BRIEF ORIGINAL

PSYCHOMETRIC PROPERTIES OF THE DEATH ANXIETY SCALE IN PATIENTS WITH ISCHEMIC CARDIOMYOPATHY

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ABSTRACT

Background: Ischemic cardiomyopathy is a major public health concern in Spain. Death from ischemic disease accounts for approximately a third of all deaths due to cardiovascular disease, and imposes a serious burden on already overstretched public health system owing to the tendency to chronicity. This study aimed to evaluate the psychometric properties of Templer's Death Anxiety Scale (DAS) in a sample of patients with ischemic cardiomyopathy (acute myocardial infarction and angina pectoris).

Methods: This study applied the Spanish version of Templer's Death Anxiety Scale (DAS). The sample consisted of 141 patients (61% men) with ischemic cardiomyopathy, mean agede 71.57 years (SD=5.76). A descriptive statistical analysis was performed, and factorial analysis of the principal components.

Results: The corrected element-total correlation was positive in all items, with values ranging from 0.32 and 0.54. Four factors jointly explained 51.85% of the data variance. The reliability coefficients were high in all of the variables analysed, with a total Cronbach Alpha of 0.77.

Conclusions: The results obtained in this study revealed ischemic cardiomyopathy was susceptible to the process of death anxiety. This underscores the need for educating patients with this pathology to help them adapt to the process of chronicity, and to develop an understanding of the naturalization process of dying bearing in mind each person's multidimensionality.

Key words: Ischemic heart disease, Death, Attitude to death, Anxiety, Psychometrics.

RESUMEN

Propiedades psicométricas del Death Anxiety Scale en pacientes con cardiopatía isquémica

Fundamentos: En España, la cardiopatía isquémica es un problema importante de salud pública. Las muertes por enfermedad isquémica representan, aproximadamente, un tercio del total de muertes debidas a una enfermedad cardiovascular. En todo caso, comportan atenciones e intervenciones importantes en materia de salud, derivadas de su tendencia a la cronicidad. Este estudio tuvo como objetivo evaluar las propiedades psicométricas de la Death Anxiety Scale (DAS) de Templer, en una muestra de pacientes con cardiopatía isquémica (infarto agudo de miocardio y angina de pecho).

Métodos: En la presente investigación se utilizó la Death Anxiety Scale (DAS) de Templer, en la versión adaptada a sujetos españoles. Se empleó una muestra total constituida por 141 sujetos con cardiopatía isquémica y con una edad media de 71,57 años (DT=5,76), siendo el 61% de la muestra varones. Se realizaron análisis estadísticos descriptivos, así como un análisis factorial de los componentes principales.

Resultados: La correlación elemento-total corregida fue positiva en todos los ítems, con valores entre el 0,32 y 0,54. Se identificaron cuatro factores que, en conjunto, explicaron un 51,85% de la varianza de los datos. Los cocientes de fiabilidad encontrados fueron elevados en todas las variables analizadas, obteniéndose un Alfa de Cronbach total de 0,77.

Conclusiones: Los resultados obtenidos en nuestra investigación nos indican que la enfermedad de cardiopatía isquémica no es ajena al proceso de ansiedad ante la muerte. Está justificado, por tanto, promover una educación en pacientes con esta patología para la adaptación al proceso de cronicidad, así como para la naturalización del proceso final del ciclo vital, teniendo presente la multidimensionalidad de la persona.

Palabras clave: Cardiopatía isquémica, Muerte, Actitud frente a la muerte, Ansiedad, Psicometría.

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INTRODUCTION

The term "death anxiety" was included by the *North American Nursing Diagnosis Association* (NANDA) in its 2007-2008 biennial taxonomy. The diagnostic term was defined as an unspecified feeling of discomfort or malaise produced by a perceived threat, real or imaginary, to one's own existence[1]. Currently, NANDA defines it as a vague and unsettling feeling, distress, and/or fear provoked by the perception of a threat, real or imaginary, to one's own existence[2].

Numerous studies have identified variables that may be significantly related to death anxiety. Tomás-Sábado[3] has identified the following: age, gender, religious beliefs, health status, occupation, and education concerning death; and found anxiety and fear of death were influenced by an individual's cultural background.

Though death anxiety has been analysed in relation to an array of pathologies such as chronic renal insufficiency[4], cancers[5], and HIV[6,7], studies on patients with cardiac diseases are scarce. Moreover, the data suggests anxiety and depression may reduce the quality of life and increase physical symptoms that may even lead to death in coronary ill patients[8].

Coronary disease or ischemic cardiomyopathy is a cardiomyopathy produced by arteriosclerosis of the coronary arteries supplying blood to the myocardium. Two prominent types are acute myocardial infarction and angina pectoris (stable and unstable). Though cardiomyopathy is a multifactorial process, 90% of cases are estimated to have an arteriosclerotic aetiology, with numbers rising according to variables such as gender and age (predominantly men in general, and myocardial infarction in particular in all groups)[9]. Moreover, studies have revealed a north-south European cline in the death rate and in the number of deaths caused in both men and women by cardiovascular diseases such as coronary disease)[10]. The initial clinical presentation of coronary disease (infarction or angina) may be influenced by other factors such as drug treatment with beta-blockers and/or statins[11].

Approximately 15.4 million people aged 20 years or over in the United States suffer from ischemic cardiomyopathy[9], and forecasts estimate that 50% of men and a third of middle aged women in the United States will suffer an episode of ischemic cardiomyopathy throughout their lives[12]. Several studies in Spain have estimated the incidence rate of myocardial infarction will grow annually between 135-210 new cases per 100.000 men, and between 29-61 new cases per 100.000 women between the ages of 25 to 74 years[13]. In 2006, 31% of deaths from cardiovascular diseases in Spain were due to ischemic heart disease, which translated into a death rate of 84.2 per 100.000 habitants[14]. In 2014, heart diseases accounted for 20.2% of all deaths in Spain[15].

In spite of recent progress in reducing the incidence of coronary disease, it remains one of the main causes of death in industrialised countries[16]. Although the incidence rate in Spain has tended to fall[17,18], it continues to be a major health issue for public health authorities. Factors such as the gradual ageing of the population and immigration indicate the absolute number of coronary episodes, and thus the prevalence of coronary disease, will not fall and may even rise in the near future[18], which underpins it is a crucial factor to be borne mind in the management of public health services.

Chronic diseases, in particular an abrupt life-threatening illness such as the different types of coronary disease expose individuals to their own mortality. It appears that a good psychological frame of mind regarding terminal illness can optimize a patient's quality of life, induce

positive attitudes, and probably improve resistance to physical and psychological deterioration[4]. Owing to ethical considerations, most of the studies on death anxiety have been undertaken on healthy subjects, and no studies have been published on the impact of coronary disease on these variable.

The aims of the present study were twofold: to examine the psychometric characteristics of the DAS[19] in patients with ischemic cardiomyopathy by using the Spanish version of the scale[20], and to analyse the results of the DAS in a clinical sample.

MATERIAL AND METHODS

Study population and procedure. The data was gathered from a sample of patients with ischemic cardiomyopathy from the Coronary Disease Unit of the University Hospital of Ourense, Spain. The initial sample consisted of 165 subjects, 24 subjects experienced experimental death; thus, the total sample was composed of 141 subjects; age range 46 to 80 years, mean age 71.57 years, and standard deviation 5.76 years. In terms of gender, men (86) predominated over women (55), representing 61%, and 39% of the sample, respectively. Regarding cardiac diagnosis, myocardial infarction (63.8%) predominated over angina pectoris (36.2%). As for occupational status, 78% (119 patients) were retired, 12.1 (17) were housewives, and 9.9 (14) were unemployed. In relation to perceptions of disease, the experience was moderate for 57.4%, good for 24.1%, and bad for 18.4%. All patients freely volunteered to participate in the study, and were informed they could withdraw from the study at any time. Written informed consent was obtained from all patients, and they were assured their data would remain anonymous and confidential.

Patients were handed a written presentation of the research project explaining the aim of the study and the importance of their collaboration in responding to the questionnaire. Owing to the specific characteristics of this group, the questionnaire was applied in groups during the daily routine of the Heart Nursing School of the University Hospital of Ourense. The subject inclusion criterion was previous diagnosis of ischemic cardiomyopathy. The research team remained constant throughout the entire study, and maintained the same attitude, motivation, and presence in all of the sessions.

The experimental design was in accordance with the Declaration of Helsinki.

Measurements and Statistical analyses. An ad hoc structured questionnaire of socio-demographic variables: age, gender, clinical diagnosis, occupation, and perception of disease. As a direct measure of death anxiety, the Spanish version of Templer's Death Anxiety Scale (DAS)[19], adapted by Tomás-Sábado and Gómez-Benito[20], was administered. This instrument is extensively used and cited in the literature, and is a benchmark for all scholars in this field[21,22]. This instrument consists of 15 items with a dichotomous "true"-"false" response. Scores range from zero to fifteen, with high scores indicating high levels of death anxiety. The experimental design was in accordance with the underlying tenets of the work of Templer[19]. The analysis of the reliability of the scale showed internal consistency values ranging from 0.76 to 0.87 (Kuder–Richardson Formula 20), and temporal stability with intervals ranging from 0.71 to 0.84. The data of other studies has substantiated good discriminant and construct validity.

Descriptive statistical analyzes were performed, and asymmetry and kurtosis as well. Likewise, a factor analysis of the main components was carried out. Both differentiated analyzes are presented in the results block below. All of the analysis were performed with the statistical software package SPSS 22.0.

RESULTS

Analysis of items. Table 1 shows the descriptive statistics, asymmetry, and kurtosis obtained after administering the DAS. The means ranged from .22 (item 10) to .81 (item 9), whereas the standard deviations with similar scores were far from zero, indicating the items discriminated. The corrected item-total coefficient was positive in all of the items, with values ranging from .32 to .54, indicating all of the items contributed to the measure of the construct measured by the test (Death Anxiety), and were in the same direction. Inclusion of items on the scale was determined on the basis of the Cronbach Alpha. The alpha coefficient for all the tests was .77, and the elimination of any of the items did not improve the overall reliability of the questionnaire.

With reference to asymmetry, 7 of the 15 items had positive asymmetry with a tendency for low scores, whereas the scores for the remaining 8 items were high. Moreover, 12 items had a negative kurtosis indices, indicating a flatter distribution than normal. Consequently, there was neither extreme asymmetry (values < 3.00) nor extreme kurtosis (values < 8.00), indicating there were neither problems of asymmetry or kurtosis in the variables under analysis. Finally, in all of the items, the Kolmogorov-Smirnov Goodness-of-Fit Test (Z) confirmed the abnormal distribution (p < .05) (table 1).

Table 1 **Descriptive statistics.**								
item	M	SD	$r_{i\text{-}t}$	α if item was eliminated	Asym. (SE = .204)	Kurt. (SE = .406)	Z	p
Das $_1$	.37	.48	.544	.744	.550	-1.722	.408	.0001
Das $_2$	.42	.50	.393	.758	.304	-1.935	.379	.0001
Das $_3$	.30	.46	.440	.767	.893	-1.219	.444	.0001
Das $_4$	.56	.50	.377	.760	-.246	-1.968	.372	.0001
Das $_5$	.78	.42	.443	.754	-1.367	-.132	.482	.0001
Das $_6$	.80	.40	.384	.759	-1.527	.338	.491	.0001
Das $_7$	.57	.49	.524	.745	-.304	-1.935	.379	.0001
Das $_8$	.52	.50	.414	.756	-.100	-2.019	.353	.0001
Das $_9$	.81	.48	.386	.766	-1.006	1.136	.534	.0001
Das $_{10}$	.22	.42	.358	.766	1.367	-.132	.482	.0001
Das $_{11}$	.38	.49	.537	.767	.487	-1.789	.401	.0001
Das $_{12}$	.67	.47	.359	.761	-.749	-1.460	.430	.0001
Das $_{13}$	.30	.46	.355	.761	.856	-1.285	.440	.0001
Das $_{14}$	.47	.50	.320	.765	.100	-2.019	.353	.0001
Das $_{15}$	.79	.41	.346	.762	-1.419	.013	.485	.0001
M = Mean; SD = Standard Deviation; ri-t = Correlation item - corrected total; α = Cronbach Alpha Indices; Asym. = Asymmetry; Kurt. = Kurtosis; SE = Standard Error; Z = Z of Kolmogorov-Smirnov; p = Statistical significance (bilateral).								

Factorial estructure. To analyse the validity of the DAS construct, factorial analysis of the principal components was performed prior to varimax rotation. The determinant of the correlation matrix was zero (< .01), indicating a high presence of correlations, which confirmed the factorial model; Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .794, which was above the recommended value of .60, and rejected the null hypothesis that the correlation matrix was an identity matrix by Bartlett's test of sphericity (χ^2 [105, N = 141] = 412,679 < .01), ensuring the factorial analysis was adequate, and the model obtained good fit. Only the saturations above .45 were included, and in line with the criterion of values above 1, a total of 4 factors were identified that explained 51.85% of the variance in the data (table 2).

Factor 1 saturated items evaluating death anxiety in the cognitive-affective matrix. This factor obtained the highest percentage of the explained variance, 24.51%, with the highest factorial loading in items 5, 9, 7 and 15. The factor was termed "cognitive-affective", with a reliability of .66. Factor 2 explained 10.19% of the variance and was composed of items relating to death anxiety associated to the awareness of the

Table 2 — Rotated factorial structure of Templer's Death Anxiety Scale in a sample of patients with cardiomyopathy ischemic.					
item	F1	F2	F3	F4	h²
5. I am not at all afraid to die.	.78	-	-	-	.67
9. I fear dying a painful death.	.75	-	-	-	.59
7. The thought of death never bothers me.	.54	-	-	-	.51
15. I feel that the future holds nothing for me to fear.	.47	-	-	-	.39
2. The thought of death seldom enters my mind.	-	.78	-	-	.68
1. I am very much afraid to die.	-	.73	-	-	.64
8. I am often distressed by the way time flies so fast.	-	.48	-	-	.41
12. I often think about how short life really is.	-	.47	-	-	.57
4. I dread to think about having to have an operation.	-	-	.65	-	.50
11. I am really scared of having a heart attack.	-	-	.64	-	.57
10. The subject of life after death troubles me greatly.	-	-	.57	-	.36
6. I am not particularly afraid of getting cancer.	-	-	.55	-	.40
14. The sight of a dead body is horrifying to me.	-	-	-	.70	.55
3. It doesn't make me nervous when people talk about death.	-	-	-	.62	.54
13. I shudder when I hear people talking about WW III.	-	-	-	.54	.43
Eigen value	24 (.51)	10 (.17)	9 (.28)	7 (.87)	-
% of Variance	24 (.51)	34 (.69)	43 (.97)	51 (.85)	-
(*) Only loadings > .45 are shown.					

passing of time (12, 8), and the fear life is coming to its end (1, 2). The reliability for this factor was .65, and it was labelled "awareness of the passing of time". Factor 3 consisted of items explaining 9.28% of the variance, referred to pain (4, 11) and disease (10, 6), and was named the "fear of pain and disease" factor, with a reliability of .56. Finally, factor 4 explained 7.87% of the variance, and had the highest factorial load in items 14, 3, and 13, and was referred to as the "stimuli related to death" factor, with a reliability of .49 (table 2).

DISCUSSION

The results of this study revealed the homogeneity of the items and their reliability, suggesting all of the items were evaluating the same variable i.e., Death Anxiety, which was in agreement with other studies[19,20,21,23,24].

The reliability coefficients of the DAS were high in all of the variables analysed, with a total Cronbach Alpha of .77 that was comparable to previous studies[7,19,20,25], underscoring it was a reliable instrument for evaluating death anxiety.

With regards to the factorial structure of the scale, four factors were obtained and termed: "cognitive-affective" (F1); "awareness of the passing of time" (F2); "pain and disease" (F3), and "stimuli related to death" (F4). Though the structure of factor 1 failed to fully coincide with the findings of other authors, these items, except 9, coincided with factor 1 in other studies[20,26,27].

As for the structure of factor 2, the factorial loadings of items 8,12 coincided with factor 4 of Tomás-Sábado, and Gómez-Benito[20]; Lonetto, Fleming, and Mercer[26]; and Devins[28]; and items 2, 1 with factor 3 of Templer[19], and factor 1 of Tomás-Sábado, and Gómez-Benito[20]; and Lonetto, Fleming, and Mercer[26]. All of the items in factor 3,

except 10, coincided with factor 3 of Saggino and Kline[27], factor 2 of Tomás-Sábado, and Gómez-Benito[20]; and factor 1 of Warren, and Chopra[29]. Finally, the factorial structure of the factor 4 was identical to factor 3 of Tomás-Sábado, and Gómez Benito[20]. In general, the factorial structure was coherent and quite similar, and the differences were in line with those suggested by several authors in relation to the multidimensionality of the DAS[19,30], which underpinned it was a valid instrument for evaluating death anxiety in patients with ischemic cardiomyopathy.

Within the main limitations found, the reduced number of participants, conditioned by experimental mortality, can be noted. However, it should also be noted as an advantage that conducting the study within a hospital context implies obtaining complementary information and making it possible longitudinal type investigations.

As previously noted, the aims of the present study were twofold: to examine the psychometric characteristics of the DAS[19] in patients with ischemic cardiomyopathy by using the Spanish version of the scale[20], and to analyse the results of the DAS in a clinical sample. The data provides valuable information given the current dearth in the literature, and is intended to contribute to development of new lines of empirical psychological research in a field that is of undoubtable clinical and theoretical interest for applications designed to further our understanding of the factors influencing personal and social attitudes and beliefs towards death, and to inform educational interventions aimed at helping patients to cope with life-threatening illness.

In short, the results of this study have revealed that ischemic cardiomyopathy was susceptible to the process of death anxiety. Thus, the aim of this study was to identify the factors relevant

to the design of psychological interventions primarily aimed at helping patients to explore their attitudes towards death, unveil their fears, develop coping strategies, view life positively, and to do everything possible to achieve this goal[31]. Hence, the need for promoting education for the ''naturalization'' of death and the process of dying, without ignoring the family system[32,33]. Taking into account each person's multidimensionality (social, somatic, psychological) but also his spiritual and religious plane[34,35], that functions as a unified, integrated, and fluctuating system, as well as being dynamic and flexible (changing through time) adapting according to the evolution of the disease, priorities, values, needs, and so forth. This approach is designed to ensure the target of intervention is aimed at improving the patient's quality of life.

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