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## Journal of Affective Disorders

journal homepage: [www.elsevier.com/locate/jad](http://www.elsevier.com/locate/jad)

Brief report

## Web-based screening for Panic Disorder: Validity of a single-item instrument

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## ARTICLE INFO

## Article history:

Received 14 November 2014

Received in revised form

4 March 2015

Accepted 30 March 2015

Available online 7 April 2015

## Keywords:

Panic Disorder

Web-based screening

Single-item instrument

Common mental disorder

## ABSTRACT

**Background:** Panic Disorder (PD) is a common mental disorder with an important social and economic cost. Web-based screening tools for early detection of PD are useful for clinical and research purposes. However, there is a paucity of instruments that specifically measure PD online. The aim of this study is to analyze the validity of one item from the Web Screening Questionnaire designed to detect PD symptoms (WSQ-Panic).

**Methods:** A total of 171 participants completed the WSQ-Panic online and were assessed by telephone using the Structured Clinical Interview for DSM Disorders (SCID-I). The sensitivity, the specificity, predictive values (PPV, NPV), and area under the ROC curve (AUC) were calculated, and the optimal cut-off point was determined.

**Results:** The WSQ-Panic showed a sensitivity of 0.83 and a specificity of 0.74. The PPV was 0.46 and NPV was 0.94. The AUC was 0.82 (95% CI: 0.74–0.90), which indicates a moderate accuracy. The optimal cut-off point is  $\geq 2$ .

**Limitations:** The representativeness of the sample is limited. All the interviews were conducted by phone. Six-month prevalence according to SCID-I criteria was considered, whereas the WSQ-Panic assesses current symptoms.

**Conclusion:** The WSQ-Panic accuracy is acceptable as an Internet screening tool, comparable to longer instruments for PD detection. This instrument is valid to quickly identify patients who suffer from panic symptoms, which can cause important distress and possibly lead to PD. It can also be very useful for screening participants in online self-help treatments and for research purposes.

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## 1. Introduction

Anxiety disorders are among the most common psychiatric disorders, with a prevalence of 13.6% and 25.6% in general and clinical populations, respectively (Roca et al., 2009). Panic Disorder (PD) is one of the most common anxiety pathologies. It affects the quality of life of those suffering from it and has an important social and economic cost (Smit et al., 2006). It has been estimated that people suffering from PD miss 11% of working days per year (Wittchen et al., 2011). Around 8 million people in the European Union suffer from PD, representing a total cost of €11 billion per year (King et al., 2008; Olesen et al., 2012; Roca et al., 2009).

Having tools that allow a quick and early detection of PD to refer patients to specialized health services and to prevent the development of the disorder in subclinical populations is crucial. Web-based screening tools can be very advantageous for clinicians and researchers, as they allow a wide geographic coverage, provide access to a large number of users, have a very low cost, reduce errors, and save time. They are also advantageous for patients: flexible hours, fewer journeys, more confidentiality, and less stigmatization (Donker et al., 2010; Marks and Cavanagh, 2009).

PD has been detected through the Internet using lengthy instruments of general health assessment, such as the *Patient Health Questionnaire* (Batterham et al., 2013), and the *Body Sensations Questionnaire* (Carlbring et al., 2007), or tools which have been designed for other disorders like the *Web Based Depression and Anxiety Test* (Farvolden et al., 2003) or the *Generalized Anxiety Scale* (Donker et al., 2011). Brief and specific screening tools must still be developed. As the Internet has become a main information source about a wide range of health issues, we believe that it is necessary to have a Web-based screening tool for early PD detection. (Leykin et al., 2012). It would allow referring potentially

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ill people to deeper evaluations in order to determine the care needed. Especially if we consider that, for many people, the Internet is the first contact with a stepped care mental health model.

The *Web Screening Questionnaire (WSQ)* is a 15-item tool, valid to screen most common mental disorders through the Internet in Dutch population (sensitivity rank: 0.72–1.00; specificity rank: 0.44–0.80) (Donker et al., 2009). The item of the WSQ that detects symptoms of agoraphobia has just been validated separately, comparing its results to the diagnosis of the *Composite International Diagnostic Interview (CIDI; WHO, 1997)*. It showed a sensitivity and a specificity of 0.81 and 0.66, respectively (Van Ballegooijen et al., 2012).

The aim of this study was to analyze the validity of the item of the WSQ, designed to detect the occurrence of symptoms of panic attacks as well as the level of distress perceived during these events, in Spanish population. For this purpose, we studied the sensitivity, the specificity, the positive and negative predictive values, and different cut-off points of the item.

## 2. Method

### 2.1. Participants and procedure

The participants were recruited using a Google banner linked to searches about common mental disorders. The individuals were redirected to a Web page which contained information about mental pathologies and the aims of the study. The inclusion criteria were as follows: being 18 or older, living in Spain and being anxious, depressed or concerned about their alcohol consumption. Suicide risk (score of 3 in the 15th item of the WSQ) was established as an exclusion criterion. The study was approved by the ethics committee of the Autonomous University of Barcelona.

Applicants completed the informed consent, the socio-demographic questionnaire and the WSQ online. Fourteen days later, a psychologist who had been trained to apply the *Structured Clinical Interview (SCID-I; First et al., 1997)* telephoned them in order to assess any anxiety disorder within the last 6 months. As this study took the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (*DSM-5; American Psychiatric Association, 2013*) as a reference, participants were diagnosed with PD if they met the diagnostic criteria for this condition, whether or not they suffered agoraphobia.

Five hundred and thirteen individuals agreed to participate anonymously. Nevertheless, 342 were not included for different reasons: 146 did not complete both questionnaires, 63 did not provide a telephone number, 87 could not be reached and 46 refused to be interviewed. The final sample consisted of 171 participants. Mean age of the participants was 36.33 ( $SD=9.4$ , range 19–58); 104 (60.8%) were female and 67 (39.2%) were male; 99 (58%) were single, 41 (24%) married, and 31 (18%) divorced/other; the educational level of the sample was: 43 (25.1%) primary, 54 (31.6%) secondary, and 74 (43.3%) higher.

### 2.2. Instruments

#### 2.2.1. Socio-demographic information

A specific questionnaire was designed to gather information about gender, marital status, education and contact data.

**2.2.1.1. WSQ-Panic.** This item measures the occurrence of panic attacks or limited-symptom attacks in the past week and the level of distress felt by individuals during these events. This distress is evaluated on a scale of 0 (*not distressing or no panic symptoms/attacks*) to 4 (*extremely distressing*). Using a cut-off point  $\geq 1$

Donker et al. (2009) reported a sensitivity and a specificity of 0.90 and 0.44 respectively.

After authorization by the authors, the WSQ was translated into Spanish by a professional translator who was supervised by a bilingual psychologist. The back translation was made by a second psychologist whose mother tongue is English. Finally, both English versions were compared and no semantic differences were found.

**2.2.1.2. SCID-I-CV.** *Structured Clinical Interview for DSM Axis I Disorders-Clinical Version (First et al., 1997)* was used as a gold standard. It is a valid and reliable instrument which has been used as a reference to determine the validity of other diagnostic tools (Caracciolo and Giaquinto, 2002; Crippa et al., 2008; Haro et al., 2006; Ventura et al., 1998).

### 2.3. Analyses

We studied differences between participants with and without PD regarding their gender and age, using Chi-square test and Student *t*-test. Sensitivity (proportion of patients with a positive test among those who are actually ill) and specificity (proportion of patients with a negative test among those who are actually healthy) were calculated. Adequate sensitivity and specificity may vary depending on the aim of the test, its cost, whether or not the disease is curable, or whether a positive screening has a negative consequence for the patient. In this study, we took as a reference the values used by the authors of the WSQ: sensitivity  $\geq 0.70$ , and specificity  $\geq 0.40$  (Donker et al., 2009).

Area under the ROC curve (AUC) was used to study the criterion validity of the *WSQ-Panic*. This procedure allows establishing the accuracy of a test by plotting its sensitivity against 1-sensitivity. With a range from 0.50 to 1, the larger the AUC is, the more accurate a test will be. It is considered that AUCs ranging from 0.50 to 0.70 reflect low accuracy, those ranging from 0.70 to 0.90 show moderate accuracy, and those greater than 0.90 show high accuracy (Fischer et al., 2003). Moreover, the optimal cut-off point, which maximizes both sensitivity and specificity, was calculated through the AUC. Because the *WSQ-Panic* is a screening tool, it is important to know the cut-off point that determines whether a deeper evaluation is needed.

Finally, positive (PPV) and negative (NPV) predictive values were calculated. PPV is the probability that a patient with a positive result in a given test is truly ill. NPV is the probability that a patient with a negative result in a test does not suffer from that condition (Fischer et al., 2003). As predictive values depend on prevalence, we describe some hypothetical values using prevalence reported in different populations in order to facilitate the interpretation of our results.

All analyses were conducted using SPSS version 22 for Windows.

## 3. Results and discussion

There were no gender or age differences between the participants with and without PD according to the *SCID-I*.

Using the theoretical cut-off point of  $\geq 1$ , the *WSQ-Panic* detected 65 participants (68%) with panic attacks/symptoms during past week. After being evaluated with the *SCID-I*, 36 participants (21%) met PD criteria. The sensitivity (0.83) and specificity (0.74) obtained by this study are similar to those described by Donker et al. (2009). These authors obtained sensitivity values of 0.90 for PD without Agoraphobia and 0.86 for PD/Agoraphobia, and specificity values of 0.44 for PD without Agoraphobia and 0.77 for PD/Agoraphobia. The results of the *WSQ-Panic* are also comparable to longer tools such as the *Panic Disorder Severity Scale (PDSS)* (sensitivity=0.83, specificity=0.64) (Shear et al., 2001).

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