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Measuring Hypochondria with Short Health Anxiety Inventory: Psychometric Properties in Colombian University Students

Medición de la hipocondría con el Short Health Anxiety Inventory: propiedades psicométricas en estudiantes universitarios colombianos

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Declaration of interests
The authors have declared that there is no conflict of interest.

Abstract

Introduction. The Short Health Anxiety Inventory is a commonly used tool for assessing health anxiety, but its psychometric properties and internal structure have not been examined in a Latin American Spanish-speaking population. This study aimed to establish the psychometric properties among Colombian university students.

Method. The goodness of fit of four latent structure models of the Short Health Anxiety Inventory was tested using confirmatory factor analysis in a sample of 1004 Colombian university students.

Results. The results show that the original model's structure does not fit well (CFI = .808; RMSEA = .074), and the reliability was .796 and .703 for the original two variables.

Conclusions. The findings do not support the utilization of the Colombian version of the Short Health Anxiety Inventory by researchers and clinicians among Colombian university students.

Keywords

Anxiety; health care; mental health; psychometrics; validation.

Resumen

Introducción. El Short Health Anxiety Inventory es una herramienta común para evaluar la ansiedad relacionada con la salud, pero sus propiedades psicométricas y estructura interna no han sido evaluadas en una población latinoamericana de habla hispana. Este estudio tuvo como objetivo establecer las propiedades psicométricas en estudiantes universitarios colombianos.

Data availability
All relevant data is in the article. For futher information, contact the corresponding author.

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Contribution of the authors
Renato Zambrano-Cruz: Conceptualization, data curation, formal analysis, investigation, methodology, resources, software, supervision, validation, visualization, writing – original draft, writing – review & editing.
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Tatiana Castañeda-Quirama: Conceptualization, data curation, funding acquisition, investigation, methodology, project administration, resources, supervision, validation, writing – review & editing.

Método. Se evaluó la bondad de ajuste de cuatro modelos de estructura latente del Short Health Anxiety Inventory, mediante análisis factorial confirmatorio, en una muestra de 1004 estudiantes universitarios colombianos.

Resultados. La estructura no se ajusta al modelo original (CFI = .808; RMSEA = .074) y la confiabilidad fue de .796 y .703 para las dos variables originales.

Conclusiones. Los resultados no respaldan el uso de la versión colombiana del Short Health Anxiety Inventory entre estudiantes universitarios colombianos, tanto para investigadores como para clínicos.

Palabras clave
Ansiedad; cuidado de la salud; salud mental; psicometría; validación.

Introduction
Hypochondria, currently known as illness anxiety disorder or health anxiety, is a condition in which an individual experiences persistent and excessive anxiety or fear about having a serious illness, despite having very mild or not having any symptoms [1]. People with hypochondria may frequently visit doctors or hospitals, seek multiple medical tests, and often obsess over their physical health, leading to significant distress and impairment in their daily functioning.

Assessing illness anxiety disorder or hypochondria is necessary to diagnose and treat the mental health issue. Symptoms of hypochondria can be like those of other health problems, and that is why a healthcare professional will conduct a medical and psychological evaluation to discover any other medical conditions that could be originating the symptoms. In addition, the health professional should use tools to assess the level of the hypochondria symptoms and determine the impact on their daily life functioning. One of those tools is the Short Health Anxiety.

The Short Health Anxiety Inventory (SHAI) is a quick and brief version of Health Anxiety Inventory (HAI) developed by Salkovskis, et al. [2] as a useful measure for worries about health. It is an 18-item version of the original 48-item measure designed to assess fear of illness and fear of negative consequences of an illness by using a two-factor structure. Four response options were designed that are coded from 0 to 3, in which the highest value indicates greater severity in the manifestation of anxiety. However, in some studies, the coding is made from 1 to 4 [3], with the same options as the original.

In 2013 a meta-analysis of psychometric properties of the SHAI [4] concluded that the SHAI is a useful tool for measuring health anxiety in many populations and has been adapted and validated among different languages [2,3,5–7]. The factor structure of the test has been reviewed in several studies and it has been found that there is no consistency in the number of factors. This may be because the populations assessed are patients with high concerns about specific health problems, and not so many people with common health concerns. However, there seems to be a tendency to establish a two-factor structure, which would allow a deeper understanding of the latent structure of anxiety associated with health.

However, the health anxiety construct should not differ from the general anxiety construct, which has been defined as an unpleasant response to a stimulus valued as a threat. This places anxiety as an emotional category characterized by neurovegetative activation and worrying thoughts. It tends to be confused with the fear response, but it differs mainly from it in that in anxiety the threat is anticipated while in fear it is responded to the live stimulus.

Some authors address anxiety as a state-trait [8], assuming a two-factor structure related to the stable presence of said response. The state is temporary while the trait is more stable. However, other authors address that it is a single dimension conceptualizing it as a continuum whose extreme manifestation would be due to severe and persistent manifestations of physiological activation and the intrusiveness of thoughts. This dimensional perspective would understand that anxiety is of negative valence but that it would vary according to arousal.

The above does not seem to be confirmed in any SHAI psychometric study. This could be because it is focused on cognitive aspects of anxiety and does not address the emotion construct considering its physiological component. This would lead to a more in-depth evaluation of the content and categories of health aspects, making this instrument a cognitive test on anxiety. Therefore, our main objective of this study is to determine the factorial structure of the SHAI in a Colombian university population, while as secondary objectives we have the establishment of reliability, as well as the determination of scales for later use in a similar population.

Given academic stress and transitions to college life, assessing for hypochondria can be key to addressing excessive health concerns that could negatively impact student well-being and academic performance. In addition, having valid and reliable instruments provides valuable data for the formulation of public health strategies adapted to the needs of Colombian university students, thus contributing to the development of comprehensive support programs in the university environment.

Method

Participants

In this instrument study [9], through a non-probabilistic sampling for convenience, 1004 undergraduate students from three universities in Medellin, two private and one public, were included. Seventy-five percent of the participants were women. Our sample of college students was mostly young adults. The mean age was 25.05 years (SD = 7.1). Students from all levels (1-10) were included (M = 5.5; SD = 2.7). 78.98% of the participants were single. 41% of the participants, besides studying, were working. 31.77% were in a municipality or rural area other than a city at the time of participating in the study. Less than half of the participants (42.43%) stated that they always had access to the Internet. The remaining percentage said they had internet connectivity almost always or sometimes. Only 1.2% reported never or rarely having the service available.

Measures

Short Health Anxiety Inventory. The Spanish version of the SHAI was used [2]. The SHAI consists of 18 items with an ordinal system of response of four options (0: no symptoms; 1: mild symptoms; 2: severe symptoms, and 3: very severe symptoms). Several studies state psychometric properties of the SHAI in clinical [2,7,10] and nonclinical settings [6,7,10]. The

SHAI has good capacity to discriminate between persons with hypochondria and healthy people [2,10]. Also, people diagnosed with hypochondria had obtained higher scores than those with anxiety disorders, and patients with physical illness [4].

Procedure

This study was carried out between May and October 2020 during the Colombian high peak of the COVID-19 pandemic. The information was collected through digital forms sent to the e-mails of the students, and all forms included the declaration on informed consent. The call to answer the instrument was open to every undergraduate student from three Colombian universities and those who participated did so voluntarily and confidentially. Participants did not receive any kind of compensation. To avoid measurement online bias, repeated answers were deleted.

Statistical analyses

CFA was conducted to test the goodness of fit of four models of the latent structure of the SHAI proposed in previous studies using the JASP software (version 0.18). The weighted least squares (WLS) estimator was selected because of its robustness with ordinal data [11,12]. The model was tested using four indices: the chi-square ($\chi 2$), the comparative fit index (CFI), the Goodness fit index (GFI), and the root mean square error of approximation (RMSEA). An acceptable adjustment of the model is determined by values greater than .90 for CFI, GFI, and TLI and less than .06 for RMSEA and SRMR [13,14]. The model with the best fit was used for the following analysis. Reliability was computed in terms of the McDonald's omega coefficient to be a more accurate estimation of reliability for ordinal response scales than Cronbach's alpha [15,16]. The Statistical Package for Social Sciences (SPSS, v 25) was used for sample descriptive analyses.

Ethical considerations

This study was approved by the Research Ethics Board at the Politécnico Grancolombiano University (Reference 002/2020). All forms included the declaration on informed consent, which was prepared considering Law 1090 of 2006 (deontological and bioethical code of the psychologist) of the Congress of the Republic of Colombia and Resolution 8430 of 1993 (scientific, technical, and administrative norms for health research) of the Ministry of Health.

Results

Confirmatory Factor Analysis

As shown in Table 1, none of the models showed a good fit for the model. The best GFI, CFI, and TLI combined were obtained by the three-factor structures of Abramowitz et al. [10] and the abbreviated structure of 13 items and two factors of Alberts et al. [7]. Factors in these models are named Illness Likelihood, Illness severity, and Body Vigilance; in the abbreviated structure factors are Thought Intrusion and Fear of Illness. However, no model obtained a good RMSEA and the one that was closest to a good fit was the three-factor model of Abramowitz et al. [10].

Exploratory Factor Analysis

Since no proposed model obtained a good fit according to the RMSEA data, an exploratory factor analysis using parallel analysis and weighted least squares method was performed in which a good fit to the model was obtained (RMSEA = .053 (CI = .047 - .059); TLI = .891; CFI = .938; BIC = -270.449) but with the elimination of four items (1, 11, 13 and 16) for not

Table 1. Goodness-of-fit indices for factor models of the SHAI.

Model	Publication	χ^2	*df*	*p*	GFI	CFI	TLI	AIC	RMSEA (CI)	SRMR	AVE
Single factor	-	1126.862	135	<.001	.943	.743	.708	38223.439	.086 (.081-.090)	.067	.219
Two-factor	Arnáez et al (2019; Morales et al. (2013)	874.672	134	<.001	.957	.808	.781	37973.250	.074 (.070-.079)	.060	F1: .230 F2: .380
Three-factor	Abramowitz et al. (2007)	719.959	116	<.001	.963	.827	.797	35818.328	.072 (.067–.077)	.059	F1: .298 F2: .380 F3: .236
Two-factor (no item 13)	Wheaton et al. (2010)	803.310	118	<.001	.961	.804	.774	35897.679	.076 (.071–.081)	.060	F1: .221 F2: .380
Two-factor (no items 14–18)	Alberts et al. (2011)	512.534	64	<.001	.967	.833	.796	28335.088	.084 (.077–.090)	.061	F1: .209 F2: .352

Note. SHAI: Short Health Anxiety Inventory; df: degrees of freedom; GFI: Goodness of fit index; CFI: comparative fit index; TLI: Tucker-Lewis Index; AIC: Akaike; RMSEA (CI): root mean square error of approximation (confidence interval); SRMR: Standardized root mean square residual; AVE: Average Variance Extracted.

having a factor load equal to or greater than .04. The items were grouped into four factors that are named below: F1 = Concern for health; F2 = Personal involvement; F3 = Excessive worries/metacognition; F4 = Body sensations. See Table 2.

Reliability

The internal consistency of the scales was also established according to the different models previously analyzed. It was found that the best reliability is presented by the single-factor model, followed by the two-factor models. The first two factors from the Abramowitz et al. [10] model had adequate coefficients, while the third factor was not (see Table 3).

We also did a reliability analysis for the factors thrown in our model according to the EFA. In this case, two factors had moderate reliability and another two had poor reliability [17,18] (see Table 2).

Table 2. Exploratory Factor Analysis and reliability.

	Factor 1	Factor 2	Factor 3	Factor 4	Uniqueness
1. Health concern					.774
2. Perception of pains in comparison to people of the same age	.430				.759
3. Awareness of changes or bodily sensations				.749	.522
4. Ability to resist disease concerns	.944				.424
5. Fear of having an illness	.415				.540
6. Imagine being sick	.515				.647
7. Ability to control the thoughts on health	.587				.613
8. Relief when the doctor reported negative results in a test	.446				.741
9. Hear about an illness makes me think I can have it			.420		.708
10. If I have bodily sensations, I wonder what may be				.434	.748
11. Perceived risk of getting a disease					.640
12. Belief of having a serious illness	.408		.435		.550
13. Ability to think of something else when I feel bodily sensations					.642
14. Perception of familiars and friends on your health concerns			.605		.739
15. Ability to enjoy life if I had a disease		.655			.588
16. The probability of cure if I had a serious illness					.780
17. A serious illness could affect many aspects of my life		.901			.382
18. Loss of dignity for contracting a disease		.597			.685
Reliability. McDonald's Omega	.709	.698	.569	.539	

Note. Applied rotation method is promax.

Table 3. Reliability according to SHAI models.			
Model	**F1**	**F2**	**F3**
Single factor	.825		
Two-factor (Arnáez et al., 2019)	.796	.703	
Three-factor (Abramowitz et al. 2007)	.800	.703	.493

Discussion

The main objective was to determine the factor structure and, for this, we use different models proposed in the literature. None of the models analyzed obtained satisfactory fit index, which directly implies that the SHAI is not an instrument that adequately measures health anxiety as it has been conceptualized. This could be explained by the COVID-19 pandemic situation that could have exacerbated health anxiety, focusing thoughts on health towards greater uncertainty. This scenario could have decreased the variability of the responses to the items and modified the relationships between the different items. In our EFA we found four factors, which may be since it is possible that the pandemic situation has modified thoughts about general health, expanding the considerations that were held for health problems. While fear or worries about illness continue to appear, excessive worries and bodily sensations suddenly became more relevant in the structure of health thoughts, at least during the pandemic. It is necessary to study whether this distinction holds in a post-pandemic period.

Our results are not consistent with any other psychometric study [3,4,19]. Despite using similar analysis methods, RMSEA was not adequate. This indicator is essential to establish the fit to the model [20], although it is known that this procedure may be more sensitive to outliers [13], as we suspect that it could have occurred in the COVID-19 pandemic, in another situation.

As a secondary objective, we determine reliability through internal consistency. This value was adequate and like that of the original version [2], which approached health anxiety from a one-factor perspective. Satisfactory results were also found for the two-factor structure supported by most of the authors [2,3,5,6,10]. Reliability is lower in the second factor (negative consequences of the disease), a phenomenon consistent with Morales et al. [5], Arnáez et al. [3], among others, who explain that this is due to the low number of items that make up the scale as it investigates various areas of life that could be affected by the disease, which could vary between people.

The last objective was to establish the interpretation norms for subsequent studies (see Appendix). These data are like those of the German study by Sauer et al. [21] on the COVID-19 pandemic and those of the population with medical conditions reported in the meta-analysis by Alberts et al. [4], but well below the population with mental health problems. This implies that anxiety about health in the university student population, and probably the general population, was almost the same as that of people with diseases such as chronic pain, which confirms the impact of the COVID-19 pandemic on emotional states.

Limitations

We consider that this study had some limitations. In the first place, a convergent or criterion validity analysis was not carried out because the time of application of the tests increased and it could represent a higher dropout rate. Regarding reliability, temporal stability could not be established based on the uncertainty of the COVID-19 pandemic. It is also possible that due to the time of information collection (in the pandemic), people wanted to be either very concerned about their health or, on the contrary, be skeptical of the health measures promoted by the entities, assuming extreme positions such as anti-vaxxers. Future studies in the university population should consider carrying out the analyzes to decide on its adequate use in research and clinical contexts.

Conclusions

In conclusion, we present a test with good reliability, but with doubts about its validity to be used in the university population. However, because of the uncertainty generated by the COVID-19 pandemic, we consider that this factor is the main component that explains the lack of evidence. Nevertheless, there are both universal and culture-specific aspects that are crucial to consider (etics and emics). In response to this need, the importance of expanding research on health anxiety through the comparison of cross-national samples is recognized. Exploring psychological universals will enable the generalization of findings beyond cultural borders, while concurrently using the emic approach to identify and understand unique elements in the experience of health anxiety within different cultural contexts. The integration of etic and emic approaches is proposed to conceptually clarify differences and construct a more comprehensive knowledge base in mental health assessment. This synthesis aims not only to enhance the global understanding of health anxiety, but also to support the development of culturally sensitive and effective interventions. This raises questions about the general validity of this test in situations of high general health uncertainty.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5-TR 5th ed. Washington D.C.: The Association; 2022. 1142 p.

2. Salkovskis PM, Rimes KA, Warwick HMC, Clark DM. The Health Anxiety Inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. Psychol Med [Internet]. 2002;32(5): 843-53. doi: https://doi.org/10.1017/S0033291702005822

3. Arnáez S, García-Soriano G, López-Santiago J, Belloch A. The Spanish validation of the Short Health Anxiety Inventory: Psychometric properties and clinical utility. Int J Clin Health Psychol [Internet]. 2019; 19(3): 251-60. doi: https://doi.org/10.1016/j.ijchp.2019.05.003

4. Alberts NM, Hadjistavropoulos HD, Jones SL, Sharpe D. The Short Health Anxiety Inventory: A systematic review and meta-analysis. J Anxiety Disord [Internet]. 2013;27(1):68-78. doi: https://doi.org/10.1016/j.janxdis.2012.10.009

5. Morales A, Reis S, Espada JP, Orgilés M. Portuguese validation of the Short Health Anxiety Inventory: Factor structure, reliability, and factor invariance. J Health Psychol [Internet]. 2018;23(14):1872-83. doi: https://doi.org/10.1177/1359105316669859

6. Wheaton MG, Berman NC, Franklin JC, Abramowitz JS. Health Anxiety: Latent Structure and Associations with Anxiety-related Psychological Processes in a Student Sample. J Psychopathol Behav Assess [Internet]. 2010;32:565-74. doi: https://doi.org/10.1007/s10862-010-9179-4

7. Alberts NM, Sharpe D, Kehler MD, Hadjistavropoulos HD. Health anxiety: Comparison of the latent structure in medical and non-medical samples. J Anxiety Disord [Internet]. 2011;25(4):612-4. doi: https://doi.org/10.1016/j.janxdis.2011.01.011

8. Spielberger CD, Reheiser EC. Measuring anxiety, anger, depression, and curiosity as emotional states and personality traits with the STAI, STAXI and STPI. In: Hilsenroth MJ, Segal DL, editors. Comprehensive handbook of psychological assessment, Vol. 2: Personality assessment. Hoboken: John Wiley & Sons, Inc.; 2004. p. 70-86.

9. Montero I, Leon O. A guide for naming research studies in Psychology. Int J Clin Health Psychol [Internet]. 2007;7(3): 847-62. Available from: http://www.aepc.es/ijchp/articulos.php?coid=Espa%EF%BF%BDol&id=256

10. Abramowitz JS, Deacon BJ, Valentiner DP. The Short Health Anxiety Inventory: Psychometric Properties and Construct Validity in a Non-clinical Sample. Cognit Ther Res [Internet]. 2007;31(6):871-83. doi: https://doi.org/10.1007/s10608-006-9058-1

11. Forero CG, Maydeu-Olivares A, Gallardo-Pujol D. Factor Analysis with Ordinal Indicators: A Monte Carlo Study Comparing DWLS and ULS Estimation. Struct Equ Modeling [Internet]. 2009;16(4):625-41. doi: https://doi.org/10.1080/10705510903203573

12. Mîndrilă D. Maximum Likelihood (ML) and Diagonally Weighted Least Squares (DWLS) Estimation Procedures: A Comparison of Estimation Bias with Ordinal and Multivariate Non-Normal Data. International Journal for Digital Society [Internet]. 2010;1(1):60-66. doi: https://doi.org/10.20533/ijds.2040.2570.2010.0010

13. Schubert A-L, Hagemann D, Voss A, Bergmann K. Evaluating the model fit of diffusion models with the root mean square error of approximation. J Math Psychol [Internet]. 2017;77:29-45. doi: https://doi.org/10.1016/j.jmp.2016.08.004

14. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Modeling [Internet]. 1999;6(1):1-55. doi: https://doi.org/10.1080/10705519909540118

15. Gadernmann AM, Guhn M, Zumbo BD. Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. Pract Assess Res Evaluation [Internet]. 2012;17:1-13. doi: https://doi.org/10.7275/n560-j767

16. Zumbo BD, Gadermann AM, Zeisser C. Ordinal Versions of Coefficients Alpha and Theta for Likert Rating Scales. J Mod Appl Stat Methods [Internet]. 2007;6(1):21-9. doi: https://doi.org/10.22237/jmasm/1177992180

17. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. J Chiropr Med [Internet]. 2016;15(2):155-63. doi: https://doi.org/10.1016/j.jcm.2016.02.012

18. Taber KS. The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. Res Sci Educ [Internet]. 2018;48:1273-96. doi: https://doi.org/10.1007/s11165-016-9602-2

19. Alshayea AK. Latent structure, measurement invariance, and reliability of an Arabic version of the Short Health Anxiety Inventory. J Exp Psychopathol [Internet]. 2020;11(2). doi: https://doi.org/10.1177/2043808720912629

20. Kelley K, Lai K. Accuracy in Parameter Estimation for the Root Mean Square Error of Approximation: Sample Size Planning for Narrow Confidence Intervals. Multivariate Behav Res [Internet]. 2011;46(1):1-32. doi: https://doi.org/10.1080/00273171.2011.543027

21. Sauer KS, Jungmann SM, Witthöft M. Emotional and Behavioral Consequences of the COVID-19 Pandemic: The Role of Health Anxiety, Intolerance of Uncertainty, and Distress (In)Tolerance. Int J Environ Res Public Health [Internet]. 2020;17(19):1-18. doi: https://doi.org/10.3390/ijerph17197241

Appendix. Norms of SHAI for Colombian university population.				
		Fear of illness	**Negative consecuences**	**SHAI**
Mean		14,04	2,59	16,64
Standar deviation		5,972	2,075	7,16
Percentiles	1	3	0	4
	2	4	0	5
	5	6	0	7
	10	7	0	9
	15	8	0	10
	20	9	1	11
	25	10	1	12
	30	10	1	12
	40	12	2	14
	50	13	2	16
	60	15	3	17
	70	16	3	20
	75	17	4	20
	80	19	4	22
	85	20	5	24
	90	22	5	26
	95	25	6	30
	98	29,9	8	36
	99	32	8,95	39