

Comparison between the GHQ-28 and SF-36 (MH 1–5) for the assessment of the mental health in patients with ischaemic heart disease

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Abstract. *Objective:* To assess the mental health of patients admitted to hospital with suspected ischaemic heart disease, by means of two instruments, the General Health Questionnaire (GHQ-28) and the MH (1–5) dimension of the SF-36 Health Survey Questionnaire, and to compare the psychometric properties of both questionnaires in this population. *Methods:* A study was conducted of 185 patients consecutively admitted to hospital with suspected ischaemic heart disease, classified into four groups: Acute Myocardial Infarctus (AMI), unstable angina, non-ischaemic cardiologies, and non-cardiological conditions. Their mental health was assessed by means of the GHQ-28 and the MH 1–5 sub-scales of the SF-36; the validity of the results were analysed by the association of each instrument with socio-demographic (age, sex, social class, and educational level) and clinical (co-morbidity, risk factors, diagnostic groups and background to the illness) variables. The correlation of each instrument with other sub-scales of the SF-36 was studied. The internal consistency was measured by Cronbach's α , together with the

item-internal consistency and item-discriminant validity. *Results:* Of the population studied, 71.9% were males and the mean age was 60.2 years (SD: 10.4). The diagnosis for 33.5% was AMI and for 37.8% unstable angina. For all the variables studied, the scores in the two instruments were ordered in the same way, and were significantly worse for females and for the most disadvantaged social class. None of the scales discriminated in respect of the diagnostic group or the presence of comorbidity. However, a linear relationship was observed with risk factors. Cronbach's α was 0.95 for the GHQ-28 and 0.80 for the MH 1–5. Correlations with the other dimensions showed ranges of -0.35 to -0.61 for the GHQ-28 and of 0.26 to 0.61 for the MH 1–5. These were highest for the Vitality and Social Functioning sub-scales in both instruments. *Conclusions:* The subjective perception of mental health is measured in a similar way by both the MH 1–5 scale of the SF-36 and the GHQ-28. However, since the MH 1–5 questionnaire is shorter, it should be administratively easier to introduce into routine cardiological practice.

Key words: GHQ-28, Ischaemic heart disease, Mental health, Quality of life, SF-36, Validity

Introduction

Ischaemic heart disease (IHD) has frequently been associated with mental health problems. A greater prevalence of anxiety or depression has been found in these patients [1, 2], and it has also been related to a substantial increase in health care utilisation [3]. Furthermore, type A personality has been considered to be a predisposing factor for this clinical condition, and in recent studies, depression has been reported as an independent risk factor in the patho-physiological progression of cardiovascular diseases, rather than merely being a secondary emotional response to the illness [3]. Furthermore, it has also been suggested that worry, which is an important component of anxiety, is related to an increased incidence of coronary heart disease [4]. Nevertheless, the identification and treatment of these mental health conditions by the doctor is not always approached in a satisfactory way, due in part to the lack of short, valid survey

instruments that can be easily used in clinical practice.

The General Health Questionnaire (GHQ) in its different versions, has frequently been used as a psychiatric screening tool [5, 6]. However the SF-36 Health Survey Questionnaire is a short instrument with well-demonstrated psychometric properties [7], that has recently been validated in Spain [8] and confirmed as useful in mental health research in the general population [9]. This instrument consists of eight sub-scales which each explore different dimensions of health; one of these is the MH 1–5 sub-scale of five items, which explores the mental health and the relative health needs of defined populations [10].

In a study conducted with non-patient populations, McCabe et al. [11] make a comparison between the GHQ-12 and the MH sub-scale of the SF-36 and find that the two instruments have similar psychometric properties.

The objective of this study is to assess the state of mental health of a population of patients admitted to hospital with suspected ischaemic heart disease, by means of two instruments, the GHQ-28 and the MH 1–5 sub-scale of the SF-36, and to compare the psychometric properties of these for the defined population.

To carry out the validation of the construct, the hypothesis was adopted that the mental health in the population studied could be inversely associated with age, educational level, social class and certain clinical variables such as the chronicity of the condition (unstable angina versus AMI), the presence of cardiovascular risk factors, previous personal history of the pathology, and the existence of other associated diseases (comorbidity). Further, and on the basis of previous studies [16], it was considered that females would suffer a worse mental health status than males.

Subjects and methods

Subjects

The study was conducted in the University Hospital of Puerto Real, Cádiz, 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 in the study, all the patients were asked for their informed consent and all agreed to participate in the study. The patients were classified into four groups: Acute Myocardial Infarction (AMI); unstable angina; non-ischaemic cardiologies; non-cardiological disease, based on clinical, electrocardiographical and biochemical criteria, and according to the medical report on discharge from hospital.

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

The socio-demographic and clinical information was obtained from a structured questionnaire and from the clinical record of the patient. The categories of social class and educational level used were those of

the Spanish Epidemiology Society (SEE) classification [12].

The presence of arterial hypertension, hyperlipemia or diabetes were considered to be risk factors when they appeared in the clinical record of the patient. The existence of comorbidity was recognised 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 of patients was assessed using the MH 1–5 sub-scale of the SF-36 Health Survey Questionnaire. The items are coded, aggregated and transformed to a scale ranging from 0 (worst health status) to 100 (best health status), according to the formula: $(\Sigma MH-5) \times 25/100$. Items MH3 and MH5 are coded in reverse manner to MH1, MH2, MH4 [13]. The MH 1–5 is claimed to have good validity as a mental health screening instrument; in addition, it covers states of anxiety and depression, as well as positive aspects of mental health [14]. Also used in the study was the General Health Questionnaire-28 (GHQ-28), validated in Spanish by Lobo et al. [15], in which a score of ≥ 6 was taken as cut-off point. Both questionnaires were applied to the patient on the same day, when the patient was clinically stable.

Analysis

1. Mean and SD were calculated for the MH 1–5 and GHQ-28 with the variables used as constructs. One-way ANOVA ($p < 0.05$) was used for their comparison.
2. Two techniques were used to assess the internal consistency of the SF-36 – item-scale correlations (item-internal consistency) [17] and Cronbach's α . The first, item-internal consistency, assesses the extent to which one item is related to the remainder of its scale omitting that item; it should exceed 0.4 [18]. Cronbach's α measures the overall correlations between items within a scale; reliability is considered acceptable for group comparisons when α exceeds 0.7 [19, 20].
3. Pearson's coefficient of correlation was calculated to determine the correlations of the GHQ-28 and the MH 1–5 with the rest of the dimensions of the SF-36.

The software used for the tabulation and statistical analysis of the data was EPINFO v.6 and SPSS v.6 for Windows.

Results

Characteristics of the population

The total sample studied was 185 patients, of whom 71.9% were males and 68.1% were older than 56 years of age (mean = 60.2; SD = 10.4). Subjects without any educational qualification represented the

Table 1. Characteristics of the population

Variables	N (%)
Sex	
Males	133 (71.9)
Females	52 (28.1)
Age group	
< 46	18 (9.7)
46–55	41 (22.2)
56–65	62 (33.5)
> 65	64 (34.6)
Social class (183)	
Housewives	42 (23.0)
I and II	13 (7.1)
III	31 (16.9)
IV and V	97 (53.0)
Educational level (184)	
Illiterate/no qualifications	142 (72.2)
Primary	16 (8.7)
Secondary	16 (8.7)
Further	10 (5.4)
Diagnostic groups	
AMI	62 (33.5)
Unstable angina	70 (37.8)
Non-ischaemic	20 (10.8)
Non-cardiological	33 (17.9)
Risk factors (184)	
None	47 (25.5)
One	75 (40.8)
More than one	62 (33.7)
History of ischaemic heart disease	
Yes	63 (34.1)
No	122 (65.9)
Comorbidity	
Yes	117 (63.2)
No	68 (36.8)

greatest proportion, and 53% of the total belonged to the categories of semi-qualified and unqualified manual workers (groups IV and V of the classification) (Table 1). The distribution of the clinical variables is also given in Table 1, where it can be observed that the diagnostic group least represented in the sample was that of patients with non-ischaemic cardiologies (10.8%).

Validity

The mean (with SD) of the socio-demographic and clinical variables from the survey instruments are shown in Tables 2 and 3. The women and the most disadvantaged social classes, together with the housewives, score significantly worse on both scales; however, no significant differences are observed in the remaining socio-demographic variables (Table 2). Among the clinical variables (Table 3), the order of scoring on the two scales is similar, although when

the previous personal history of the illness is considered, the scores are only significantly lower in the GHQ-28. The study of the risk factors shows a linear

Table 2. Mean (SD) scores with the GHQ-28 and the MH 1–5 in the socio-demographic variables of the population studied

	GHQ-28	MH 1–5
Sex		
Males	5.3 (4.8)	69.8 (23.2)
Females	8.6 (6.6)	55.3 (24.3)
Significance	0.000	0.000
Age group		
< 46	7.3 (6.6)	62.4 (29.3)
46–55	6.7 (5.3)	62.5 (28.9)
56–65	6.2 (5.3)	69.1 (21.4)
> 65	5.7 (4.8)	65.4 (22.6)
Significance	0.64	0.53
Educational level		
Illiterate/no qualifications	6.5 (5.2)	64.5 (24.3)
Primary	5.6 (4.8)	71.0 (24.4)
Secondary	6.4 (6.4)	65.5 (27.1)
Further	3.3 (3.7)	76.8 (21.3)
Significance	0.27	0.36
Social class		
Housewives	7.9 (5.3)	58.0 (22.7)
I and II	2.9 (3.2)	80.6 (16.3)
III	6.6 (5.2)	63.7 (24.4)
IV and V	5.8 (5.2)	68.0 (25.1)
Significance	0.016	0.017

Table 3. Mean (SD) scores with the GHQ-28 and the MH 1–5 in the clinical variables of the population studied

	GHQ-28	MH 1–5
Diagnostic group		
AMI	5.4 (4.8)	70.6 (23.2)
Unstable angina	7.2 (5.5)	62.0 (24.8)
Non-ischaemic	5.9 (5.9)	69.8 (21.9)
Non-cardiological	6.0 (4.9)	61.8 (25.8)
Significance	0.28	0.13
History IHD^a		
Yes	7.6 (5.8)	62.0 (25.3)
No	5.5 (4.8)	67.6 (23.7)
Significance	0.01	0.14
Risk factors^b		
None	4.3 (3.3)	73.0 (23.4)
One	6.3 (5.8)	64.8 (23.3)
More than one	7.7 (5.3)	61.5 (25.6)
Significance	0.005	0.03
Comorbidity		
Yes	6.7 (5.3)	67.5 (27.4)
No	5.4 (5.1)	64.6 (22.4)
Significance	0.08	0.16

^a Ischaemic heart disease.

^b *F*-test for linear trend: GHQ-28, $p = 0.000$; MH 1–5, $p = 0.017$.

Table 4. Correlations of the SF-36 dimensions with the GHQ-28 and the MH 1–5

SF-36 scales	GHQ-28	MH 1–5
Physical functioning (PF)	–0.46	0.30
Social functioning (SF)	–0.53	0.61
Role limitation attributed to physical problems (RP)	–0.44	0.33
Role limitation attributed to emotional problems (RE)	–0.51	0.49
Mental health (MH)	–0.61	1
Vitality (VT)	–0.61	0.60
Bodily pain (BP)	–0.35	0.26
General health perception (GH)	–0.58	0.44

Correlation coefficients are negative because two scales run in opposite direction.

Cronbach's α : GHQ-28 = 0.95; MH 1–5 = 0.80.

relationship with the mental health, evident in both instruments (Table 3). However, no significant differences are identified between the scores of the diagnostic groups, in either of the scales (Table 3).

The correlations of the GHQ-28 and the MH 1–5 with the rest of the sub-scales of the SF-36 (Table 4) are higher for Vitality (VT) and Social Functioning (SF), together with the sub-scales General Health (GH) and RE (Role Limitation attributed to Emotional problems), particularly in the GHQ-28. These are the aspects of health, which one would expect, a priori, to correlate most closely with mental health. The correlation of the MH 1–5 with the GHQ-28 was higher (–0.61).

Internal consistency

Cronbach's α exceeds the recommended level of 0.7 in both instruments (Table 4), and the range of correlations of each item with its dimension, adjusted for overlap, is from 0.55 to 0.7 for the GHQ-28 and from 0.73 to 0.80 for the MH 1–5. These are greater than the correlations of each item with the other sub-scales (0.05–0.61 for the MH and 0.07–0.46 for the GHQ-28).

Discussion

The presence of psychiatric symptoms, particularly those of anxiety and depression, have been associated with a health-related quality of life (HRQL) score similar to [21] and even worse than [22] that of patients with chronic illnesses. These symptoms are frequent in patients with ischaemic heart disease [1] although they are rarely diagnosed by the cardiologist, or else are inappropriately attributed to a physical disease. The identification and measurement of such symptoms require simple and valid instruments that can be introduced into clinical practice, to

enable these conditions to be treated with improved medical and HRQL results, and help to prevent repetition of cardiovascular events [23].

The aim of this study is to compare the validity of the sub-scale MH 1–5 of the SF-36 as a psychiatric screening tool in patients with heart disease, with the GHQ-28, whose sensitivity and specificity in this type of patient has already been demonstrated [6].

The principal limitation of the study is considered to be the existence of a selection bias from the inclusion of patients admitted into hospital for IHD, but not out-patients. However, such bias is unlikely seriously to affect the results, given the specific objectives of the study.

More notable among the results observed is the similar behaviour of the scales in the scores obtained on the socio-demographic variables. McCabe et al. [11], in contrast to other authors [16], do not find an association with the age variable in the MH 1–5, and this finding is in agreement with that observed by Alonso et al. [24] and by Ayuso-Mateos et al. [9] in the general Spanish population; in this population, of all the scales of the SF-36, the MH is the scale, which is least closely related to age. McCabe et al., however, do detect differences by age groups in the GHQ-28; these authors claimed that, if the GHQ-28 is sensitive to age, this could be due to the fact that it contains items, which respond to age as well as to mental health, and that, for this reason, it may not be suitable for use with elderly people. Nevertheless, in our population of patients in which the percentage of subjects older than 55 years is high, this hypothesis does not appear to be proven. On the other hand, our results could be explained by a cohort effect or by the demonstrated tendency for successive generations to report their health more adversely [25], or else by the relatively less variation in the ages of the patients included in our study.

Although the clinical variables present the same hierarchy of scores in the two instruments, they do not point in the direction of the foregoing hypothesis, except when risk factors are considered. Coulehan et al. [21] studying patients with severe depression only find a correlation of the comorbidity with the Physical Functioning (PF) sub-scale of the SF-36. Further, Dougherty et al. [26] observe that none of the sub-scales of the SF-36 discriminates between degrees of severity of the clinical condition in patients with angina pectoris. This last finding is in line with that observed in our study in the diagnostic groups and could be explained by the existence of precordial pain and of the stress caused by admission to hospital; since these are factors that are common to all the groups, they could mask the effect of the illness itself, but such possible explanation would be susceptible to determination in a follow-up study.

The correlations of the two instruments with the other sub-scales of the SF-36 are as expected; as has been shown by its authors, the MH 1–5 is related

more strongly with the SF and RE sub-scales than with the PF sub-scale [27]. This behaviour is also maintained in the GHQ-28, and is similar to that observed by McCabe et al. [11] and by Ayuso-Mateos et al. [9].

In conclusion, we can state that the MH 1–5 is a promising survey instrument for revealing the mental health state of heart disease patients. In addition, it can be used with the other sub-scales of the SF-36 to assess other aspects of the general health of the individual. At the same time, it is a short instrument, with psychometric properties similar to others that have already been in use as screening tools for psychiatric disorders. However, its usefulness is limited in respect of aspects such as sleep disorders or sexual functioning, which are not dealt with in any of the sub-scales.

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