Predictive factors of mental disorders in patients with suspected ischaemic cardiopathy

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Abstract. *Objective*: To identify the predictive factors of mental disorders in patients with suspected Ischaemic Cardiopathy (IC). *Method*: The patients admitted to the Cardiology Service of an University Hospital (SW Spain) for acute thoracic pain with suspected IC were studied. Patients were classified into four diagnostic groups (acute myocardial infarction, unstable angina, non-ischaemic cardiological process, non-cardiological) based on clinical, electrocardiographical and biochemical data. The sociodemographic and clinical variables were obtained by a 'ad hoc' questionnaire and the clinical records of the patient. The GHQ-28 questionnaire was used to assess the status of mental health, and a score of $\geqslant 6$ was taken as the cut-off point for being a 'probable psychiatric case'. Crude odds ratios (OR $\pm$ 95% CI), and adjusted OR according to a logistic model, were calculated in order to study the variables associated with the mental disorders. The tabulation and analysis of data was carried out with the SPSS v.8 (for Windows) program. *Results*: From June 1996 to November 1997, 185 patients were studied; 72% were males and the mean age was 60.2 years (SD = 10.4). 49.2% of the patients were scored at $\geqslant 6$ on the GHQ-28, and the sub-scale accounting for the highest scores was that of somatic symptoms of psychological origin. The adjusted ORs showed that female sex (OR: 2.5; 95% CI: 1.2–5.0), previous personal history of IC (OR: 2.3; 95% CI: 1.1–4.4), and the presence of arterial hypertension (OR: 2.0; 95% CI: 1.1–3.9), were the predictive variables for being a 'probable psychiatric case', whereas neither age nor comorbidity were predictive. *Conclusions*: The percentage of subjects considered to be a 'probable psychiatric case' among patients with suspected ischaemic cardiopathy was high. Screening for mental disorders and intervention to control the risk factors associated are measures recommended in these patients.

Introduction

Ischaemic Heart Disease (IHD) has frequently been associated with moderate to severe mental disorders. In this sense, a greater prevalence of anxiety and depression has been found in these patients [1–3].

In recent studies, depression has been reported as an independent risk factor in the patho-physiological progression of cardiovascular disease, rather than merely being a secondary emotional response to the illness [4, 5], and it has also been suggested that worry (an important component of anxiety) is related to an increased incidence of IHD [6].

On the other hand, some research has focused on the association between mental disorders and cardiovascular risk factors. Thus, a greater incidence of depression has been demonstrated in diabetic patients, leading to poor control of the disease and lack of compliance with treatment [7, 8]. Likewise an inverse relationship seems to develop between mental disorders and plasma levels of cholesterol [9, 10], with low levels of plasma lipids associated with a high incidence of anxiety and depression.

In the case of arterial hypertension (HT), a worse prognosis has been observed in hypertense patients who present anxiety as a comorbidity [11].

Despite the relationship demonstrated between IHD and mental disorders, and the association of anxiety and depression with specific cardiovascular risk factors, there are to our knowledge no previous studies of the predictive effect of cardiological risk factors, together with others clinical and sociodemographic variables, on the mental health status in patients with ischaemic cardiopathy.

Thus, the objective of the present study was to identify the predictive factors of mental disorders in a population of patients with suspected ischaemic cardiopathy.

Methodology

Subjects

The study was conducted in a University Hospital (SW Spain) which serves a population of 218,813 inhabitants.

A cross-sectional design was used, and a total of 185 in-patients consecutively admitted to the Cardiology Service with suspected IHD were included in the study. Before inclusion, all the patients were asked for their informed consent and all agreed to participate in the study. The patients were classified by a cardiologist of the same hospital into four groups: acute myocardial infarction (AMI); unstable angina; non-ischaemic cardiologies; non-cardiological disease, based on clinical, electrocardiographical and biochemical criteria. In those cases where no definitive diagnosis was made during their period of admission, the classification was based on the patient's medical discharge report.

Patients with AMI (Group 1) were considered to be those meeting at least two of the following criteria: precordial pain of at least 20 min duration; CPK and CPK-MB values above normal in at least two samples of serum; and the appearance of a Q wave in at least two ECG derivations.

The unstable angina classification (Group 2) corresponded to those patients with precordial pain of at least 20 min duration, together with changes in the ST segment of the ECG, with no enzymatic increase. Groups 3 and 4 corresponded, respectively, to those patients in whom ischaemic pathology (G3) or any cardiac pathology (G4) was discounted.

Instruments and analysis

The socio-demographic and clinical information was obtained from a 'ad hoc' questionnaire and from the clinical record of the patient. The categories of social class used were those of the Spanish Epidemiology Society classification [12].

The presence of HT, hyperlipemia, diabetes and tobacco consumption were considered to be risk factors when they appeared in the clinical record of the patient. The existence of comorbidity was recognized when the clinical record referred to the presence of another pathology in addition to that specified as the reason for admission to hospital or their risk factors.

Mental health status of the patients was assessed by an interviewer (who was not the same cardiologist as that one performing the clinical assessment), when the patient was in a clinically stable condition, using the General Health Questionnaire (GHQ-28). This is a screening instrument designed to detect non-psychotic psychiatric disorders in the general population and in hospitalized patients. This questionnaire, which can be useful to the non-psychiatrist doctor, consists of 28 items grouped into four sub-scales of seven items each, providing additional information on: somatic symptoms of psychological origin (scale A); anxiety or distress (scale B); social dysfunctioning in every-day activities (scale C); depression (scale D). This version of the questionnaire appeared in 1979 [13], and was translated into Spanish and validated both in the general population [14] and in cardiology patients [15]. A score of $\geqslant 6$ on this instrument was taken as the cut-off point [13] for consideration of 'probable psychiatric case'; this provided a sensitivity of 76.9% and a specificity of 90.2% [16].

For the analysis of data, measurements of central tendency and of dispersion were calculated, and for the study between the variables associated with the score of GHQ-28 $\geqslant 6$, the crude Odds Ratios (OR $\pm$ 95% CI) and adjusted ORs according a logistic model were calculated; those variables found to be significantly associated ($p < 0.05$) in the analysis or clinically relevant were selected for the construction of the logistic model. The computer program SPSS, version 8.0 was used for the tabulation and analysis of the data.

Results

A total of 185 patients were studied (response rate 100%). These were predominantly males (71.9%) and 68.1% of total were aged 56 years or more. In respect of occupational category, 53% of patients were classified as unskilled or semi-skilled manual workers, and the 23% considered 'unclassifiable' were all housewives.

The least-represented diagnostic group was that of non-ischaemic patients (10.8%), whereas the group of patients with IC in the two clinical forms considered constituted 71.3% of the population (Table 1).

In relation to the risk factors studied, 91.2% of patients presented at least one; HT and consumption of tobacco were the two most prevalent factors (Table 1). Scores on the GHQ-28 of $\geqslant 6$ were found for 49.2% of the population; the two scales showing the highest mean scores were those of somatic symptoms of psychological origin and anxiety.

The variables associated with this cut-off score on the GHQ-28 were: female sex and the presence of HT (Table 2). The group of housewives and the RFs, considered globally, presented high ORs although with very wide CIs. The comorbidity and personal history of IC were on the limit for association (Table 2).

In the logistic model, female sex, existence of a personal history of the illness and presence of HT were the predictors of 'probable psychiatric case'. Age, included in the model as a continuous variable, presented an adjusted OR slightly greater than unity, but this did not occur for the variable of comorbidity (Table 3).

The assumptions of linearity, variance of the outcome variable, outliers and the stability of the model were confirmed. The result of the 'goodness of fit' test (Hosmer–Lemeshow) of the model was 5.77 (dl = 8

Table 1. General characteristics of the population studied

Variables	N	%
Sex		
Male	133	71.9
Female	52	28.1
Social class*		
Not classifiable	42	23
I and II	13	7.1
III (a,b,c)	31	16.9
IV (a,b) and V	97	53
Age group (years)		
<46	18	9.7
46–55	41	22.2
56–65	62	33.5
>65	64	34.6
Diagnostic group		
AMI	62	33.5
Unstable angina	70	37.8
Non-ischaemic	20	10.8
Non-cardiological	33	17.9
Personal history of IC		
Yes	63	34.1
No	122	65.9
Comorbidity		
Yes	117	63.2
No	68	36.8
Cardiovascular risk factors		
Yes	168	91.3
No	16	8.7
Hypertension		
Yes	89	48.4
No	95	51.6
Consumption of tobacco		
Yes	94	51.1
No	90	48.9
Hypercholesterolemia		
Yes	69	37.5
No	115	62.5
Diabetes		
Yes	58	31.5
No	126	68.5
GHQ-28 score		
<6	94	50.8
⩾6	91	49.2

*I: Senior managers, professionals; II: managers, technically qualified and trades people; III: supervisory and administrative; IV: skilled manual workers; V: unskilled manual workers.

significance $= 0.6724$) and the sensitivity and specificity were 61.54 and 66.67%, respectively.

Discussion

The presence of mental disorders in patients with IHD has been previously studied [17, 18]. However, the identification and control of the risk factors associated with these disorders is not a measure that is habitually utilized in such patients [19].

The present findings indicated that the percentage of patients considered as a 'probable psychiatric case' was high among the patients studied, and the subscale of the GHQ-28 with the highest score was 'somatic symptoms of psychological origin'.

Although it could be anticipated that an overestimation of the scores might be obtained due to the existence of false positives, as described in other studies [20], it has been found that in these patients the GHQ-28 gives similar results to those showed with the Mental Health Inventory (MH1-5) of the SF-36 [21]. A possible explanation of these findings is the effect on the questionnaire scores due specifically to the discomfort produced by admission into hospital.

These results agree with those observed by Simon et al. [22] who find a strong association between somatic symptoms and psychological distress.

With regard to the cardiological risk factors considered, HT, personal history of the illness and female sex were the most important predictive factors. On this point, Wandell et al. [23] find that patients with hypertension or diabetes had more psychological symptoms and long-standing psychiatric disorders than the healthy people. However Coelho et al. [24] in a community sample, find no significant differences in psychological well-being according to the presence of an increasing number of cardiovascular risk factors.

Other variables such as personality have been related both with the evolution of the IHD and with HT. Denollet et al. [17], Denollet and Brutsaert [25] and Denollet [26] point to the prognostic effect of personality type D, which is characterized by negative affectivity and social inhibition, on the IHD, and state that patients with this behavior are prone to anxiety, depression and anger. Similarly, Rozanski [27] refers to the effect of social isolation on HT, and D'Antono et al. [28] find a significant correlation between hostility and blood pressure. Personality is not a factor considered in this study, but may however have influenced the results obtained.

In our study, the risk of mental disorders observed in women was greater than that in men. This results are in agreement with other studies conducted in the general population [24, 29] and in specific occupational groups [30], where similar results have been found.

Furthermore, and supporting the view that chronicity effects the patient's mental health status and quality of life, as reported elsewhere [31], our study point out that a personal history of the disease constitutes a factor independently associated with worse mental health. Nevertheless, these results should be interpreted with caution due to the transversal design of the study.

Table 2. Variables associated with Mental Health Status

Variables	GHQ-28 ⩾6 N (%)	GHQ-28 < 6 N (%)	OR (95% CI)
Sex			
Female	35 (38.5)	17 (18.1)	2.8 (1.4–5.5)
Male	56 (61.5)	77 (81.9)	1
Social class*			
Housewives	27 (30.0)	15 (16.1)	4.1 (1.1–15.04)
I and II	4 (4.4)	9 (9.7)	1
III	17 (18.9)	14 (15.1)	2.7 (0.7–10.8)
IV and V	42 (46.7)	55 (59.1)	1.7 (0.5–5.9)
Age group (years)			
<46	9 (9.8)	9 (9.6)	1
46–55	23 (25.3)	18 (19.1)	1.3 (0.4–3.8)
56–65	30 (33.0)	32 (34.1)	0.9 (0.3–2.7)
>65	29 (31.9)	35 (37.2)	0.8 (0.3–2.4)
Diagnostic group			
AMI	27 (29.7)	35 (37.3)	0.7 (0.3–1.7)
Unstable angina	38 (41.8)	32 (34.0)	1.1 (0.5–2.6)
Non-ischaemic	9 (9.8)	11 (11.7)	0.8 (0.3–2.4)
Non-cardiological	17 (18.7)	16 (17.0)	1
Personal history of IC			
Yes	37 (40.7)	26 (27.7)	1.8 (0.97–3.3)
No	54 (59.3)	68 (72.3)	1
Comorbidity			
Yes	63 (69.2)	54 (57.4)	1.7 (0.9–3.1)
No	28 (30.8)	40 (42.6)	1
Hypertension			
Yes	54 (59.3)	35 (37.6)	2.41 (1.3–4.4)
No	37 (40.7)	58 (62.4)	1
Consumption of tobacco			
Yes	47 (51.6)	47 (50.5)	1.04 (0.6–1.9)
No	44 (48.4)	46 (49.5)	1
Hypercholesterolemia			
Yes	36 (39.6)	33 (35.5)	1.2 (0.7–2.2)
No	55 (60.4)	60 (64.5)	1
Diabetes			
Yes	33 (36.3)	25 (26.9)	1.5 (0.8–2.9)
No	58 (63.7)	68 (73.1)	1
Cardiological risk factors			
Yes	87 (95.6)	81 (87.1)	3.2 (0.99–10.4)
No	4 (4.4)	12 (12.9)	1

*I: Senior managers, professionals; II: managers, technically qualified and trades people; III: supervisory and administrative; IV: skilled manual workers; V: unskilled manual workers.

In relation to the limitations of the work, it could be considered that there was a selection bias, given that patients with the stable form of IC were not included. However, taking into account the need for a better understanding of the factors influencing the clinical evolution of patients in a poor enough condition, the selection of the group we have studied would be particularly important.

Also it should be stated that, in order to reduce the potential effect of false negatives described by Maguirre et al. [32] in hospitalized patients, the cut-off point of ⩾6 in the questionnaire score was selected [13, 33, 34], this have been recognized to provide a high degree of specificity and sensitivity in cardiology patients [15].

Lastly, it should be explained that psychiatric interviewing was not included in our study design, since this had previously been utilized in the process of validation of the questionnaire in cardiology patients [15] and had shown a good correlation with the GHQ-28 of 0.73.

In conclusion, we could state that the 'probable psychiatric case' is high among subjects with suspected ischaemic cardiopathy. Moreover, among the predictive clinical factors identified, HT is the only one appropriate to be modified. In consequence the screening of mental health status and the control the risk factors of mental disorders should be recommended measures for these patients.

Table 3. Logistic model of the variables associated with the GHQ-28 score $\geqslant 6$

Variables	B	SE	Wald	df	Sig	OR	Lower 95% CI	Upper 95% CI
Sex								
Male*								
Female	0.89	0.37	5.98	1	0.01	2.45	1.19	5.01
Personal history IC								
No*								
Yes	0.82	0.36	5.25	1	0.02	2.26	1.13	4.35
Comorbidity								
No*								
Yes	0.6	0.34	3.1	1	0.07	1.81	0.94	3.53
Hypertension								
No*								
Yes	0.72	0.33	4.73	1	0.02	2.04	1.07	3.89
Age (years)	−0.03	0.02	4.14	1	0.04	1.03	1.01	1.07

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