



Mini-Mental Adjustment to Cancer Scale: Construct validation in Spanish breast cancer patients

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ABSTRACT

Objective: The Mini-Mental Adjustment to Cancer Scale (MiniMAC) is widely used to evaluate cancer patients' psychological responses to diagnosis and treatment. Validation studies of the scale have shown inconsistency in the obtained factor structures. The aim of this study was to explore the factor structure, using Confirmatory Factor Analysis (CFA), and other psychometric properties of the MiniMAC in Spanish breast cancer patients.

Methods: A sample of 368 women with breast cancer completed the MiniMAC and the 18 items version of the Brief Symptom Inventory (BSI-18).

Results: The original penta-factorial model and three additional models derived from the empirical research -two first-order structures with four and three factors, and a second-order bifactorial structure- were tested. The five-factor model showed the best model fit and largely replicated the original MiniMAC's subscales. Five factors had acceptable reliability and showed modest correlations with emotional distress in the expected direction.

Conclusions: The Spanish version of the MiniMAC has a satisfactory overall performance and serves as a brief, reliable and valid tool measuring cognitive appraisals and ensuing reactions to cancer.

1. Introduction

Research points to that people with cancer show high levels of psychological distress, and prevalence of any mood disorder is around 38% (28%–49%) [1]. Therefore, distress has been endorsed as the “6th vital sign” in cancer care by international societies and accreditation organizations [2,3], and recommendations of routine screening for and management of distress have been established as an integral part of whole-person cancer care in clinical practice guidelines [4,5].

Coping strategies have been associated with various psychological results and have a significant influence on cancer patients' distress [6–10]. The Mini-Mental Adjustment to Cancer scale (Mini-MAC), a shortened and refined version of the original MAC scale [11], is among the most widely used instruments in assessing cancer-specific coping.

The *Mental Adjustment to Cancer model* was developed by Greer and Morris in the late 1970s [12–14]. According to this model, mental adjustment comprises both cognitive appraisals of the threatening situation and the ensuing reactions [15]. After initial period of distress and confusion, many people perceive cancer as a challenge, others focus on the uncertainty and feel anxious, while some see the diagnosis as loss of

a hoped-for future. This appraisal of the diagnosis challenge, threat, or loss then leads to a secondary appraisal of the resources available to the individual for coping with the illness. If the diagnosis is seen as a challenge, a positive adjustment style that has been termed by some as a “fighting spirit” develops. If the diagnosis is seen as a loss or defeat and death is seen as inevitable, a “helpless/hopeless” adjustment results. A person who focused on the uncertainty in his or her situation and the unpredictability of the future becomes anxiously preoccupied with the disease. Two further patterns of interpretation and coping may be found: fatalism (the trend to have a stoic acceptance of their illness) and cognitive avoidance (when the threat is so great that people minimize, avoid or even deny its severity) [16,17]. Studies have consistently found that patients with helpless/hopeless and anxious adjustment styles have greater emotional distress than those with fighting spirit [18–23].

The Mental Adjustment to Cancer Scale (MAC), a 40-item self-rating measure using a four-point Likert scale, was developed by the authors of the theoretical model to measure the five adjustment styles in cancer patients above mentioned: fighting spirit (FS, 16-items), helpless-hopelessness (HH, 6-items), anxious preoccupation (AP, 9-items),

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fatalism (FA, 8-items) and cognitive avoidance (CA, 1-item) [12]. The problem of assessing avoidance with only one item, along with heterogeneous findings regarding the factor structure of the MAC, led to subsequent changes and improvements. Watson et al. [11] improved the measure of CA by including additional items. They refined the original scale using a sample of 573 cancer patients, resulting in a shortened version called the Mini-MAC. The Mini-MAC is a self-rating questionnaire with 29 items, 16 of which are from the original MAC, measuring the same five dimensions: FS (4-items), HH (8-items), AP (8-items), FA (5-items), and CA (4-items).

Since its creation, the Mini-MAC has become one of the most widely used instruments for assessing coping in oncology contexts, and it has been employed with diverse samples of cancer patients [21,23–30]; and adapted to various languages: Chinese [31], Italian [32], Greek [33], Korean [34], Norwegian [35], Portuguese [36], Persian [37], and even dialects such as Taiwanese [38]. Further, the psychometric properties of the original English version and the Chinese adaptation have been re-analysed [39,40].

Existing research has suggested a four- or five-factor structure (or even three-factor). In some cases, these factors have been grouped into other, higher-order structures. Five-factor solutions replicate to a large extent the original structure of the Mini-MAC [32,33,36–38,40]. Most four-factor solutions have grouped FS and FA together into a single factor, with HH, AP, and CA remaining independent factors [34,35]. Some findings have grouped HH and FS in the same factor [36] or eliminated FA [39]. Regarding three-factor structures, FS and FA are usually grouped into a single factor, HH and AP are grouped into a second factor, and CA remains isolated [31]. Finally, the possible existence of structures of higher order has also been explored. Anagnostopoulos et al. [33] supported a second-order bifactorial structure differentiating adaptive (FS, FA, and CA) and maladaptive coping (HH and AP).

Several authors point out that the inconsistency findings regarding the Mini-MAC's factor structure are due to methodological issues [35,38,40]. Certainly, small or insufficient sample sizes in some studies [31,33,34,39] would have been an impediment to obtaining accurate and robust factor solutions [41]. Furthermore, exploratory factor analysis (EFA) was used by several authors rather than confirmatory factor analysis (CFA) to test the structure [31,32,34–37,39], even though EFA is discouraged to obtain substantive conclusions regarding the maintenance of an instrument structure through different population subgroups [42]. Moreover, CFA provides very informative fit indices and includes an indication of the measurement error [43].

Given the common use of this scale by professionals in the cancer context and the absence of data in the Spanish population, the present study aims to examine the factor structure of the Mini-MAC by analysing data from a large sample of Spanish breast cancer patients and using CFA to test the fit of several previous models. Moreover, we provide information on the internal consistency of the Mini-MAC scores and examine its relationship to psychological distress.

2. Method

2.1. Procedure and participants

Consecutive breast cancer patients who sought care at any of the medical departments at the Fundación Instituto Valenciano de Oncología (FIVO; Spanish Institute of Oncology) were approached. The study was approved by the Ethics Committee of the Institution. Eligible patients were over 18 years of age, diagnosed with breast cancer, and able to provide informed consent. Selected patients received information about the study, provided informed consent, and completed the questionnaire package. Of 388 patients who were approached, 20 (5%) declined to participate in the study for several reasons: not interested (45%), too tired (30%), too rushed (10%), and others (15%). The final sample consisted of 368 women with breast cancer. Ages ranged from

Table 1
Descriptive statistics of the medical variables.

	N	%
Stage of disease (N = 306):		
0	3	1.0
I	64	20.9
II	139	45.4
III	78	25.5
IV	22	7.2
Phase of the illness process (N = 305):		
Diagnosis	4	1.3
Treatment*	168	55.1
Follow-up	133	43.6
Medical treatment* (N = 168):		
Surgery	27	16.0
Chemotherapy (CT)	128	76.2
Radiotherapy (RT)	8	4.8
CT + RT	2	1.2
Other	3	1.8

The asterisk indicates the subgroup of patients of the first variable (phase of the illness process) referred to in the second (medical treatment).

27 to 78, with an average of 51 years ($SD = 10.72$). The majority of the sample (70%) was married or living with a steady partner and had, at least, completed primary studies (79%). As for work status, 35% of the participants were unemployed or on sick leave, 34% worked outside of the home, 23% were homemakers, and 15% were retired. Table 1 displays medical descriptive data.

2.2. Materials

2.2.1. Sociodemographic and medical data

A data sheet was used to obtain sociodemographic information, including age, marital status, education level, and employment status. Medical data, including stage of disease, phase of illness process, and medical treatment at the time of the study, were gathered by chart review.

2.2.2. Mini-Mental Adjustment to Cancer Scale

The Mini-MAC was developed to measure patients' cognitive and behavioral responses to cancer [11]. The self-report questionnaire consists of 29 items on a four-point Likert scale and provides five subscales: helpless/hopeless (HH, 8 items), anxious preoccupation (AP, 8 items), fighting spirit (FS, 4 items), fatalism (FA, 5 items), and cognitive avoidance (CA, 4 items). Using standard translation procedures, the Mini-MAC was independently translated into Spanish by three team members, who then compared their translations and collaborated to develop a common final version. This version was back-translated into English and reviewed for equivalence to the original version. Needed changes were incorporated into the final text.

2.2.3. Brief Symptom Inventory-18

The Brief Symptom Inventory-18 (BSI-18) is a self-report symptom checklist [44]. Respondents rate 18 items on a five-point Likert scale according to the level of distress during the previous week. It provides scores for three symptom subscales (anxiety, depression, and somatization) and an overall score (Global Severity Index [GSI]). Using gender-specific normative data suggested by Derogatis [44], scores are transformed into T scores to identify "caseness" of distress ($T \geq 63$ in GSI or in at least two subscales). The Spanish version of the BSI-18 has shown adequate psychometric properties in previous studies on cancer populations [45,46]. For the present study, the BSI-18, answered by a subgroup of 284 women, indicated a satisfactory internal consistency in both GSI and the subscales (Cronbach's $\alpha_{GSI} = 0.92$; $\alpha_{\text{somatization}} = 0.77$; $\alpha_{\text{depression}} = 0.84$; $\alpha_{\text{anxiety}} = 0.86$).

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