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Abstract

Aims: To analyze the health-related quality of life of patients with Generalized Anxiety Disorder (GAD), with respect to the population at large and to a control group. The following goals are addressed: 1.- To determine what, if any, differences exist between the health status of patients diagnosed with GAD, the population in general and a group of control patients; 2.- To analyze the relation between the variables *age*, *sex*, and *health status* (as assessed by the patient's GP) measured on the Hamilton anxiety scale, with the quality of life of the GAD patients and of the control group; 3.- To determine whether the variables *age*, *sex*, *Hamilton scale values* and *index of quality of life* influence the annual cost caused by the illness; 4.- To determine whether there are any differences in the evaluation of the same health status made by GAD patients and by the general population. This study forms part of a broader-ranging one (the ANCORA Study) set up to analyze Generalized Anxiety Disorder (GAD) and the costs and other burdens provoked by this illness in Spain.

Material and Methods: Regression models were used to obtain the EQ-5D index of health state (EQ_{index}) and to analyze the above-mentioned variables. The data on patients and on the costs of the illness are those registered in the ANCORA study.

Results: The patients with GAD present a self-perceived level of health (EQ-5D) that is conspicuously below that corresponding to the general population, especially in three of the dimensions, namely usual activities, pain/discomfort and anxiety/depression. The mean value of the health index (EQ_{index}) is ten points below that of the general population and that of the control group. Age was found to be negatively related to the health variables, as was a higher score on the Hamilton scale. For the group of patients with GAD, a worse perceived health state and a higher score on the Hamilton scale were associated with higher costs, although in the latter case the explicative power of the model is weak. Finally, the GAD patients assessed their health status more negatively than did the general population, with a visual analogue scale (VAS) result that was four points lower than that made by the general population.

Introduction

GAD is an anxiety disorder that is clearly specified within disease classification systems. Both in the DSM-IV classification system (APA, 2000) and in CIE-10 (WHO, 1992), there is an explicit separation between the generalized anxiety syndrome (GAD) and other syndromes of anxiety or depression (Mahe and Balogh, 2000).

It has been estimated that the lifetime prevalence for persons diagnosed with GAD is 5.1% (DSM-IV), and in accordance with the classification criterion used in Europe, it is 6.5% (CIE-10) (ADAA, 2004). In studies of the general population, the prevalence of GAD ranges from 5-7% (Lobo and Campos, 1997).

Over half of the patients with anxiety disorders are believed to visit primary healthcare clinics for treatment. Of these patients, approximately 8% are diagnosed with GAD, which means this is the most prevalent of all anxiety disorders (Wittchen, 2002).

In Spain, the prevalence of GAD reported in studies of primary healthcare attention ranges from 4.5% (Zaragoza study, 1993, in Lobo and Campos, 1997), to 7.3% (Chocrón et al., 1995) to 7.9% (Goldberg and Lecrubier, 1995).

A combination of genetic, biological, socioeconomic and employment-related factors may influence the appearance of GAD. Although its exact cause has yet to be determined, some population groups are at higher risk; for example, Afro-American women aged under 30 years present a higher probability of suffering this illness (Horwath and Weissman, 1995, in Cano Vindel, 2005). The prevalence among women aged over 45 years is 8-10%. Furthermore, GAD is the anxiety disorder that is most frequently suffered among the population aged over 65 years (Andlin-Sobocki and Wittchen, 2005).

One of the effects of GAD is its impact on patients' quality of life. Even after adjusting for age, sex and the presence of other pathologies, such as severe depression, there is clearly a reduction in the quality of life of persons affected by GAD, and in consequence, a gradual loss of psychosocial functionality (Albarracín *et al.,* 2007; Hoffman, Dukes and Wittchen, 2008, Wittchen *et al.,* 2000).

The present study forms part of a wider-ranging one, termed the ANCORA study, aimed at analyzing Generalized Anxiety Disorder (GAD), together with the cost and other burdens caused by the illness in Spain. The goals of the ANCORA study include evaluating the cost and other burdens of the illness with respect to patients' health status, as determined on self-perceived health scales. This study employs two instruments for assessing health-related quality of life, namely SF-36 and EQ-5D. The first of these is a profile with eight dimensions related to health status, measured in terms of functional state and emotional wellbeing. The dimensions, however, are not combined to form an index (Ware *et al.,* 1993, Alonso, Prieto and Antó, 1995).

EQ-5D, which was developed by the EuroQoL group, is also a generic, standardized instrument, which was created to describe and assess the health-related quality of life (Brooks, 1996). Its aim is to produce a cardinal index of health, which has considerable potential for use in economic evaluation and as a synthetic measure of the health of individuals and of population groups. At present, the index created by Dolan (1997) is increasingly employed in the evaluation of healthcare procedures. This index has been recommended for use in cost-utility analysis of healthcare technologies by the National Institute for Clinical Excellence (NICE), to guide the decisions taken within the British National Health Service (Roberts and Dolan, 2004).

In the present study, an analysis is made of the health-related quality of life of patients with GAD, in relation both to the general population and to a control group, and seeks to achieve the following: 1.- To determine what, if any, differences exist between the health status of patients diagnosed with GAD, the population in general and a group of control patients; 2.- To analyze the relation between the variables *age*, *sex*, and *health status* (as assessed by the patient's GP) measured on the Hamilton anxiety scale, with the quality of life of the GAD patients and of the control group; 3.- To determine whether the variables *age*, *sex*, *Hamilton scale* and *index of quality of life* influence the annual cost caused by the illness; 4.- To determine whether there are any differences in the evaluation of the same health status made by GAD patients and by the population in general. Econometric regression models are used to derive an EQ-5D health index and also to analyze the above-mentioned variables. When *a priori* information is available, Bayesian statistics are used. The data on the patients and on the costs of the illness are those obtained in the ANCORA study.

Material and Methods

The ANCORA project is an observational, retrospective, longitudinal and multicentre study of Generalized Anxiety Disorder (GAD), and of its costs and other burdens, carried out in Spain with the participation of doctors at primary healthcare clinics. The criteria for inclusion in the study were that the patients should be out-patients, of either sex, aged over 18 years, diagnosed with Generalized Anxiety Disorder (codes CIE-9: 300.02 and CIE-10: F41.1) and with data reflecting a clinical history of at least twelve months. The patient should give written consent to participate in the study and be capable of reading, understanding and completing health-related questionnaires drafted in Spanish. Criteria for exclusion, as well as not satisfying those for inclusion, were the presence of severe illness that might interfere with the patient's ability to complete the questionnaire, or of mental handicap that might interfere with the patient's capacity to remember the previous use made of healthcare resources, or to complete the questionnaire.

Measuring Health-Related Quality of Life

Quality of life was measured using EQ-5D, an instrument that was designed as a self-assessed questionnaire, comprised of two parts.

Part 1 obtains a description of the individual's health status, via five dimensions: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (PD) and anxiety/depression (AD). Each of these dimensions is then sub-divided into three levels: no health problems (1), moderate health problems (2) and extreme health problems (3). Each interviewee identified a level for each of the five dimensions, and so their health status was described by five digits, with values from 1 to 3, such that a health state of 11111 was considered *a priori* to be the best possible, and 33333 would represent the worst possible one. The combination of these levels defines a total of 243 (3^5) states of health.

In Part 2, the interviewee was asked to assess his/her health status on the basis of a vertical visual analogue scale (VAS), like that of a thermometer, where "the best health state imaginable" is given a value of 100, and "the worst health state imaginable" is given a value of 0.

From these EVA scores, values may be obtained for the 243 health states reflected by the EQ-5D measure. Dolan (1996), a pioneer in the field of indexes of health status, showed there to be a linear relation between the value of an index and that of the dummy variables corresponding to the different levels of each of the dimensions of the EQ-5D instrument. Moreover, to test the hypothesis that the value of the index decreases when one of these dimensions is located at the level associated with "extreme health problems", the latter author proposed that an additional dummy variable (N3) should be incorporated, to be given a value of 1 if any dimension was located at level 3. Using coefficients to establish relations between the index and the different dimensions makes it possible to interpolate values of health states that were not observed directly, and thus to obtain the values of the 243 EQ-5D states. This functional relation is employed throughout the present study. The index values used are based on data obtained from the Catalonian Health Survey (ESCA), carried out in 2002 and in 2006.

Models utilized

Obtaining the EQ-5D health index (EQ_{index})

An index for the general population (EQ_{index}) is obtained by means of a model similar to that used by Dolan (1996), using the following expression:

$$Y_i/100 = \beta_0 + \beta_1\,\mathbf{MO2}_i + \beta_2\,\mathbf{SC2}_i + \beta_3\,\mathbf{UA2}_i + \beta_4\,\mathbf{PD2}_i + \beta_5\,\mathbf{AD2}_i + \beta_6\,\mathbf{MO3}_i + {}$$

$$+ \beta_7\,\mathbf{SC3}_i + \beta_8\,\mathbf{UA3}_i + \beta_9\,\mathbf{PD3}_i + \beta_{10}\,\mathbf{AD3}_i + \beta_{11}\,\mathbf{N3}_i$$

Model 1

$$VAS_{score\,i} \sim N(Y_i, \tau) \qquad \tau \sim \mathbf{G}(a, b)$$

$$\beta_j \sim N(\beta_j, \Omega_{jxj}),\ j=0,\ldots,11$$

The variables used for this model take the following values:

MO2, SC2, UA2, PD2, AD2 if the response has a value of 2, then it is 1; otherwise = 0.

MO3, SC3, UA3, PD3, AD3 if the response has a value of 3, then it is 1; otherwise = 0.

N3 if the response has a value of 3 in any of the dimensions, then it is 1; otherwise = 0.

Once the coefficients of interest are known, the index value for a health state is calculated from the mean value of the dependent variable explained for that health state ($EQ_{index\ i}$).

Between-sample comparison of the health status index

We now obtain the index value for each one of the individuals in the general population sample and also for the persons diagnosed with GAD. This value represents one of the 243 possible health states. The following functional form is used to analyze the differences in the index:

$$Y_i = \alpha_0 \mathbf{POP}_i + \alpha_1 \mathbf{GAD}_i$$

Model 2

$$EQ_{index\ i} \sim N(Y_i, \tau) \qquad \tau \sim \mathbf{G}(a, b)$$

$$\alpha_j \sim N(\alpha_j, \Omega_{jxj}),\ j=0,1$$

where **POP** = 1 if the person belongs to the general population; otherwise, 0.

GAD = 1 if the person belongs to the group diagnosed with GAD; otherwise 0.

We also calculated the differences in the index between the persons diagnosed with GAD and the control group used in the ANCORA study, in accordance with the following model:

$$EQ_{index\ i} = \beta_1 \mathbf{CONT}_i + \beta_2 \mathbf{GAD} + u_i$$

Model 3

where **CONT** = 1 if the person belongs to the control group; otherwise, 0.

GAD = 1 if the person belongs to the group diagnosed with GAD; otherwise 0.

Relation between health state assessment and the Hamilton score

The relation between each of the variables age, sex and Hamilton scale score for anxiety with the quality of life of patients with GAD and of those in the control group, measured using the variables $EVA_{score\ i}$ and $EQ_{index\ i}$., is analyzed by means of the following models:

Model 4.1: the dependent variable is the VAS

$VAS_{score\ i} = \beta_0 + \beta_1$ **Sex**$_i$ $+ \beta_2$ **Age**$_i$ $+ \beta_3$ **Hamtot**$_i$ $+ u_i$

Model 4.1

Model 4.2: the dependent variable is $EQ_{index\ i}$, *the index obtained in Model 1*

$EQ_{index\ i} = \beta_0 + \beta_1$ **Sex**$_i$ $+ \beta_2$ **Age**$_i$ $+ \beta_3$ **Hamtot**$_i$ $+ u_i$

Model 4.2

where **Sex** = 1 if the person is female; otherwise, = 0.

Age in years

Hamtot measured from the Hamilton scale values

Variables that influence the cost of the illness

We wish to determine whether the variables *age*, *sex*, *Hamilton scale values* and *index of quality of life* influence the logarithmic transform of the annual cost of the illness (AnnCost), using the following functional form:

$Log(AnnCost_i) = \beta_0 + \beta_1$ **Sex**$_i$ $+ \beta_2$ **Age**$_i$ $+ \beta_3$ **Hamtot**$_i$ $+ \beta_3$ $\mathbf{EQ}_{index\ i}$ $+u_i$

Model 5

Differences between patients and the general population in assessing the same health status

For the patients diagnosed with GAD, we analyzed the difference between VAS and EQ_{index}, which represents the value assigned by the patient to his/her health status on the VAS less that assigned by the general population to the same health status, as described by the five dimensions of the EQ-5D. This was performed on a patient-by-patient basis, and we present descriptive statistics of the variable resulting from the variation between the evaluations (ΔVal):

$\Delta Val_i = VAS_i - EQ_{index\ i}$

Calculation methodology

The computations and simulations made for Models 1 and 2 were carried out by Bayesian statistics, using Gibbs sampling and Metropolis-Hasting algorithms, which constitute the two basic approaches used in the Markov Chain Monte Carlo methodology (Gilks *et al.,* 1996). These algorithms were applied by means of WinBUGS 1.4 statistical software (Spiegelhalter *et al.,* 2003). For the simulations, a total of 100000 iterations were carried out, after a burn-in run of 10000, with a few minutes being required for the simulation of each model.

In addition, a non-informative *a priori* distribution was used, except in the calculation performed to obtain the EQ_{index} variable. In estimating the *a posteriori* distributions of the mean and the variance in the parameters, in order to obtain the value of the index, the *a posteriori* data from the ESCA 2002 sample was incorporated as *a priori* information for the ESCA 2006 sample.

Models 3, 4-1, 4-2 and 5 were calculated using the ordinary least squares estimation procedure, with Eviews 5 software.

Data

The EQ_{index} of health was obtained using the Catalonian Health Surveys published by the Health Ministry of the *Generalitat* (Catalonian Regional Government) for the years 2002 and 2006 (ESCA 2002 and ESCA 2006). These surveys correspond to the non-institutionalized population of Catalonia, with sample sizes of 8,089 and 16,164, respectively.

Other analyses were based on the data taken from the ANCORA study, using a sample of patients with GAD (N= 456) and a control group (N= 74) who were treated during 2006 at 134 primary healthcare clinics (Rovira *et al.,* 2008; Albarracín *et al.,* 2008). The samples were distributed by age, sex and geographic groups, in accordance with the populational weight of each Autonomous Community (Region) in Spain. The data were obtained by means of two questionnaires filled in by the patient and by his/her GP, respectively.

The questionnaire filled in by the GP contained two blocks of questions. The first of these referred to sociodemographic data, comorbidity, sick leave (including sick leave attributable to GAD), the course of the illness, medication prescribed (for GAD and for any other health problem), and also questions aimed at determining the doctor's own view of the severity of the patient's illness. The second block referred to data for obtaining an evaluation on the Hamilton Anxiety Rating Scale.

The information provided by the patient was classified in five blocks. The first one was for personal data, information as to whether the patient had a carer/nursing help, the course of the illness, the medication being taken (and any side effects occurring). The following blocks corresponded to questionnaires on Sheehan's syndrome, the EQ-5D index, the SF-36 index and the MOS sleep scale, respectively.

Results

The relevant sociodemographic characteristics for the patients included in this study are shown in Table 1.

Table 1

Sociodemographic characteristics of the GAD patients and of the controls

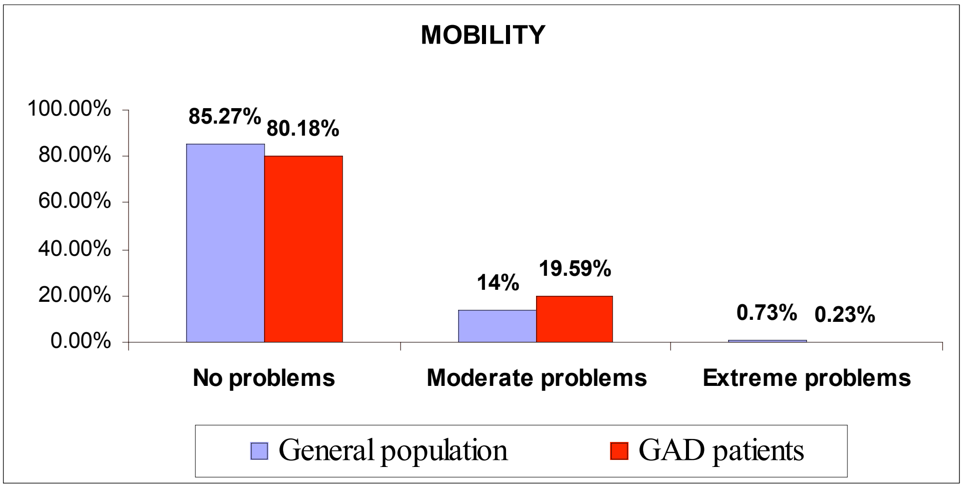
Characteristics	Patients with GAD		Controls	
	N	%	N	%
Sex				
Male	105	23.18%	42	57.53%
Female	348	76.82%	31	42.47%
Age (years)				
18 – 34	122	27.5%	17	23.9%
35 – 64	201	45.3%	37	52.1%
>= 65	121	27.3%	17	23.9%

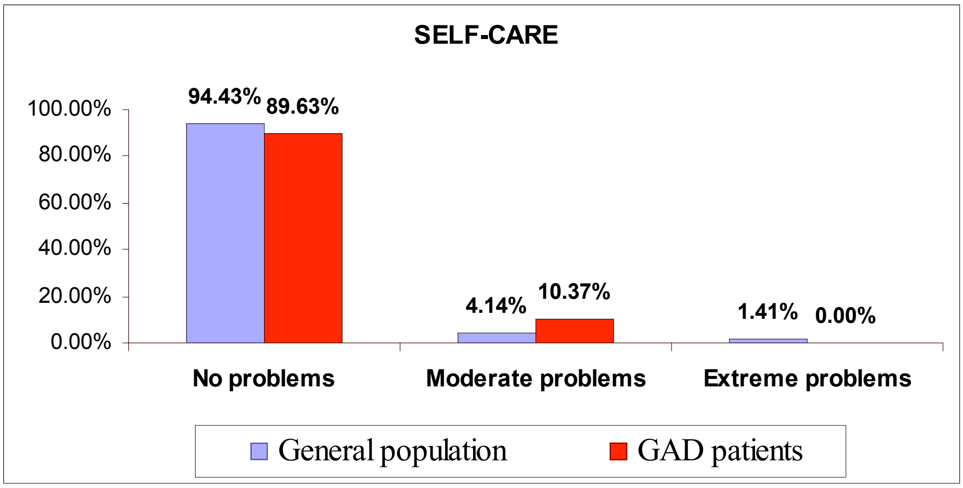
N: 456 patients and 74 controls, of whom: 3 patients with GAD and 1 control did not state their sex; 12 patients with GAD and 3 controls did not state their age.

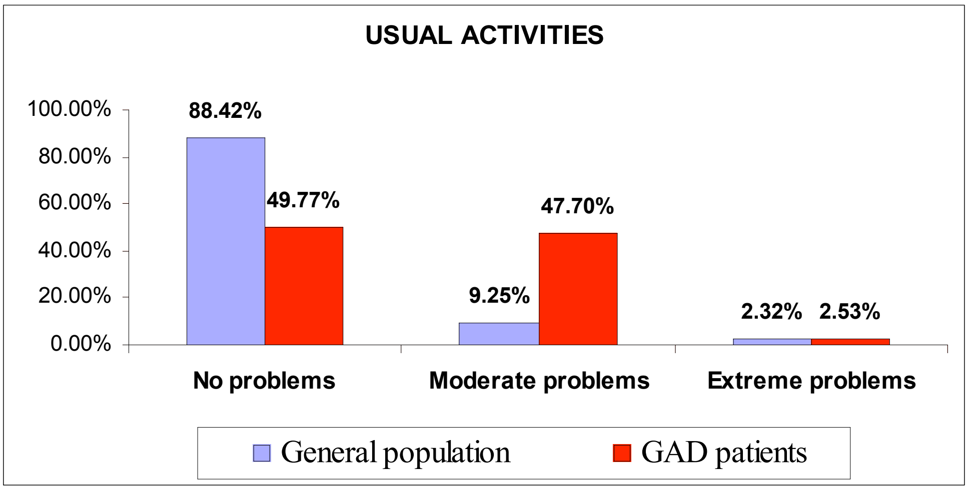
From the replies to the EQ-5D survey, we obtained data on 518 participants for the first part of the questionnaire, distributed as 444 cases of GAD and 74 controls. Figure 1 shows, as percentages, the replies concerning the five dimensions that constitute the EQ-5D measure, among the general population and among patients with GAD, illustrating the existence of marked differences between the variables *usual activities*, *pain/discomfort* and *anxiety/depression*. More than half of the patients located these dimensions between scores of 2 and 3. These differences are not so conspicuous for the variables *mobility* and *self care*.

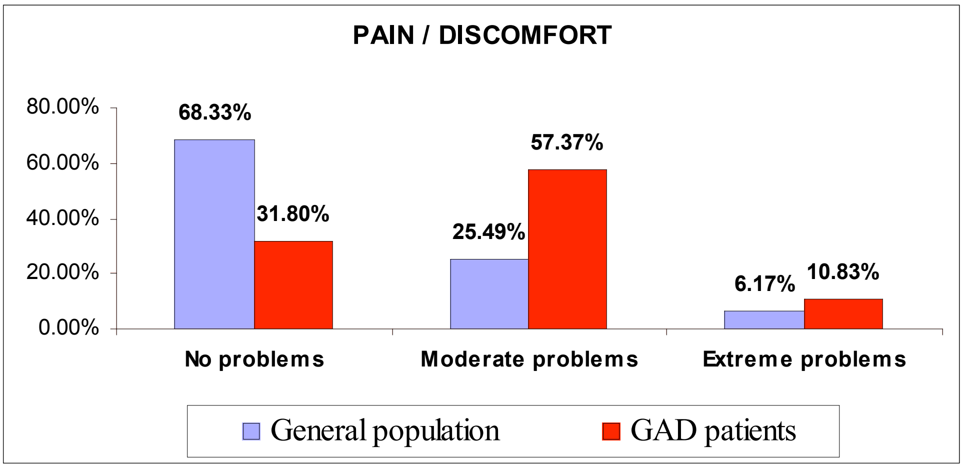
Figure 1

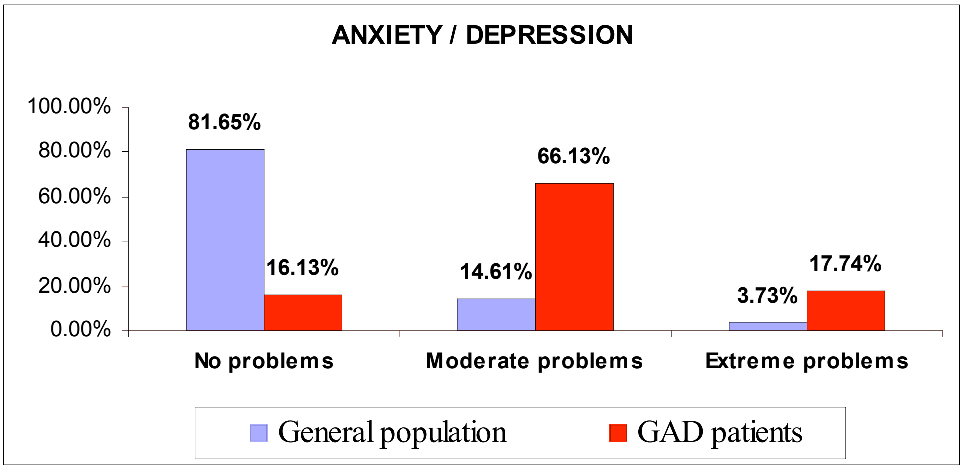
EQ-5D dimensions for the general population and for GAD patients (%)






USUAL ACTIVITIES
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
88.42%
49.77%
47.70%
9.25%
2.32%
2.53%
No problems
Moderate problems
Extreme problems
General population
GAD patients


PAIN / DISCOMFORT
80.00%
60.00%
40.00%
20.00%
0.00%
68.33%
31.80%
57.37%
25.49%
6.17%
10.83%
No problems
Moderate problems
Extreme problems
General population
GAD patients


ANXIETY / DEPRESSION
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
81.65%
16.13%
66.13%
14.61%
3.73%
17.74%
No problems
Moderate problems
Extreme problems
General population
GAD patients

Model 1

The VAS responses were obtained from 404 participants distributed as 345 GAD patients and 59 controls. Table 2 shows the results for Model 1 concerning the values of the VAS/100 variable, the *a posteriori* distribution of the coefficients of interest (mean and standard deviation), and the Bayesian 95% probability intervals for the model, with the information obtained in the ESCA 2006 survey and using ESCA 2002 as an *a priori* source.

Table 2

Results of Model 1 for the values of the VAS/100 variable, the *a posteriori* distribution of the coefficients of interest (mean and standard deviation), and the Bayesian 95% probability intervals

Associated Variables	**Model 1 (N = 24253)**	
	mean (sd)	***95% BI***
Constant	0.800(0.0012)	(0.79,0.80)
MO2	-0.088(0.0035)	(-0.09,-0.08)
SC2	-0.007(0.0057)	(-0.02,0.00)
UA2	-0.086(0.0043)	(-0.09,-0.08)
PD2	-0.111(0.0024)	(-0.12,-0.11)
AD2	-0.077(0.0029)	(-0.08,-0.07)
MO3	-0.124(0.0131)	(-0.15,-0.10)
SC3	-0.060(0.0115)	(-0.08,-0.04)
UA3	-0.146(0.0095)	(-0.16,-0.13)
PD3	-0.173(0.0070)	(-0.19,-0.16)
AD3	-0.156(0.0068)	(-0.17,-0.14)
N3	-0.001(0.0071)	(-0.02,0.010)

The mean value of the parameters associated with the variables is negative, which means that the index is constructed in such a way that the 11111 state represents the highest value, while the parameters associated with level 3 (extreme health problems) lower the value of the index to a greater degree than do those associated with the level 2 (moderate health problems) of the corresponding dimension. Therefore, the variable created from these results (EQ_{index}) presents an order of values of health states that is free of inconsistencies, with a value of 80% corresponding to the 11111 state.

Model 2

Table 3 and Figure 2 show the results obtained by Model 2 for the EQ_{index}, the *a posteriori* distribution of the coefficients of interest (mean and standard deviation) and the Bayesian 95% probability intervals for the general population and for patients with GAD.

Table 3

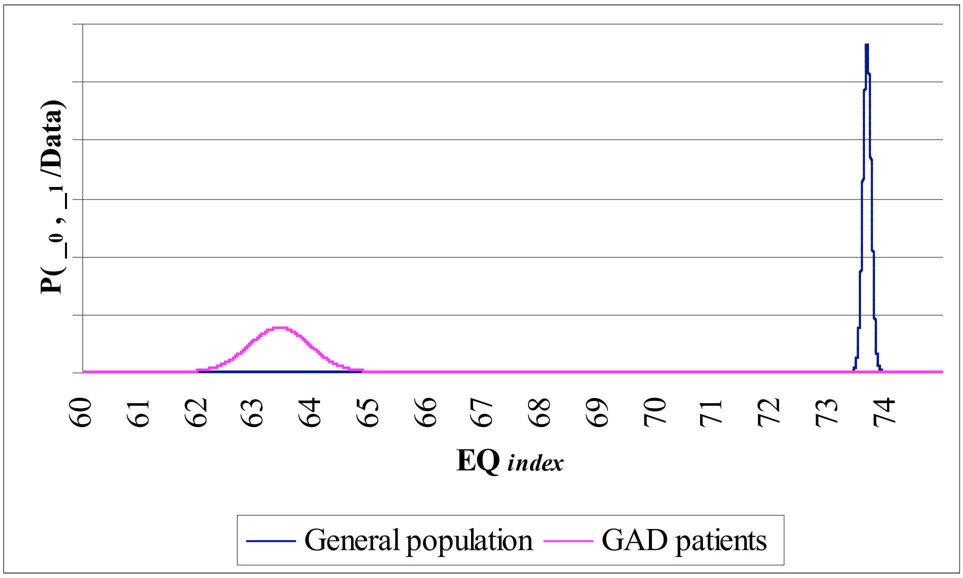
Results of Model 2 for the EQ_{index} values, the *a posteriori* distribution of the coefficients of interest (mean and standard deviation) and the Bayesian 95% probability intervals

Associated variables	**Model 2 (N = 24,687)**	
	mean (sd)	***95% BI***
POP	73.70(0.0709)	(73.56,73.84)
GAD	63.46(0.5256)	(62.43,64.48)

The GAD patients presented a mean health status value that was 10 points below that of the general population, which illustrates the effect of GAD on the perceived health-related quality of life. Figure 2 shows that the differences in terms of probability are substantial, as there is no overlap of the *a posteriori* distributions of the parameters.

Figure 2

***A posteriori* distributions of the parameters of interest in Model 2**



Model 3

Table 4 shows the results of Model 3 for the EQ_{index}, the distribution of the coefficients of interest: the mean, the standard deviation and the level of significance (*p*-value) for the GAD patients and the controls.

Table 4

Results from Model 3 for the EQ_{index}, the distribution of the coefficients of interest: mean, standard deviation and level of significance (*p*-value)

Associated variables	**Model 3 (N=506)**	
	mean (sd)	***p-value***
CONT	76.25(1.231)	(0.0000)
GAD	63.46(0.501)	(0.0000)

R^2 0.154

Adjusted R^2 0.153

The results obtained for the patients in the control group were similar to those for the general population in Model 2.

Model 4

Tables 5 and 6 show the relation between the variables *age*, *sex* and *health status* as assessed by the GP, measured on the Hamilton anxiety scale, and the quality of life of the GAD patients and the controls.

Table 5

Results of Model 4.1, where the dependent variable is the VAS_{score} - mean, standard deviation and level of significance (*p*-value)

Associated variables	**GAD (N=333)**		**CONTROL (N=57)**	
	mean (sd)	***p-value***	***mean (sd)***	***p-value***
Constant	87.202(3.59)	(0.000)	100.866(4.50)	(0.000)
Sex	-2.464(2.09)	(0.240)	-0.0310(3.22)	(0.992)
Age	-0.258(0.05)	(0.000)	-0.410(0.08)	(0.000)
Hamtot	-0.721(0.09)	(0.000)	0.331(0.26)	(0.213)

R^2 0.220 R^2 0.292

Adjusted R^2 0.213 Adjusted R^2 0.252

Table 6

Results of Model 4.2, where the dependent variable is the EQ_{index}

- mean, standard deviation and level of significance (*p*-value)

Associated variables	**GAD (N=418)**		**CONTROL (N=68)**	
	mean (sd)	***p-value***	***mean (sd)***	***p-value***
Constant	82.743(1.82)	(0.000)	87.230(2.15)	(0.000)
Sex	-1.490(1.08)	(0.170)	-1.960(1.38)	(0.161)
Age	-0.159(0.02)	(0.000)	-0.215(0.04)	(0.000)
Hamtot	-0.515(0.04)	(0.000)	-0.003(0.12)	(0.979)

R^2 0.317 — R^2 0.286

Adjusted R^2 0.285 — Adjusted R^2 0.281

The variable *age* has a negative and significantly non-zero relation with the health variables in both models, while the Hamilton scale data are only significant for the GAD patients in the two indexes.

Model 5

Table 7 shows the results, the mean, the standard deviation and level of significance (*p*-value) of the parameters in which the dependent variable is the annual cost of the illness.

Table 7

Results of Model 5. Mean, standard deviation and level of significance (*p*-value) of the parameters in which the dependent variable is the annual cost of the illness

Associated variables	GAD (N=415)		CONTROL (N=64)	
	mean (sd)	*p-value*	*mean (sd)*	*p-value*
Constant	9.672(0.65)	(0.000)	9.150(3.68)	(0.0159)
Sex	-0.370(0.16)	(0.021)	-1.174(0.47)	(0.0157)
Age	-0.015(0.00)	(0.000)	-0.000(0.01)	(0.9911)
Hamtot	0.035(0.00)	(0.000)	-0.103(0.04)	(0.0174)
EQ_{ind}	-0.023(0.00)	(0.001)	-0.027(0.04)	(0.5087)

R^2 0.132 — Adjusted R^2 0.124 (GAD)

R^2 0.159 — Adjusted R^2 0.102 (CONTROL)

For the GAD patients, a poorer health status (as represented by a lower health state index) was associated with higher costs derived from the illness and a higher score on the Hamilton scale, at a higher cost. Nevertheless, the explicative power of the model is slight.

Are there differences between the patients' own assessment and that of the general population regarding their health status?

The differences between the assessments of the same health status by GAD patients and by the general population were determined from the differences between the VAS scores and the mean values obtained for each health state in the $EQ_{index\ i}$:

$\Delta Val_i = VAS_i - EQ_{index\ i}$

The results show that the GAD patients assessed their own health status an average of 4.328 points (standard deviation 15.18) lower than did the general population, on the health status index (Figure 3).

Figure 3

Health states assessment by GAD patients, compared to that made for the same health states by the general population

Discussion

One of the components of the burden imposed by illness is its effect on the health-related quality of life. The present study shows that the GAD patients in the sample have a self-perceived health status (EQ-5D) that is markedly lower than that of the general population, especially in three of its dimensions – usual activities, pain/discomfort and anxiety/depression. The patients' age was negatively related to both the health variables and to higher scores on the Hamilton scale (i.e., a worse health status, in the GP's opinion).

Our results are consistent with those reported in the, as yet, few published studies on the effects of GAD on health-related quality of life. The difficulty of isolating the specific effects of GAD, due to the presence of comorbidity, accounts for the scant number of studies made in this respect, but those that have appeared confirm that GAD has an important negative effect on the quality of life (Hoffman *et al.,* 2008; Lieb, Becker and Altamura, 2005; Wittchen *et al.,* 2000).

Of the two generic instruments applied in the ANCORA study to measuring the health-related quality of life, we decided to use EQ-5D because it enabled us to work with an index, to measure health status and to analyze the explicative variables. In the sample of GAD patients, the mean value of the health status index (EQ_{index}) was ten points below that of the general population and of the control group.

The EQ-5D data for the general population were taken from the Catalonian Health Survey (ECSA) for the years 2002 and 2006. This decision was taken because it was thus possible to obtain a much larger and more recent body of information than other indexes published in Spain, which enabled us to apply the model developed by Dolan (1996) with dummy variables, thus avoiding the problem of possible inconsistencies within the index values (Dolan and Kind, 1996). Badia *et al.* (1999) produced a Spanish version of EQ-5D, for which purpose they used a linear function with no dummy variables. This index has been applied in various economic evaluation studies (Ciudad *et al.*, 2004; Prieto *et al.*, 2004).

The decision to use VAS data in a health status survey (ESCA, 2002 and 2006) requires some explanation: this data source raises the question of how data are selected in drawing up an index. In general, health status indexes are obtained by means of diverse preference-measurement techniques, normally based on procedures for choosing among health states, with or without uncertainty, using evaluations of hypothetical health states, and not the actual, present one, as is the case of EQ-5D. The use of the former techniques is justified when the aim is to obtain indexes to be used for economic assessment. The present index, however, is aimed at measuring health status and obtains a descriptive measure of health, in which VAS values are associated with the actual health states perceived by the interviewees themselves.

This study uses regression models to obtain the EQ-5D health status index and also to analyze the explicative variables for the latter. When *a priori* information is available (the two ESCA sample periods employed), Bayesian statistics were applied. This technique incorporates *a priori* information in estimating the coefficients, which makes it possible to improve the estimates of the parameters and, from the *a posteriori* distributions of the coefficients, achieve targeted estimations and calculate Bayesian probability intervals (BI).

The data on the costs of the illness are those obtained by the ANCORA study (Rovira *et al.,* 2008). Both healthcare and non-healthcare direct costs are included, together with the indirect costs of lost productivity due to sick leave. For the GAD patients, a poorer self-perceived health status and higher scores on the Hamilton scale were associated with higher costs, although in the latter case the explicative power of the model is weak.

It is interesting to note that the GAD patients assign lower values to their health states than does the general population to the same health states. The GAD patients' score on the VAS scale was four points lower than that given by the general population index. This finding was also obtained by the authors in a study of severe mental illness (Cabasés *et al.,* 2005). This difference in perceptions might be important in terms of designing healthcare policies for diverse population groups.

Conclusions

Patients with GAD present a health-related quality of life that is clearly below that of the general population. In this respect, the present study recorded differences in health status of 10.24 points on the EQ-5D health status index. Both the patient's age and a higher score on the Hamilton scale were negatively related to health variables. For the group of GAD patients, it was found that a poorer self-perceived health status and a higher score on the Hamilton scale were associated with higher costs provoked by the illness, although the explicative power of the model in the latter case is weak. Finally, the GAD patients assign lower values to their health states than does the general population to the same health states, with a VAS score four points lower than the value obtained by the health status index.

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Credits

This is a collaborative work, and the authors worked closely each other. J M Cabasés did the design and wrote the paper. E Sánchez-Iriso developed the models and did the calculations and J Rovira provided the data on patients and on the costs of the illness, previously calculated by himself and colleagues for the ANCORA study.

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