

Validation of the health belief model scale for generalized anxiety in Mexican adult of general population

Validación de la escala del modelo de creencias en salud para la ansiedad generalizada en adultos mexicanos de población general

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Abstract:

According to the literature review, there are theoretical models that explain the presence of anxiety in people. These explanations agree that beliefs regarding control and the perception of vulnerability to worry seem to play an important role in the onset and maintenance of generalized anxiety. Perceiving oneself capable of modifying these concerns facilitates change and taking action in the face of worrying situations in everyday life. The Health Belief Model (MCS) has been one of the most widely used conceptual frameworks to explain the change and maintenance of behaviors related to different health situations and to develop scales that allow identifying beliefs related to the problem in question. However, there are no scales based on this generalized anxiety model, so this research aimed to construct and validate a scale with these characteristics. The construction of the items was carried out based on the dimensions that make up the MCS, and subsequently, validation by judges was carried out. Scales of anxiety, depression, life satisfaction, and self-efficacy were applied to establish the convergent and discriminant validity of the scale. Finally, an Exploratory Factor Analysis was carried out, from which 24 Likert-type scale items were obtained that were grouped into 5 dimensions, explaining 58.6% of the total variance and with a total Cronbach's alpha of .803.

Keywords:

Generalized anxiety disorder, scale, health belief model, validation, factor analysis.

Resumen:

Distintas investigaciones han demostrado que la ansiedad de las personas puede explicarse mediante distintos modelos teóricos. La mayoría de éstos sugieren que las creencias sobre el control y la percepción de vulnerabilidad a la preocupación desempeñan un papel importante en la aparición y el mantenimiento del trastorno de ansiedad generalizada (TAG). Las personas que creen que pueden modificar estas preocupaciones tienen más probabilidades de actuar ante situaciones preocupantes de la vida cotidiana. El Modelo de Creencias en Salud (MCS) es un marco conceptual ampliamente utilizado para explicar el cambio y mantenimiento de conductas relacionadas con diferentes situaciones problemáticas de salud. Sin embargo, no existen escalas basadas en este modelo para el TAG. Por lo que el propósito de esta investigación fue construir y validar una escala con estas características para la población mexicana. Los ítems se construyeron a partir de las dimensiones que componen el MCS y primeramente se realizó la validación por jueces. Posterior a ello y para establecer la validez convergente y discriminante de la escala se aplicaron escalas de ansiedad, depresión, satisfacción con la vida y autoeficacia. Finalmente se realizó un Análisis Factorial Exploratorio, del cual se obtuvieron 24 ítems con escala tipo Likert, agrupados en 5 dimensiones, explicando el 58.6% de la varianza, y con un alfa de Cronbach total de .803.

Palabras Clave:

Ansiedad generalizada, escala, modelo de creencias en salud, validación, análisis factorial

INTRODUCCIÓN

The World Health Organization (2017) reports that 3.6% of the global population suffers from anxiety disorders. By 2030, anxiety and depression are projected to be among the most debilitating health issues worldwide, posing significant public health challenges due to their substantial economic and social impact. Before 2019, an estimated 57.22 million adults in America were affected by this condition. The National Institute of Statistics and

Geography (INEGI) conducted a National Household Survey (ENH) that same year, revealing that 47.8% of Mexicans between the ages of 30 and 49 reported experiencing symptoms related to anxiety, such as worry or nervousness. The survey also found that in the State of Hidalgo, 57.2% of individuals in the same age range reported feeling worried or nervous. The Organization for Economic Co-operation and Development (OECD) reported in 2014 that mental health issues, including anxiety disorders, had a significant social cost in Mexico, contributing to unemployment,

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illness-related absenteeism, and decreased productivity at work. Additionally, the OECD highlighted that individuals with severe mental illnesses tend to have a shorter lifespan, living 20 to 30 years less than those without such conditions.

Generalized anxiety disorder (GAD) is a chronic and debilitating condition that can pose a threat to the physical and mental well-being of those affected by it. As per the Diagnostic and Statistical Manual of Mental Disorders (DSM), individuals with GAD experience excessive worry and intense nervousness, even in situations where there is little or no cause for concern. This condition often manifests as a persistent sense of fear that can significantly disrupt daily life (Jerez et al., 2016).

In January 2020, the COVID-19 health emergency was declared, leading to a global confinement protocol. In Mexico, this protocol lasted for 737 days, significantly affecting citizens' physical and psychological well-being. As a result, living conditions changed drastically, leading to a rise in mental illnesses among Mexican adults, with prevalence rates increasing by up to 48%. Various theories exist on the origins of anxiety symptoms, including emotional and cognitive processes that trigger physiological responses and perpetuate these symptoms.

One prominent theory in the field is Barlow's (1988) Anxiety Apprehension Model. According to this model, anxiety is triggered when an individual encounters a situation that has been stored in their long-term memory. This triggers a negative mood characterized by feelings of predictability, uncontrollability, incapacity, and physiological activation. The individual then tends to focus on themselves and make negative self-evaluations, which can lead to chronic activation and, eventually, hypervigilance. Simultaneously, an anxious cognitive framework is triggered, leading to an increase in the perception of threat and a decrease in the perception of control. This results in individuals perceiving themselves as incapable of effectively managing the situation.

Borkovec (1994) proposed the Cognitive Avoidance Model, which highlights two key factors that contribute to psychological vulnerability: the perception of a generalized threat and the feeling of being unable to cope with threatening situations. The model suggests that worry is a natural response to perceived threats and motivates to act and find a solution to the problem at hand. The preference for anxiogenic images facilitates a vicious cycle of pathological worry, triggering an internal cognitive avoidance response (Koerner & McEvoy, 2020).

As per Borkovec (1984), the response to anxiety is a series of uncontrollable thoughts about how to deal with future threats. These thoughts are based on the belief that worrying will reduce the chances of the feared thing happening and even help prevent or solve the problem in a better way. According to this model, pathological worry persists because it is followed by a negative reinforcement perceived by the subject, as none of the threats are fulfilled.

In his Metacognitive Model of worry, Wells (2006) suggests that pathological worry initially arises from the formation and maintenance of positive metacognitive beliefs about the process of worrying. The subject thinks that the more they worry, the better they will perform. This model also proposes the existence of a second type of meta-cognition called meta-concerns, which refers to worrying about being worried. When the subject realizes their

worry is uncontrollable, they perceive it as dangerous, as if something bad will happen to them because they are worried. As a result, they try to avoid worrying.

In 1998, Dugas and his colleagues proposed a model that explains the relationship between excessive worry and uncertainty intolerance. According to their model, uncertainty intolerance is a construct that represents negative behavioral, cognitive, and emotional reactions to situations and contexts of uncertainty. The model suggests that uncertainty intolerance originated and maintained excessive worry.

Uncertainty can be seen as a tendency of an individual to react negatively to any uncertain event or situation, regardless of the probability of occurrence and its consequences. The subjective evaluation of the individual plays a crucial role in determining their intolerance towards uncertainty. The level of intolerance depends on how the individual perceives themselves. The higher the level of intolerance, the more reactions they may experience, such as high emotional arousal, hypervigilance, and cognitive avoidance, where they suppress catastrophic and threatening images. (Díaz et al., 2016).

According to Davey's Model of Mood-Induced Perseverative Worry (2006), pathological worry is often seen as an ineffective attempt to solve problems. The main difference between people with anxiety and those without is the former's lack of confidence in their ability to solve problems. This low self-confidence and positive assessment of worries are the main characteristics that define dysfunctional cognitive perseverance. This usually happens when the person imagines a greater number of possible negative events that could interfere with their personal goals and objectives in the future. The person values this excessive worry positively since they constantly evaluate the fulfillment of their objectives.

It appears that intolerance to uncertainty and the perception of control over worrisome situations can trigger cognitive processes that lead to symptoms associated with anxiety (González et al., 2006). High levels of anxiety indicate a malfunction in the cognitive system, which activates and deactivates defensive responses to threats. Anxiety can lead to cognitive vulnerability, which is characterized by the presence of cognitive schemas related to threats or danger around acceptance, competence, and control. This type of thinking contains highly maladaptive content that usually occurs in situations that generate significant discomfort. It can make people dysfunctional by causing them to focus their attention on situations of threat or harm. (Bekhat & Neigh, 2018). The Health Belief Model identifies the key psychological characteristics that can be modified to encourage healthy behavior. It links individual beliefs with external factors that are relatively fixed and unchangeable to determine the likelihood of adopting healthy behavior (Becker & Maiman, 1995). These beliefs are evaluations that people make about different events, and they ultimately determine whether a healthy behavior is attractive or unattractive to the person (San Pedro & Roales-Nieto, 2003). The perception of risk severity and personal susceptibility determine threat perception and protective action probability.

The Health Beliefs Model places great importance on cognitive factors and considers them as a predisposing factor for adopting healthy habits. The model suggests that an individual's behavior is the result of mental processes, which are called individual beliefs.

These beliefs assign values to the consequences of their actions. The model is based on three main premises, which are formed through subjective assessments of certain expectations (Conner & Norman, 2005):

There are three important beliefs that need to be considered when dealing with anxiety. Firstly, the person needs to believe that anxiety is a significant problem that requires modification. Secondly, they need to believe that they have a certain vulnerability to anxious symptoms. Finally, they need to believe that the actions taken during the intervention will produce a benefit that is worth the personal cost. It is important to address these beliefs in order to manage anxiety effectively.

The Health Belief Model is based on assessing people's expectations and desires to avoid disease and their belief that individual actions can prevent or improve the process of acquiring healthy habits. This research aims to create an instrument that can evaluate the dimensions of the Health Belief Model in relation to the symptoms associated with generalized anxiety. According to the literature review, there is currently no scale available to measure health beliefs for anxiety.

METHOD

Participants

The study included 1,353 participants, comprising 508 men and 841 women, aged between 18 and 73 years ($\bar{x} = 26$, $SD = 9$). Of the total participants, 67% resided in the State of Hidalgo, 10% in the State of Mexico, 6% in Mexico City, and the remaining 17% were from various other states of the Mexican Republic.

It was found that 71% of the participants were single, 14% were formally married, 9% were in a common-law union, 3% were separated or divorced, and only 1% were in a dating relationship, while another 1% were widowed. In terms of education, 56% of the sample had studied or were studying for a bachelor's degree or its equivalent, 26% had completed upper secondary level or its equivalent, 11% had completed postgraduate studies, and 4% had only completed basic level studies such as primary and/or secondary.

48% of the participants were students, 17% were employed, 6% were teachers/academics, 6% were professionals, and 6% provided other occupations.

To collect participants, non-probabilistic convenience and snowball sampling was used. Participants were recruited via social media and answered a Google form.

Instruments

Questionnaire of Sociodemographic Variables (QSV). For this research, a questionnaire was constructed to gather information on sociodemographic variables, including sex, age, marital status, place of residence, occupation, and education.

Health Belief Model Scale for Anxiety in Adults (EMCS-A, constructed and validated expressly for the present research). Composed of 26 items that evaluate perceived severity, perceived susceptibility, benefits obtained, perceived barriers, and self-efficacy. 5-point Likert response scale (1 = strongly disagree, 2 =

disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree).

Life Satisfaction Scale (Diener, Emmons, Larsen & Griffin, 1985). The survey estimates people's overall satisfaction with their lives and has a high level of internal consistency ($\alpha = .84$). The Mexican version, adapted by Atienza, Balaguer, and García-Merita (2000), is used.

General Self-Efficacy Scale (Baessler & Schwarzer, 1996). The scale developed by Clavijo et al. (2020) consists of 10 items that assess an individual's perceived ability to handle a wide range of stressful situations. The response form is a 5-point Likert-type scale, where 1 indicates strong agreement, and 5 indicates strong disagreement. The scale has a high level of internal consistency, with a Cronbach's alpha (α) of .83.

Beck's Depression Inventory (Beck et al., 1988). The scale is designed to assess the intensity of anxiety symptoms in an individual and differentiate between symptoms of anxiety and depression. It has good internal consistency ($\alpha = .92$) and has been translated, adapted, and standardized for the Mexican population by Jurado et al. (1998). The scale has an internal consistency of $\alpha = .87$.

The Anxiety Inventory: Trait-State (IDARE) (Spielberg & Diaz-Guerrero, 1975). This assessment aims to differentiate between two types of anxiety: State and trait. State anxiety refers to the subjective feelings of tension, apprehension, nervousness, and worry that an individual experiences at a particular time due to the increase in the autonomic nervous system that accompanies such sensations. On the other hand, trait anxiety is described as individual differences that remain relatively stable over time. The entire scale has an internal consistency of $\alpha = .87$.

Beck's Anxiety Inventory (Beck et al., 1988). The instrument consists of 21 items and measures the severity of symptoms using a Likert-type scale ranging from zero to three points. A score of zero indicates the absence of the symptom, while a score of three indicates its maximum severity. The Mexican version for adults has been found to have high internal consistency ($\alpha = .83$), high test-retest reliability coefficient ($r = .75$), and a factorial structure of four main components, according to a study by Díaz-Barriga and Rangel in 2019.

Procedure

After reviewing the literature on the Health Belief Model (HCM), the 5 factors that would determine the scale were established, which correspond to those that make up the HBM. Based on these 5 factors, a version of 26 items was developed, using the following criteria: Writing the items in a clear, simple, and direct language to avoid any ambiguity in interpreting the reagents was necessary. The use of words with absolute content was avoided as they tend to create confusion in the reagent (Nunnally & Bernstein, 1995).

Content Validity

The scale was evaluated by eight expert judges in the fields of clinical and psychometric psychology. They were asked to assess

the relevance, clarity, and consistency of the items with the factor and the total scale. To validate the scale, a validation format was used that described the objective of the scale and the population it would be used for. The format also explained the dimensions and indicators measured by each item on the scale.

The scale was initially created and then transformed into a Google form for digital use. A pilot study was conducted with 20 participants who provided feedback on the answer options, format, wording, time, and ease of answering. After addressing the observations from the pilot phase, an online survey was conducted with 1353 Mexican men and women over 18 years of age who lived in different Mexican states. Once the database was built, statistical analyses were performed to determine the validity and reliability of the scale.

Convergent and Discriminant Validity

The Health Belief Model Scale for Anxiety (EMCS-A, Bernal-Ávila & Gil-Bernal) was administered to 1,353 Mexican adults. The scale was included in a battery of other scales, and the entire battery was administered digitally through Google Forms. The participants were contacted through various social networks such as Facebook, Messenger, and WhatsApp. Before participating, the participants were asked to provide informed consent, which included information about the study's purpose, ethical considerations, and the confidentiality and protection of their personal data. To determine the convergent and discriminant validity of the EMCS-A, Pearson's *r* was used to measure the correlation between them.

Construct Validity and Reliability

After following the judges' indications and piloting with 20 participants, an exploratory factor analysis was conducted on the adjusted scale version to determine its structure and dimensions. Finally, Cronbach's alpha was calculated for the scale as well as for each dimension of the scale.

RESULTS

After analyzing the agreements and observations made by the judges, it was found that the dimension related to perceived susceptibility did not accurately correspond to anxiety and its definition. The reagents needed to be formulated based on the probability of developing or suffering from generalized anxiety rather than specific anxiety symptoms.

It was noticed that items 2 and 4 in this dimension were written vaguely and could be interpreted in any aspect. They did not reflect the subject's belief about their own vulnerability to illness but rather their fear of losing control.

To better assess the benefits and perceived barriers of specific behaviors aimed at reducing symptoms associated with generalized anxiety, a few items in the survey had to be adjusted in their wording. Some of the reagents had similar wording, which could lead to confusion. To address this, the reagents were reworded and rearranged to fit their assigned dimensions better.

Convergent and Discriminant Validity

To assess the convergent and discriminant validity, we conducted Pearson's *r* correlations. The analysis revealed that all the factors, including the total ones, had a statistically significant positive correlation with the anxiety and depression scales. However, the correlations with self-efficacy and satisfaction with life were statistically significant but negative.

Table 1.
Pearson Correlations

EMCS-A	IA-E	IA-R	BAI	BDI	EAE	ESV
F1	.061*	.058*	.054	.060*	-.112**	-.116**
F2	.215**	.216**	.190**	.205**	-.128**	-.095**
F3	.510**	.525**	.500**	.539**	-.490**	-.359**
F4	.386**	.405**	.396**	.405**	-.381**	-.299**
F5	.218**	.240**	.177**	.235**	-.301**	-.251**
Total	.531**	.547**	.504**	.550**	-.535**	-.415**

Note: EMCS-A = Health Belief Model for Anxiety Scale, IA-E = State Anxiety Inventory, IA-R = Trait Anxiety Inventory, BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, EAE = Self-Efficacy Scale, ESV = Satisfaction with Life Scale.

Factor Analysis and Reliability

After the participants in the study answered the scale; the sample was split into two groups based on their scores - one group with high scores and the other with low scores. The first and third quartiles were used to conduct a Student's *t*-test for independent samples for each item. As a result, item 26 was discarded as it was found to be non-discriminatory. Afterward, an Exploratory Factor Analysis was conducted, and it was noticed in the commonalities table that reagent 12 reduced the overall reliability of the scale. Therefore, it was removed. Finally, a KMO of .904 was achieved (Bartlett's sphericity test, *p* < .000).

Table 2.
Factores y Alpha de Cronbach

Factor	Alpha
1. Benefits obtained	.829
2. Perceived severity	.849
3. Perceived susceptibility	.859
4. Perceived barriers	.688
5. Self-efficacy	.700
Total	.803

The final model comprised 24 items that were grouped into 5 factors. These factors explain 58.6% of the total variance and have a Cronbach's alpha of .803. The factors were named as follows: Benefits obtained, which consists of 5 items and has an alpha of .829, explaining 22.61% of the total variance. Perceived severity consists of 5 items with an alpha of .849, explaining 19.32% of the total variance. Perceived susceptibility, which consists of 5 items, has an alpha of .859 and explains 6.17% of the total variance. Perceived barriers, which consist of 5 items, have an alpha of .688, explaining 5.34% of the total variance. Finally, Self-efficacy,

which consists of 4 items, has an alpha of .700, explaining 5.16% of the total variance.

Table 3.

Factors, reagents, and factor weight

Factor	Reagent	Factor weight
I. Benefits obtained	12. Relaxing can help me feel less anxiety.	.816
	13. Paying attention to the present moment helps me reduce the discomfort caused by uncertainty.	.795
II. Perceived severity	7. Not being able to control my anxiety is serious.	.782
	9. Not being able to relax is something really serious	.767
III. Perceived susceptibility	2. There is no good chance that my excessive worrying will cause me to lose control.	.817
	1. I may not be able to control my worry about having a panic attack in the future.	.789
IV. Perceived barriers	17. I think breathing exercises are difficult to do.	.692
	19. I think that worrying less will make me more vulnerable.	.676
V. Self-efficacy	24. I am able to perform relaxation and/or breathing exercises when I feel anxious	.734
	25. I am capable of being in a situation that makes me uncomfortable without feeling the need to leave that situation.	.688

DISCUSSION AND CONCLUSIONS

An instrument was needed to evaluate the interventions based on the HBM and their relationship with generalized anxiety. However, no such instrument was found in Mexico that could evaluate the elements of the model and their relationship with the interventions. Therefore, a new instrument was developed and validated to fulfill this need.

Using the theoretical components of the HBM, 26 items were constructed to address its different factors. One of the main difficulties encountered at the time of the realization was related to the wording of the items. At first, this wording was very general, for example: "I am likely to avoid doing things that make me uncomfortable..." In this item, "discomfort" was replaced by "excessive worry," which corresponds to the symptoms associated with a generalized anxiety disorder. Likewise, we ensured clear and specific wording to identify the relationship between each factor and generalized anxiety without inducing responses.

During the experiment, special attention was given to the composition of the items to avoid any confusion between them. Specific items were written for each factor to ensure accuracy. However, the perceived susceptibility dimension did not have corresponding items, while the variability and differentiation between anxiety symptoms allowed many items to be included in the scale. After validation by judges, the number of items was not significantly reduced.

Based on the statistical analysis conducted, it was observed that the 25 items were grouped into five factors during the exploratory factor analysis (EFA). This analysis helped us to explore the number of underlying latent variables that were present in the previous observations. The five initial identified factors were maintained when performing the confirmatory factor analysis. The factorial structure of the construct was confirmed, indicating that the empirical data supports the theoretical model used to create the scale. This analysis allowed us to determine that the constructed instrument has construct validity. Further research is required to

perform a confirmatory analysis using different sample characteristics.

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