have a body mass index of 30 or above, which represents a proportion of obese that is higher than previously reported (42, 43). We certainly bear in mind that the large proportion of obesity in the EPISER sample is accounting for a large proportion of the knee pain cases suggesting OA.

As to the type of activities performed, there was a clear association of knee pain suggesting OA with jobs involving a great deal of physical demands. However, we could not confirm this association in the multivariate analysis, very plausibly because of the great number of housewives who presented knee pain suggesting OA (19.3%), and whose activities could not easily be assigned as a physically demanding job. Living in an urban setting appeared as a modest determinant after adjustment, which is not easy to explain, as it is in contrast with previous observations of higher prevalence in rural settings (25, 44). We do not believe that a real association exists between knee OA and living in an urban setting, and other confounders, not adjusted for, may explain the association.

The association between knee pain suggesting OA and years of formal education is noticeable. Other studies have shown a negative association between the studies attained and the presence of rheumatic symptoms (45). In EPISER, the less educated ones are those who report pain more frequently. Given that the association could not be confirmed in the adjusted analysis, it may well happen that those with less years of formal education correspond, to a great extent, with the population of elder women, who, as it happens in other cultures, had less opportunities than men to study while young. A similar effect occurs with social class: the higher the class, the lower the probability to have knee pain suggesting OA. Actually, the way social class was assigned in EPISER, by means of the professional category, is a limitation to our study, as a great number of housewives could not be assigned to a social class.

The impact of knee pain on function and quality of life is significantly high. This study shows that near 10% of those with knee pain suggesting OA in the general population are unable or have serious difficulties to perform activities of daily living, and that such difficulties are not only related to sociodemographic characteristics or comorbidities proper to the elderly. Moreover, the quality of the lives of elderly women depends strongly on whether they have knee symptoms. Only 5% of the people classified as with knee OA perceived disability claims, but 10% was actually severely disabled. This discordance could be explained by the high proportion of housewives over 50 who are affected, and who are not included in

compensation plans. As the population in the Western world becomes older, and unfortunately also more obese, and as women become a greater part in the labor place, the budget for disability claims will overflow.

In conclusion, the prevalence of knee pain suggesting OA in the Spanish general population is higher than expected. Whether this is due to a high prevalence of obesity among the elderly women or to other unmeasured variables, we yet do not know. One thing is sure: a high proportion of people with knee pain suggesting OA present severe impairment in daily functioning and in quality of life, outcomes that, in the very near future, as older women become more present in the labor market, will have important socioeconomic consequences.

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Appendix

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(in alphabetical order)

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