




## **Validation of the PHQ-15 questionnaire version for the Mexican population to assess psychosomatic symptoms**

### **Validación de la versión del Cuestionario PHQ-15 para población mexicana para evaluar síntomas psicósomáticos**

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#### **Abstract**

Psychosomatic symptoms are physical manifestations of psychological origin that are not adequately explained by organic causes. For this reason, it is difficult to differentiate them from other conditions, so health sciences must consider their diagnosis and research on them a priority. The PHQ-15 (Patient Health Questionnaire) is an instrument that allows its diagnosis through a list of 15 psychosomatic symptoms. The purpose of this research was to validate the PHQ-15 for the Mexican adult population, obtaining indicators of reliability, construct, and convergent validity. First, the instrument was translated and culturally adapted. This version was evaluated by mental health specialists and doctors. The PHQ-15 and the Hospital Anxiety and Depression Scale (HADS) were applied to 420 Mexican participants through an online survey. A Confirmatory Factor Analysis was performed that rectified the unifactorial structure. The results showed acceptable fit indicators and a significant contribution of all the reagents to the model. The correlations between the PHQ-15 and the HADS showed a directly proportional relationship between psychosomatic symptoms with depression and anxiety, which provides evidence of convergent validity. Regarding internal consistency, it showed adequate levels of reliability.

**Keywords:** symptom; psychosomatics; diagnosis; scale; measurement; validity; anxiety; depression; Spanish; Mexicans; organic causes; instruments; Mexican adult population; culture; health

#### **Resumen**

Los síntomas psicósomáticos son manifestaciones físicas de origen psicológico que no son explicados adecuadamente por causas orgánicas. Por lo mismo, es difícil diferenciarlos de otros padecimientos, por lo que las ciencias de la salud deben considerar prioritario su diagnóstico y la investigación sobre ellos. El PHQ-15 (Patient Health Questionnaire) es un instrumento que permite su diagnóstico a través de un listado de 15 síntomas psicósomáticos. El propósito de esta investigación fue validar el PHQ-15 para población adulta mexicana, obteniendo indicadores de confiabilidad, validez de constructo y convergente y. Primero se tradujo y se adaptó culturalmente el instrumento. Esta versión fue evaluada por especialistas en salud mental y médicos. Se aplicó el PHQ-15 y la Escala Hospitalaria de Ansiedad y Depresión (HADS) a 420 participantes mexicanos mediante una encuesta en línea. Se realizó un Análisis Factorial Confirmatorio que rectificó la estructura unifactorial. Los resultados mostraron indicadores aceptables de ajuste y un aporte significativo de todos los reactivos al modelo. Las correlaciones entre el PHQ-15 y el HADS mostraron una relación directamente proporcional entre los síntomas psicósomáticos con la depresión y la ansiedad, lo que da evidencia de validez convergente. En cuanto a la consistencia interna, mostró niveles adecuados de confiabilidad.

**Palabras clave:** síntomas; psicósomáticos; diagnóstico; escala; medición; validez; ansiedad; depresión; español; mexicanos; causas orgánicas; instrumentos; población adulta mexicana; cultura; salud

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## 1. Introduction

Psychosomatic disorders (PD) are one of the main problems in primary care (Holloway & Zerbe, 2000; Nisar & Srivastava, 2018), along with depression and anxiety (Yaskevich et al., 2015). PD are 10 times more common in women than in men, they usually manifest for the first time in adolescence (Gabbard, 2014; Yaskevich et al., 2015) and although they worsen in early adulthood, symptoms have been found in patients of all ages. They have been classified as serious chronic diseases (Holloway & Zerbe, 2000), because they are long term conditions and can worsen over time if they are not treated, in fact, somatization is often comorbid with other psychiatric conditions, such as depression, anxiety disorders (Henning et al., 2020), personality disorders, and panic disorders (Landa et al., 2012).

PD can be defined as diseases related to bodily symptoms caused by mental or emotional disturbances (Merriam-Webster Dictionary, 2021); the most common are characterized by numerous recurrent pains, such as gastrointestinal and sexual pain that occur over a period of years (Association, DSM-5 Task Force, 2013). Although somatization often occurs in comorbidity with other psychiatric conditions (Landa et al., 2012), in practice, they are symptoms that have no or limited medical explanation; thus, their diagnosis is based on the absence of a “physical” explanation, resulting in the reinforcement the mind-body dualism (American Psychiatric Association, DSM-5 Task Force, 2013). Although PD frequently present in conjunction with depression and/or anxiety, one-third or more of patients present with isolated somatization (Yaskevich et al., 2015). Patients often experience symptoms that mimic physical illnesses, making diagnosis difficult to achieve (Bransfield & Friedman, 2019).

Due to the difficulties in diagnosing PD, psychiatry has agreed that relying on the absence of a physical explanation for such a diagnosis is problematic, since this reflects the pejorative perception of psychosomatic disorders (American Psychiatric Association, DSM-5 Task Force, 2013). Stigma does not only exist among medical personnel, but also among the general population, since popular beliefs mark that the physical symptoms “are not real” (American Psychiatric Association, DSM-5 Task Force, 2013; Stone et al., 2004). Thus, the diagnosis becomes complicated and difficult to obtain, at the same time that they are usually diseases that are downplayed and are therefore little studied.

The consequence is that PTs are perceived as less important compared to a bodily disease; this in turn causes patients to feel excluded, rejected, and afraid to express their illness (Stone et al., 2004). In clinical practice, all of this leads to patients being stigmatized, misdiagnosed, or sometimes being called “liars”, “menopausal” or “hysterical”, as well as illness symptoms being ignored or to medical personnel using stress as the preferred diagnosis when other causes are not readily found. Finally, to corroborate the diagnosis, many tests and analyses are required, which implies spending money, time, and energy, in addition to emotionally draining patients (Bransfield & Friedman, 2019).

Currently there are some guidelines that facilitate the PD diagnosis. The DSM-5 manual mentions that one of the characteristics to distinguish between physical illness and PD is not the symptoms, but the way they are presented and interpreted. Affective, cognitive, and behavioral components play an important role in PD, so a more complex clinical picture can be observed than when only somatic complaints are evaluated (American Psychiatric Association, DSM-5 Task Force, 2013).

During the pandemic, psychosomatic illnesses increased, which makes it more necessary to study them. The pandemic that began at the end of 2019 due to the Covid-19 virus has caused fear, anxiety, a feeling of threat in the population, as well as excessive purchases (alcohol gel, toilet paper, cleaning supplies, bottled water), hoarding, mainly at the beginning and during the quarantine (Quezada-Scholz, 2020). This is consistent with different studies that have shown that the secondary effects of different quarantines (for instance SARS, Ebola, H1N1 influenza, Middle East respiratory syndrome and equine influenza) are similar (post-traumatic stress, confusion, anger, fears of infection, frustration, boredom, inadequate supplies, inadequate information, and financial losses) (Brooks et al., 2020). All these psychological consequences deteriorate the mental health of people causing a greater number of psychosomatic illnesses (Quezada-Scholz, 2020). Therefore, the importance of the study of psychosomatic illnesses has increased since the current pandemic.

The measurement of psychological and psychosomatic symptoms in health sciences, such as psychology, should be considered essential. Measuring PD allows both to expand knowledge about somatization generating research and, in the clinic, to provide standards for medical personnel to evaluate and manage it (Bransfield & Friedman, 2019). However, there are currently few psychometric instruments that provide us with data.

Among the best-known instruments is the PRIME-MD (Primary Care Evaluation of Mental Disorders) (Spitzer et al., 1994), which is a brief tool for making criteria-based diagnoses of mental disorders that are commonly found in primary care. Another widely used instrument is the PHQ-15 (Patient Health Questionnaire), a self-administered diagnostic scale developed for detecting somatoform disorders that consist of a list of 15 psychosomatic symptoms (Escobar et al., 1998). The PHQ-15 listing is made up of the most common physical complaints in primary care (Marple et al., 1997). The test characteristics of the PHQ-15 have been studied by several researchers, including Kroenke et al. (2002), who mentions that the PHQ-15 has high internal reliability and construct and convergent validity in relation to sick leave days at work and physical functioning.

The purpose of this research was to validate the PHQ-15 test for the Mexican adult population with the intention of having a valid scale for the PD evaluation. Although there is a previously validated instrument in Spanish (Ros Montalban et al., 2010), it was decided to use words that were better understood by the Mexican population, in addition to using less technical language so that it could be used within a population with low levels of education or different contexts.

## **2. Methods, techniques, and instruments**

### ***Participants***

To determine the sample size, a formula was used to estimate the sample size for an infinite population, with a confidence level of 96% and a margin of error of 5%. A non-probabilistic sample was used (Hernández Sampieri et al., 2018), including 420 participants, from which 64% were women and 36% men. The age range encompasses all stages of adulthood (early adulthood, middle adulthood, late adulthood) (Craig & Baucum, 2001), so that the scale would be valid for any Mexican adult, aged between 18 and 75 years ( $M = 30$ ,  $SD = 9.13$ ). The participants were Mexican from the 32 states of the Mexican Republic (northwest 13%, northeast 6.8%, west 11.3%, east 11.7%, north-central 9.6%, south-central 40%, southeast 3.1%, southwest 4.6%); however, the states with the greatest presence were Mexico City, the State of Mexico, Jalisco, and Veracruz. The first three are the most populous urban states in the entire country (Instituto Nacional de Estadística y Geografía [INEGI], 2020).

### ***Instruments***

PHQ-15, is the subscale of psychosomatic symptoms derived from the PHQ (Kroenke et al., 2002; Ros Montalban et al., 2010), which contains 15 items with somatic symptoms or groups of symptoms that represent more than 90% of the physical complaints reported in consultations (Schappert, 1992), it also includes 14 of the 15 most prevalent somatic symptoms of the somatization disorder in DSM-V (American Psychiatric Association, DSM-5 Task Force, 2013). However, it was decided to remove one question (menstrual cramps or other discomfort related to your period, such as nausea and fatigue) because not all participants are people who menstruate or can be pregnant. The answer format for each symptom was 0 (none), 1 (little), and 2 (a lot). The minimum score that participants can obtain is 0, while the maximum was 28. The Spanish version has Cronbach's Alpha coefficient of 0.78 for the global scale, and adequate validity, including divergence/convergent with correlations between moderate and high, these being between 0.3 and 0.5 with the Montgomery-Asberg Depression Rating Scale (MADRS) (Lobo et al., 2002).

Hospital Anxiety and Depression Scale (HADS) (Barriguet Meléndez et al., 2017), to assess emotional distress in patients with different chronic conditions, assessing the cognitive and behavioral symptoms of anxiety and depression. It consists of two subscales: Depression (“I always do stuff gladly”, “I feel slow”) and Anxiety (“I have suffered sensations of fear and oppression”, “I have suffered sensations of panic”), each one of them with seven items. The score for each subscale can vary between 0 and 21, since each item presents four response options, ranging from absence/minimal presence = 0, to maximum presence = 3. The higher the score obtained, the greater the intensity or severity of the symptoms. The scale shows an explained variation of 56.3% of the variance and a coefficient alpha of .88.

### **Procedure**

Due to the pandemic caused by Covid-19 and the social distancing health measures, the scale application was performed remotely through the Google Forms platform. The participants were summoned through the social network Facebook. Before the participants answered the questionnaire, they were informed that their participation was voluntary, confidential, and anonymous; they were also told the purpose of the research and that they could withdraw at any time. The emails of the researchers were provided in case the participants wanted more information. Participants had to check a box if they agreed to participate in the research, which started the questionnaire. If they did not agree, they marked another box, which opened a message thanking them for their time and ending the questionnaire. Once the participants agreed to collaborate, and if they were of legal age, the questionnaire was carried out. Once the participants finished the questionnaire, they received phone numbers for psychological attention in case the questionnaire had aroused the need to talk about a problem.

### **Data analysis**

In order to conduct the validation of the scale as a first step, the translation and cultural adaptation of the instrument was carried out; subsequently, the Confirmatory Factor Analysis (CFA) was performed. Because the items are ordinal and their distribution was not normal, the diagonally weighted least squares (DWLS) technique was used. To confirm the reliability of the scale, the coefficient omega of the scale was obtained (McDonald, 1999), which must be between .70 and .90 (Campo-Arias & Oviedo, 2008). Consecutively, it was observed if the scale has convergent validation through Pearson product-moment correlation test. Finally, percentiles were obtained for men and women to verify if they differ between the two groups.

## **3. Results and discussion**

### **3.1. Translation and content validation**

Initially, two separate psychologists translated the instrument, to later contrast it with the Spanish version from Spain (Ros Montalban et al., 2010). Many coincidences were found in the translation, with the exception of items 12 and 14, which have different ways to be expressed in Mexican Spanish. Likewise, item 6, in the Spain version was translated as “thorax pain”, while in the new translation it was modified to “chest pain”.

The translation was shown to a doctor with 10 years of professional clinical practice in Mexico, who suggested: a) the modification of item 6 “chest pain” for “chest tightness”, since tightness is usually more related to a prevalent psychosomatic symptom (American Psychiatric Association, DSM-5 Task Force, 2013) and is a more precise description, and b) the modification of item 10, from “shortness of breath” to “difficulty breathing”, also clarifying it as “*feeling that at rest you are suffocating or feeling like you have to interrupt an activity to catch your breath*”.

This modified version (see Table 1) was subject to judgment by 5 health professionals practicing in Mexico (2 of them working in research and 3 in clinical practice), who were asked to rate: a) the clarity of the instructions, b) the clarity of each item on a scale of 1 to 10, c) if the item could be understood in different ways (yes/no), and d) if it could be understood by anyone regardless their school level. Likewise, the suggestions of

the first medical judge were requested to be considered by the 5 judges and when a score of 10 was not awarded for clarity to an item, they were asked for suggestions for improvement.

The judges decided to add in item 1 “stomach pain” a clarification on what type of stomach pain the item referred to, so “(any type of pain)” was added in parentheses; regarding item 3 “arm pain” the same observation was made about the non-specificity of the item, so “pain in your arms, legs or joints (knees, hips, etc.)” was added in parentheses, which are also symptoms associated with psychosomatic disorders (American Psychiatric Association, DSM-5 Task Force, 2013); and item 4 was written as “menstrual cramps or other discomfort related to your period (such as nausea and fatigue)”.

Regarding the instructions, 4 out of 5 judges considered them clear. One of the judges suggested a rephrasing to make them easier to understand (see Table 1). The items rated less clear were: a) Item 1 “stomach pain”; b) Item 3 “arm pain” c) Item 4 “menstrual cramps or other discomfort related to your period”.

**Tabla 1.** *Tabla comparativa de versiones y modificaciones de España.*

**Table 1.** *Spain version and modifications comparison table.*

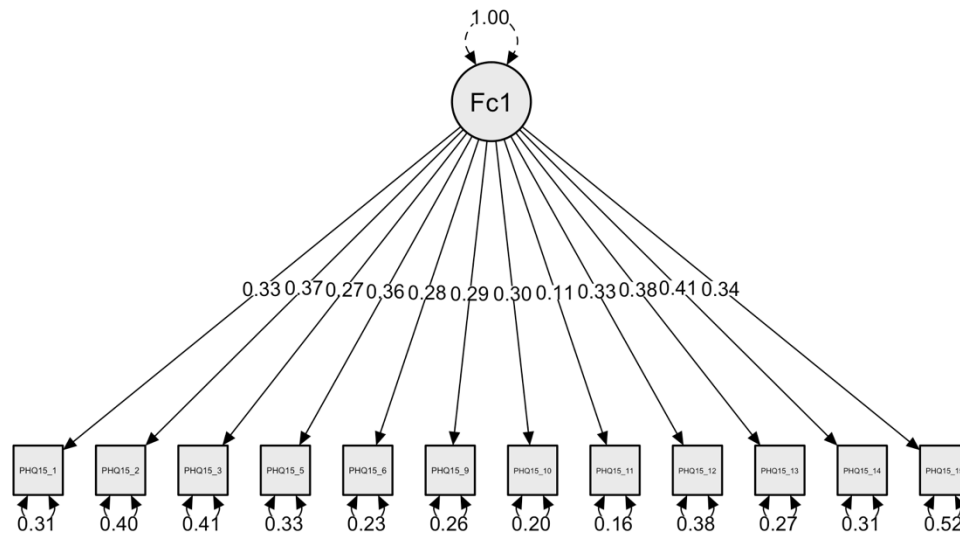
	<b>Spain version</b>	<b>First version subject to judgment in Mexico</b>	<b>Cause of modification</b>	<b>Final version</b>
R1	a.- Dolor de estómago	a. Dolor de estómago	Two judges found the description very vague, requiring a description of the type of stomach pain. Theory suggests that it could be expressed as any type of pain.	Dolor de estómago (cualquier tipo de dolor) Stomach pain (any type of pain)
R2	b.- Dolor de espalda	b. Dolor de espalda	No comments.	Dolor de espalda Back pain
R3	c.- Dolor en sus brazos, piernas o articulaciones (rodillas, caderas, etc.)	c. Dolor en tus brazos, piernas o articulaciones (rodillas, caderas, etc.).	Two judges considered it necessary to specify the type of pain, so it was referred to as any type of pain.	Dolor en tus brazos, piernas o articulaciones (rodillas, caderas, etc). Cualquier tipo de dolor. Pain in your arms, legs or joints (knees, hips, etc.). Any type of pain
R4	d.- Dolores menstruales u otras molestias asociadas a la menstruación (sólo mujeres)	d. Cólicos menstruales u otros problemas relacionados con tu periodo (Sólo mujeres)	It was modified because two judges considered that “period-related problems” was open to different interpretations. Two other problems associated with menstrual pain “nausea and fatigue” were added (Han & Hur, 1999).	Sólo mujeres. Cólicos menstruales u otras molestias relacionadas con tu periodo (como náuseas y fatiga). Only women. Menstrual cramps or other discomfort related to your period (such as nausea and fatigue).
R5	e.- Dolores de cabeza	e. Dolores de cabeza	No comments.	Dolores de cabeza Headaches
R6	f.- Dolor torácico (zona del pecho)	f. Opresión en el pecho (se relaciona más los síntomas psicósomáticos que el dolor).	It was suggested to change the wording to clarify (it is more related to psychosomatic symptoms than pain).	Sensación de opresión en el pecho Feeling of chest tightness
R7	g.- Mareos	g. Mareos	No comments.	Mareos Dizziness
R8	h.- Desmayos	h. Desmayos	No comments.	Desmayos Fainting
R9	i.- Palpitaciones o sentir el corazón acelerado	i. Sentir que el corazón late fuerte o que el corazón late más rápido	No comments.	Sentir que el corazón late fuerte o que el corazón late más rápido Feeling like your heart is pounding or your heart is beating faster

R10	j.- Falta de respiración	j. Dificultad para respirar (sentir que en reposo te estás ahogando o sentir que tienes que interrumpir una actividad para recuperar el aliento)	(Examples were added because the term “difficulty breathing” usually needs to be explained in a medical consultation). The 5 judges validated that the clarification in parentheses made the item more precise.	Dificultad para respirar (sentir que en reposo te estás ahogando o sentir que tienes que interrumpir una actividad para recuperar el aliento) Difficulty breathing (feeling that at rest you are suffocating or feeling like you have to interrupt an activity to catch your breath)
R11	k.- Dolor o problemas durante sus relaciones sexuales	k. Dolor o problemas al tener relaciones sexuales	Three judges considered the item ambiguous, so problems were changed to “discomfort”	Dolor o molestias al tener relaciones sexuales Pain or discomfort during intercourse
R12	l.- Estreñimiento, ir suelto de vientre o diarrea	l. Estreñimiento, estar suelta/o del estómago o diarrea	The idiom was modified, “being loose/having a loose stomach” is the expression used in Mexico instead of “going loose from the belly”. A judge found it necessary to explain constipation.	Estreñimiento (dificultades para evacuar o hacer popó), estar suelta/o del estómago o diarrea Constipation (difficulty having a bowel movement or pooping), having a loose stomach, or diarrhea
R13	m.- Nauseas, gases o indigestión	m. Náuseas, gases o indigestión	Three judges considered it necessary to explain the terms nausea and indigestion.	Náuseas (ganas de vomitar), gases o indigestión (ardor) Nausea (feeling sick), gas or indigestion (heartburn)
R14	n.- Sentirse cansado o con pocas energías	n. Sentirse cansado o con poca energía	The plural form in Spanish of “low energy” was changed to the singular form due to language matters.	Sentirse cansado o con poca energía Feeling tired or with low energy
R15	o.- Problemas de sueño	o. Dificultades para conciliar el sueño o permanecer dormido	This was modified because in English the meaning was different and it seeks to describe the most common sleep problems to avoid ambiguity. No remarks by the judges.	Dificultades para conciliar el sueño o permanecer dormido Difficulty falling asleep or staying asleep

### 3.2. Confirmatory Factor Analysis

Because the PHQ-15 has been previously validated and used in different populations, which gives sufficient knowledge of the underlying theoretical structure of the scale (Pérez & Medrano, 2010), it was decided to confirm the structure of the scale by performing the CFA using the DWLS technique as it has an ordinal measurement level. The values of global fit indicators were optimal (see Figure 1) (see Table 2).

To determine the model fit, the following indexes were analyzed from the  $X^2$  goodness-of-fit test as proposed by Hu and Bentler (1999): a)  $X^2$  goodness-of-fit test, the  $\chi^2/df$  ratio was considered, whose value  $< 3$  indicates an adequate fit; b) comparative indexes CFI (Comparative Fit Index), IFI (Incremental Fit Index) and NFI (Normed Fit Index), whose values  $> .90$  are considered adequate; c) the proportion of variance GFI (Goodness of Fit Index) where the value must be  $> .90$  to be interpreted as an adequate fit; d) error: SRMR (Standardized Root Mean Square Residual) and RMSEA (Root Mean Square of Approximation), which show an adequate fit if their value is  $< .05$  in the first case, and  $< .08$ , for the second; e) Modification Indexes (MI) in order to improve the model fit.



**Figura 1.** AFC del modelo de la escala PHQ-15.

**Figure 1.** CFA of the PHQ-15 scale model.

**Tabla 2.** Indicadores de ajuste global del análisis factorial confirmatorio.

**Table 2.** Global fit indicators of the confirmatory factor analysis

Indicators	$\chi^2$ g.l <sup>a</sup>	p $\chi^2$ <sup>b</sup>	RMSEA	NFI	CFI	SRMR	GFI	IFI
Desirable values of the indicators	<3	>0.05	<0.08	>0.9	>0.9	<0.05	<0.90	>0.9
Values obtained with the DWLS method	92.063 (54)	< .001	0.041 0.845	0.967	0.973	0.064	0.982	0.973

### 3.3. Reliability

In order to compare the reliability of the PHQ-15 scale, the coefficient omega of the scale was obtained (McDonald, 1999), whose result was .849, which is considered adequate (Campo-Arias & Oviedo, 2008) (see Table 3).

**Tabla 3.** Coeficiente omega.

**Table 3.** Coefficient omega

Sum of factor loading	7.45
Square of the sum of the loadings	55.50
Sum of error variance	9.81
Sum of loadings and error variance	65.31
Composite reliability (omega)	.849

### 3.4. Convergent validity

Once the items were obtained, Pearson product-moment correlations were made between the PHQ-15 and the HADS anxiety and depression scale for each of the scales, to verify the convergent validity of the scale.

**Tabla 4.** *Correlaciones entre el PHQ-15, Ansiedad y Depresión.***Table 4.** *Correlations between the PHQ-15, Anxiety and Depression*

Depression and Anxiety Mean (SD) .98(.56)	
Expected correlation	Positive
PHQ-15	.632**
Mean (SD) 1.56(.32)	

Note: \*\* p = .05.

### 3.5 Normative data for population

To verify the differences between the genders and see how each of the items behaves, the mean, standard deviation, and each of the percentiles in men, women and the total sample were analyzed (see Table 5).

**Tabla 5.** *Datos normativos para la población general del PHQ-15.***Table 5.** *Normative data for the general population of the PHQ-15.*

	N	Mean (SD)	P 10	P 20	P 30	P 40	P 50	P 60	P 70	P 80	P 90	P 100
Women	352	10.18(4.79)	4.0	6.0	7.0	8.0	10.0	11.0	13.0	14.0	17.0	24.0
Men	71	7(4.66)	1.2	2.4	4.0	5.0	6.0	8.0	10.0	12.0	13.0	19.0
Total	423	9.65(4.91)	3.0	5.0	7.0	8.0	10.0	11.0	12.0	14.0	17.0	24.0

Note: The total score is obtained by adding the 14 items, giving a possible score between 0 and 28.

Nota: La puntuación total se obtiene sumando los 14 ítems, dando una puntuación posible entre 0 y 28.

## 4. Conclusions

Psychosomatic disorders are diseases related to bodily symptoms but caused by some mental or emotional disturbance (Merriam-Webster Dictionary, 2021); the most common are various types of pain that recur over the years (Association, DSM-5 Task Force, 2013), and which represent one of the main problems in primary care (Escobar et al., 1998; Holloway & Zerbe, 2000).

Although they are very common, there is great difficulty in diagnosing them since they are usually diseases that are not given importance and are little studied (American Psychiatric Association, DSM-5 Task Force, 2013), which causes patients to be stigmatized. Due to these events, there are few psychometric instruments that measure this variable, despite the fact that its measurement should be considered essential (Kroenke et al., 2002). Therefore, in the present study, it was sought to have evidence of validity to evaluate PD in the Mexican population of an instrument widely used worldwide, the PHQ-15.

The PHQ-15 is made up of the majority of physical complaints in primary care (Marple et al., 1997) and has been used in numerous studies and translated into several languages, for which its reliability, validity and single-factor composition have been verified (Becker et al., 2002; Kroenke et al., 2002; Ros Montalban et al., 2010); however, the version that until now existed in Spanish was an adaptation by Spanish researchers (Ros Montalban et al., 2010), despite having adequate psychometric evidence, its language needed to be adapted to another cultural context; hence the objective of the study was to validate the PHQ-15 test for the Mexican adult population.

The judgment results showed that the instrument required modifications, which were thus made to improve the clarity of the instrument and to include words that were better understood by the patients. In this sense, the medical judges were asked to express the words that they commonly use in the office to communicate with their patients. Regarding the construct validity of the instrument, the results showed acceptable indicators and likewise all the reagents contribute significantly to the model. On the reliability side, the scale shows that it is consistent in its measurement (Campo-Arias & Oviedo, 2008; McDonald, 1999). In this study, item 4:



Menstrual cramps or other discomforts related to your period (such as nausea and fatigue) was removed because not all the participants were women or people that can be pregnant; in addition, the item showed very little variability when a frequency analysis was performed.

Comparing the original version to the Spanish version, both scales show good psychometric properties and convergent validity with anxiety and depression. The version for the Mexican population provides evidence to confirm the factorial structure of the version proposed by the CFA, with a satisfactory adjustment of the indices.

On the other hand, a Pearson correlation test was carried out between the PHQ-15 and the HADS anxiety and depression scale, to rectify its convergent validity, which obtained a mean correlation of .632, which shows that the greater the psychosomatic symptoms, the more depression and anxiety the individual will present. These results agree with Henning et al. (2020), Landa et al. (2012) and Spitzer et al. (1994), who propose that somatization is strongly associated with diseases such as depression, anxiety and even personality disorders and panic disorders. Future studies could explore the relationship that psychosomatic symptoms have with cultural variables, instead of just using personality variables, since it has been shown that psychopathology has different ways of expressing itself according to cultural patterns (Matsumoto & Juang, 2016).

Regarding gender, differences are observed in men and women in relation to the percentiles, which shows that women are the ones who suffer from more symptoms of psychosomatic disorders (Gabbard, 2014); however, with this statement, it is necessary to be careful because statistical tests of means comparison were not carried out, the results of which would show that there are truly statistically significant differences. The main reason for not having performed the corresponding analyses was due to the distribution of the sample where women represent more than 64% of the participants. In this regard, future studies should explore the differences by sex and also by gender. Thus, psychosomatic symptoms in women and men should not only be contrasted by attributing them to biological issues, but also by measuring variables of a cultural, personality and gender nature.

Finally, it is important to highlight that no behavioral observations were made. Future studies could compensate for this methodological limitation by making some physiological and behavioral observations to provide more validity to the self-report instrument. Likewise, an advantage of this instrument is that an effort was made so that the symptoms were described in such a way that they were understandable by people with low educational levels, a hypothesis that was not tested. Future studies should verify that effectively people with low educational levels understand the instrument without difficulties.

The results obtained with the Mexican version of the PHQ-15 questionnaire show acceptable fit indexes, and content and convergent validity that allow the evaluation of psychosomatic symptoms that are very frequent today and of primary and priority care (Nisar & Srivastava, 2018). Thus, we can conclude that the presented version of the PHQ-15 is an adequate linguistic adaptation to measure psychosomatic disorders in a population of Spanish-speaking adults in Mexico. Having a valid and reliable measure, it is possible to carry out quality research to understand the processes underlying the physical symptoms that are real and affect the population. Future studies should explore the reasons that produce gender differences, as well as the processes that lead to physical symptoms.

## 5. Supplementary information

PHQ-15 para población mexicana.

Instrucciones: Durante las últimas 4 semanas, ¿Qué tanto le han molestado los siguientes problemas?

		Mucho		
		Poco		
		Nada		
1.	Dolor de estómago (cualquier tipo de dolor)			
2.	Dolor de espalda			
3.	Dolor en tus brazos, piernas o articulaciones (rodillas, caderas, etc). Cualquier tipo de dolor.			
4.	Cólicos menstruales u otras molestias relacionadas con tu periodo (como náuseas y fatiga) (sólo mujeres)			
5.	Dolores de cabeza			
6.	Sensación de opresión en el pecho			
7.	Mareos			
8.	Desmayos			
9.	Sentir que el corazón late fuerte o que el corazón late más rápido			
10.	Dificultad para respirar (sentir que en reposo te estás ahogando o sentir que tienes que interrumpir una actividad para recuperar el aliento)			
11.	Dolor o molestias al tener relaciones sexuales			
12.	Estreñimiento (dificultades para evacuar o hacer popó), estar suelta/o del estómago o diarrea			
13.	Náuseas (ganas de vomitar), gases o indigestión (ardor)			
14.	Sentirse cansada/o o con poca energía			
15.	Dificultades para conciliar el sueño o permanecer dormida/o			

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## Contribution of the authors in the development of the work

Andrea Bravo Doddoli: introduction, results and conclusion. Paola Eunice Díaz Rivera: introduction, method and results.

## Interest conflict

*The authors declare that there is no conflict of interest.*

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