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ORIGINAL

The development and validation in hypertensive patients of the Health Belief Model for pharmacological adherence (HBM-FA) scale

Desarrollo y validación en pacientes hipertensos de la escala Modelo de Creencias de Salud para la Adherencia Farmacológica (HBM-FA)

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ABSTRACT

Introduction: pharmacological adherence in hypertensive patients is essential, so the study of the factors that influence it is essential.
Objective: to develop and validate a scale based on the health belief model to measure factors influencing drug adherence in hypertensive patients.
Methods: the development process of the HBM-FAS scale included the review of the literature, the generation of the items that conformed it (grouped in the six constructs that respond to the theoretical framework of the Health Belief Model), the evaluation of its content by a panel of experts, and the subsequent application of a pilot test. A confirmatory factor analysis of the proposed model was carried out, and its validity and reliability were subsequently evaluated.
Results: a panel of experts evaluated the content validity of the instrument, showing a high degree of content validity. The CFA indicated poor fit indices (CFI=0,763; TLI=0,735; RMSEA=0,118; SRMR=0,143; CMIN/DF=0,07), leading to modifications (removal of 9 out of 30 items). The refined model showed an acceptable fit (CMIN/DF=1,69; CFI=0,977; TLI=0,972; SRMR=0,0393; RMSEA=0,0434). The scale demonstrated high internal consistency reliability (0,895) as well as good discriminant validity.
Conclusions: the HBM-FA scale showed good psychometric properties, being suitable for measuring health beliefs associated with pharmacological adherence in hypertensive patients, which makes its use in future intervention studies beneficial.

Keywords: Behavioral Medicine; Factor Analysis, Statistical; Health Belief Model; Hypertension.

RESUMEN

Introducción: la adherencia farmacológica en pacientes hipertensos es fundamental, por lo que el estudio de los factores que influyen en ella es esencial.
Objetivo: desarrollar y validar una escala basada en el modelo de creencias de salud para medir los factores que influyen en la adherencia farmacológica en pacientes hipertensos.

Método: El proceso de desarrollo de la escala HBM-FAS incluyó la revisión de la literatura, la generación de los ítems que la conforman (agrupados en los seis constructos que responden al marco teórico del Modelo de Creencias de Salud), la evaluación de su contenido por un panel de expertos y la posterior aplicación de una prueba piloto. Se realizó un análisis factorial confirmatorio del modelo propuesto y posteriormente se evaluó su validez y fiabilidad.
Resultados: un panel de expertos evaluó la validez de contenido del instrumento, mostrando el mismo un alto grado de validez de contenido. El AFC mostró índices de ajuste deficientes (CFI=0,763; TLI=0,735; RMSEA=0,118; SRMR=0,143; CMIN/DF=6,07), lo que condujo a modificaciones (eliminación de 9 de los 30 ítems). El modelo refinado tuvo un ajuste aceptable (CMIN/DF=1,69; CFI=0,977; TLI=0,972; SRMR=0,0393; RMSEA=0,0434). La escala presentó una alta fiabilidad de consistencia interna (0,895), así como una buena validez discriminante.
Conclusiones: la escala HBM-FA mostró buenas propiedades psicométricas, siendo adecuada para medir las creencias de salud asociadas a la adherencia farmacológica en pacientes hipertensos, lo que hace beneficioso su uso en futuros estudios de intervención.

Palabras clave: Medicina de la Conducta; Análisis factorial; Modelo de Creencias sobre la Salud; Hipertensión.

INTRODUCTION

Non-communicable diseases (NCDs), such as hypertension, represent a significant threat to health and economic and social development, especially in developing countries. According to the World Health Organization, it affects approximately 1,13 billion people worldwide (about two-thirds of them living in low- and middle-income countries), and is responsible for 10,4 million deaths annually, representing a considerable economic, health and social burden, with significant cumulative production losses projected in the coming years.[1,2,3]

In this context, medication adherence is a crucial factor for the effective control of hypertension, which can significantly reduce the risk of serious cardiovascular complications, such as heart attacks and strokes. However, adherence to medication regimens is often suboptimal in this population, which may be due to a variety of psychological, social, and economic factors.[4]

Defined as the 'degree to which patients take their medication as prescribed, medication adherence becomes a health issue when one considers that a high percentage of hypertensive patients do not achieve adequate adherence, which has contributed to poor blood pressure (BP) control worldwide. Consequently, optimal BP control is achieved in less than one-third and one-tenth of patients with hypertension in high-income and low- to middle-income countries, respectively.[5,6]

In recent years, several models have been developed to explain medication adherence, which consider beliefs about the disease, as well as behavioral intentions and the influence of social attitudes and norms.[7] Among them is the Health Belief Model, which allows us to understand how patients' beliefs and perceptions about health and disease influence their behavior. It provides a valuable theoretical framework for understanding health-related behaviors and the barriers perceived by patients that may influence their medication adherence. The Health Belief Model (HBM) postulates that cognition plays a crucial role in decision-making, as it generates expectations about the outcomes of certain behaviors.[8,9] Individuals are more likely to adopt health behaviors when they believe that they are at high risk for a health problem, that the health problem will have serious consequences, that the behavior will reduce the risk or severity, that the benefits outweigh the barriers, who have internal or external signs and confidence to carry out the behavior, and in the specific case addressed in this research, play a determining role in the decisions of individuals regarding compliance with medical recommendations.[10]

In view of this, the development and validation of a scale based on the HBM to measure the factors that affect medication adherence in hypertensive patients is essential,[11] since it offers a theoretical framework that helps design interventions to improve medication adherence, addressing specific barriers and facilitators, making them more effective and personalized, promoting greater adherence and, therefore, better health outcomes.[12] Taking into account the above, the need arose to carry out the present research, which aimed to validate a scale based on the health belief model to measure the factors that influence pharmacological adherence in hypertensive patients.

METHOD

Research design and sampling

A cross-sectional study was carried out at the Luis Augusto Turcios Lima University Teaching Polyclinic, in the municipality of Pinar del Río, between January and April 2024. The development process of the HBM-FAS scale included the review of the literature, the generation of the items that conformed it (30 items grouped in the six constructs that correspond to the theoretical framework of the Health Belief Model), the evaluation of its content by a panel of experts, and the subsequent application of a pilot test.

For the purposes of the research, expert judgment analysis was used, using an intentional non-probabilistic sample made up of seven experts (belonging to the aforementioned health institution). In the context of constructing a path model, adherence to Klein's recommendation of a minimum of 10 cases for each estimated parameter was observed.[13] Considering the total number of items included in the self-designed questionnaire, a sample size of 300 was considered adequate. From a universe of 10 078 hypertensive patients, a sample of 332 patients was selected in a probabilistic, simple random manner, once compliance with the inclusion criteria (patient over 19 years of age, classified as hypertensive, who agrees to participate in the study, stating this through informed consent) and exclusion criteria (patient with dementia, cognitive impairment or terminal illness) had been verified. Data were collected through personal interviews, using a structured questionnaire. Informed consent was obtained from all participants before the start of the study.

Measurement tool

To develop the scale, a literature analysis was used, in addition to consulting several specialists in the field, which allowed the identification and design of the instrument in its initial version. The developed instrument incorporates six dimensions: perceived susceptibility (this construct was designed to assess an individual's perception of their risk of contracting a health problem due to failure to achieve proper drug adherence [items 1-5]), cues to action (this construct included questions intended to identify factors and stimuli that might motivate or prompt individuals to engage in behaviors aligned with proper drug adherence [items 6-10]), perceived severity (within this construct, participants' perceptions regarding the severity and potential consequences of failure to maintain proper drug adherence were assessed [items 11-15]), perceived benefits (this construct sought to elucidate participants' perspectives on the advantages and favorable outcomes associated with adopting proper drug adherence [items 16-20]), perceived barriers (questions within this construct were structured to elicit responses regarding the impediments and challenges that individuals may encounter when attempting to adhere to a drug treatment [items 21-25]) and self-efficacy (within this construct, participants' perceptions about their ability to establish adequate pharmacological adherence were assessed [items 26-30]). It was a 5-point Likert scale. All items were evaluated on a 5-point Likert scale from 1 (totally disagree) to 5 (totally agree). A high score on the scale indicates a strong sense of belief.

Statistical analysis

Descriptive analysis was used to describe the demographic information of the recruited sample. Scale and factor analyses were performed to verify the reliability and validity of the questionnaire. The reliability of the instrument was calculated using item-total score correlations, Cronbach's alpha, and retest reliability. Validity tests were analyzed using content validity and construct validity. The structural equation model (SEM) framework was used, employing the confirmatory factor analysis (CFA) method, to determine the number of factors and the correspondence between each item and factor. The instrument fit indicators used were the values of the standardized factor loadings (they had to be greater than 0,30), CMIN/DF<3, Root Mean Square Error of Approximation (RMSEA)<0,08; Standardized Root Mean Square Residual (SRMR)<0,08; Comparative Fit Index (CFI)>0,900; and Tucker-Lewis Index (TLI)>0,900. To investigate the discriminant validity of the scale, a two-tailed independent samples T test was used in the study. The results of the analysis were evaluated within the 95 % confidence interval and the statistical significance limit was accepted as p<0,05. The software used for statistical analysis was Jamovi v.2.3.28.

Ethical Statement

Before beginning the survey, explicit written informed consent was diligently obtained from each participant, in strict compliance with the ethical principles established in the Declaration of Helsinki. It is imperative to note that the questionnaire used in this study was designed to guarantee the anonymity of the participants, refraining from collecting directly identifying information, such as names, social security numbers or personal health numbers. The study was approved by the Ethics Committee and the Technical Advisory Board of the Luis Augusto Turcios Lima University Teaching Polyclinic, which verified compliance with ethical standards and guidelines during the course of the study.

RESULTS

The sample

A total of 332 participants (including 240 females and 92 males) aged 23 to 87 years (mean age 63,7±8,5 years) completed the baseline questionnaire. Patients were predominantly white (54,8 %), with pre-university education (37,3 %), employed (56,6 %), low socioeconomic status (55,4 %), with a mean of 8,5±2,7 years since diagnosis of the disease.

Scale analysis

Content validity

Seven domain experts were consulted to evaluate the content validity of the questionnaire, with a focus on the clarity, relevance, coherence, pertinence, and precise wording of the items. The assessment was conducted using established psychometric methodologies to ensure robust evaluation. The results indicated that the Item-Level Content Validity Index (I-CVI) ranged from 0,83~0,97, demonstrating a high degree of content validity for individual items. Moreover, the Scale-Level Content Validity Index (S-CVI) was found to be 0,89, which is within acceptable thresholds, thereby confirming the overall validity of the scale for measuring the intended constructs.

Item analysis

We computed the Pearson correlation coefficient for each item score in relation to the total score of the scale. Corrected item-total correlations should ideally exceed 0,20. Items with t-values less than 3,00 or p-values greater than 0,05 were considered for deletion. The mean values for individual items ranged from 2,338~4,809 (table 1). Notable variations in item-total score correlations were observed across the scale, with coefficients ranging from 0,237~0,691. items I10 and I16 presented the lowest correlation coefficients of the entire scale (0,237 and 0,275 respectively) and were therefore excluded from the modified model.

Table 1. Results of the correlation analysis between the total score of the items and the person in the designed instrument

Item content	Means	r	t	p
I1. I believe that not taking my high blood pressure medications may make my health condition worse.	2,73	0,574	14,4	<0,001
I2. I believe that not complying with my medication makes me more vulnerable to serious complications.	2,86	0,681	20,9	<0,001
I3. I think that I am more prone to complications if I do not follow my medication regimen.	2,73	0,674	17,4	<0,001
I4. I perceive that the risk of hospitalization is greater if I am not consistent with my medication.	3,09	0,587	16,8	<0,001
I5. I perceive that my blood pressure will not be controlled if I do not follow the treatment prescribed by my doctor.	3,0	0,452	17,0	<0,001
I6. The information provided at my medical consultation motivates me to adhere to my treatment.	3,04	0,690	6,0	<0,001
I7. My doctor has clearly explained the benefits of taking my medication.	2,65	0,589	11,7	<0,001
I8. The support of my family and friends helps me remember to take my medication.	3,25	0,691	12,4	<0,001
I9. Regular check-ups with my doctor remind me of the importance of adherence.	2,53	0,537	11,9	<0,001
I10. Reminders such as alarms or apps help me to follow my medication regimen.	4,03	0,237	5,3	<0,001
I11. I perceive that not following my treatment can lead to serious problems such as a heart attack or stroke.	3,99	0,491	20,8	<0,001
I12. I perceive that untreated hypertension negatively affects my quality of life.	3,99	0,479	22,9	<0,001
I13. I believe that lack of adherence to treatment can cause progressive deterioration of my health.	3,99	0,520	23,7	<0,001
I14. I consider that non-compliance with treatment can result in expensive and difficult-to-manage medical complications.	4,04	0,676	19,0	<0,001
I15. I believe that uncontrolled hypertension can put my life at risk.	4,07	0,485	16,5	<0,001
I16. I believe that adherence to my medication will help me maintain controlled blood pressure.	4,10	0,275	4,1	<0,001
I17. I feel that adherence to my medication will protect me from unnecessary hospitalizations.	3,98	0,484	9,4	<0,001
I18. I believe that following my medication will allow me to enjoy a more active and healthy life.	3,76	0,497	15,5	<0,001
I19. I believe that following my medication regimen reduces the risk of serious complications.	3,87	0,518	20,4	<0,001
I20. I believe that taking my medication regularly improves my quality of life.	3,87	0,469	21,8	<0,001
I21. I find that I often forget to take my medications at the prescribed time.	3,74	0,598	17,7	<0,001
I22. I think medication costs are a major barrier to adherence to my treatment.	3,74	0,582	19,6	<0,001
I23. I feel that complex medication instructions make it difficult for me to adhere.	3,92	0,652	15,1	<0,001
I24. I feel that lack of time affects my ability to follow treatment.	3,82	0,485	16,9	<0,001
I25. I feel that the feeling of well-being makes me believe that I do not need to take my medication regularly.	3,46	0,449	6,6	<0,001
I26. I feel capable of taking my medications as prescribed.	3,47	0,463	20,9	<0,001
I27. I feel I can organize myself so that I don't miss any doses of my treatment.	3,53	0,550	19,2	<0,001
I28. I feel I can overcome any barriers that interfere with my adherence to my treatment.	3,71	0,562	20,9	<0,001
I29. I feel I can adjust my routine to include adherence to my treatment.	3,38	0,437	18,2	<0,001
I30. I feel confident that I can adhere to my treatment even on busy days.	3,64	0,418	17,5	<0,001

Construct validity

The model's goodness-of-fit was assessed using several fit indices to analyze the relationship between the theoretical basis of the initial model design (Fig. 1) and the empirical data. Initial results from the Confirmatory Factor Analysis (CFA) indicated that the fit indices needed improvement (CFI=0,763; TLI=0,735; RMSEA=0,118; SRMR=0,143; CMIN/DF=6,07; p-Value <0,001). Adjustments were made by removing items with low factor loadings, which enhanced the fit indices.

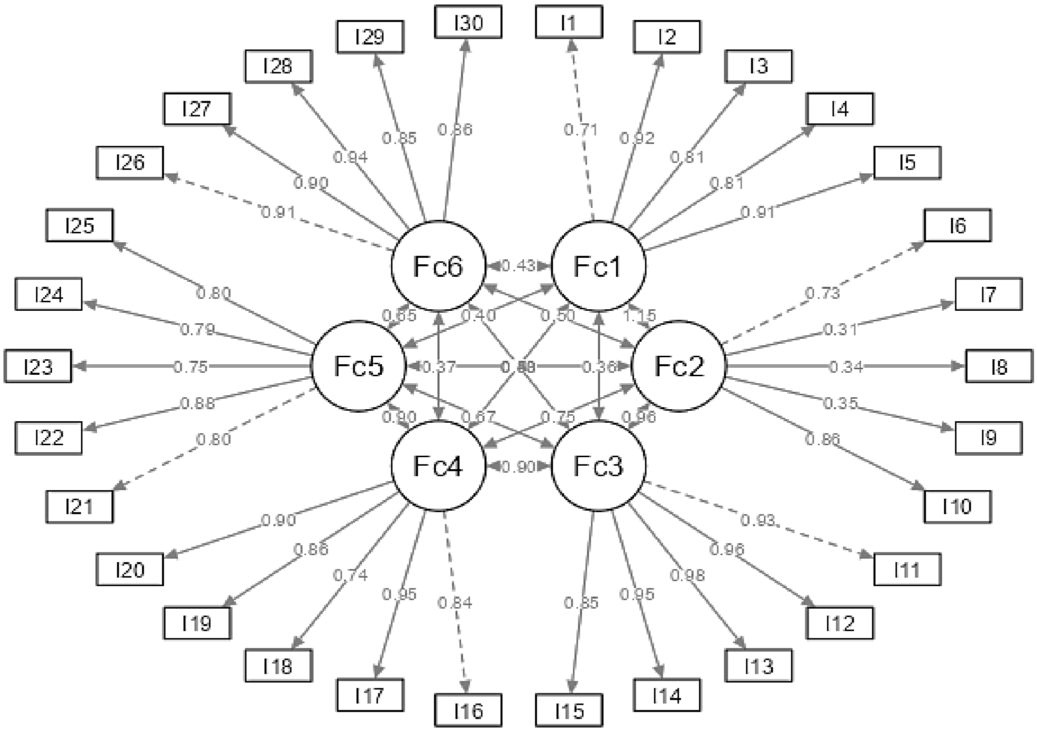

Figure 1. Standardized six-factor structural model of the Health Belief Model for pharmacological adherence (HBM-FA) scale [Initial model]
Notes: Fc1 (Perceived susceptibility); Fc2 (Cues to action); Fc (Perceived severity); Fc4 (Perceived benefits); Fc5 (Perceived barriers); Fc6 (Self-efficacy)

The refined six-factor model (which excluded items 1, 6, 14, 15, 17, 25, and 30 [which showed low factor loadings], as well as the already-deleted items 10 and 16 [which had low item-total score correlations]) demonstrated acceptable fit, with CMIN/DF=1,69, CFI=0,977, TLI=0,972, SRMR=0,0393, RMSEA=0,0434 and p-Value<0,001. Table 2 shows the two models (initial and modified) evaluated, with the analysis of the factor loadings of each item and the respective values of their standard errors. Figure 2 shows the path diagram of the modified model, with the evaluated constructs and their respective items.

Table 2. Fit indices for each item in the model

Factor	Indicador	Initial model			Modifed model		
		Carga factorial	p	Error estándar	Carga factorial	p	Error estándar
Fc1	I1	0,567	<0,001	0,0394	*	*	*
	I2	0,801	<0,001	0,0383	0,930	<0,001	0,0392
	I3	0,702	<0,001	0,0403	0,833	<0,001	0,0407
	I4	0,708	<0,001	0,0421	0,842	<0,001	0,0422
	I5	0,726	<0,001	0,0427	0,840	<0,001	0,0427
Fc2	I6	0,406	<0,001	0,0681	*	*	*
	I7	0,657	<0,001	0,0560	0,764	<0,001	0,0507
	I8	0,677	<0,001	0,0547	0,821	<0,001	0,0496
	I9	0,656	<0,001	0,0549	0,760	<0,001	0,0526
	I10	0,252	<0,001	0,0473	*	*	*
Fc3	I11	0,610	<0,001	0,0293	0,932	<0,001	0,0295
	I12	0,655	<0,001	0,0286	0,971	<0,001	0,0285
	I13	0,645	<0,001	0,0272	0,997	<0,001	0,0273
	I14	0,582	<0,001	0,0306	*	*	*
	I15	0,526	<0,001	0,0319	*	*	*

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Fc4	I16	0,293	<0,001	0,0361	*	*	*
	I17	0,373	<0,001	0,0397	*	*	*
	I18	0,559	<0,001	0,0360	0,812	<0,001	0,0361
	I19	0,658	<0,001	0,0322	0,931	<0,001	0,0320
	I20	0,698	<0,001	0,0320	0,964	<0,001	0,0314
Fc5	I21	0,622	<0,001	0,0352	0,852	<0,001	0,0350
	I22	0,629	<0,001	0,0321	0,930	<0,001	0,0319
	I23	0,588	<0,001	0,0389	0,772	<0,001	0,0391
	I24	0,592	<0,001	0,0350	0,843	<0,001	0,0351
	I25	0,329	<0,001	0,0496	*	*	*
Fc6	I26	0,814	<0,001	0,0389	0,914	<0,001	0,0391
	I27	0,752	<0,001	0,0391	0,891	<0,001	0,0391
	I28	0,718	<0,001	0,0344	0,962	<0,001	0,0343
	I29	0,758	<0,001	0,0417	0,834	<0,001	0,0424
	I30	0,660	<0,001	0,0377	*	*	*

Notes: Fc1 (Perceived susceptibility); Fc2 (Cues to action); Fc (Perceived severity); Fc4 (Perceived benefits); Fc5 (Perceived barriers); Fc6 (Self-efficacy); *Item removed in the modified model

Discriminant validity

The total scores were ranked from highest to lowest in the sample. The highest 25 % of scores were classified as the high subgroup, while the lowest 25 % made up the low subgroup, with the low subgroup coded as 1 and the high subgroup coded as 2. An independent samples t-test was then conducted to compare the high and low subgroups. The observed significant difference between these subgroups demonstrated that the discriminant validity was acceptable.

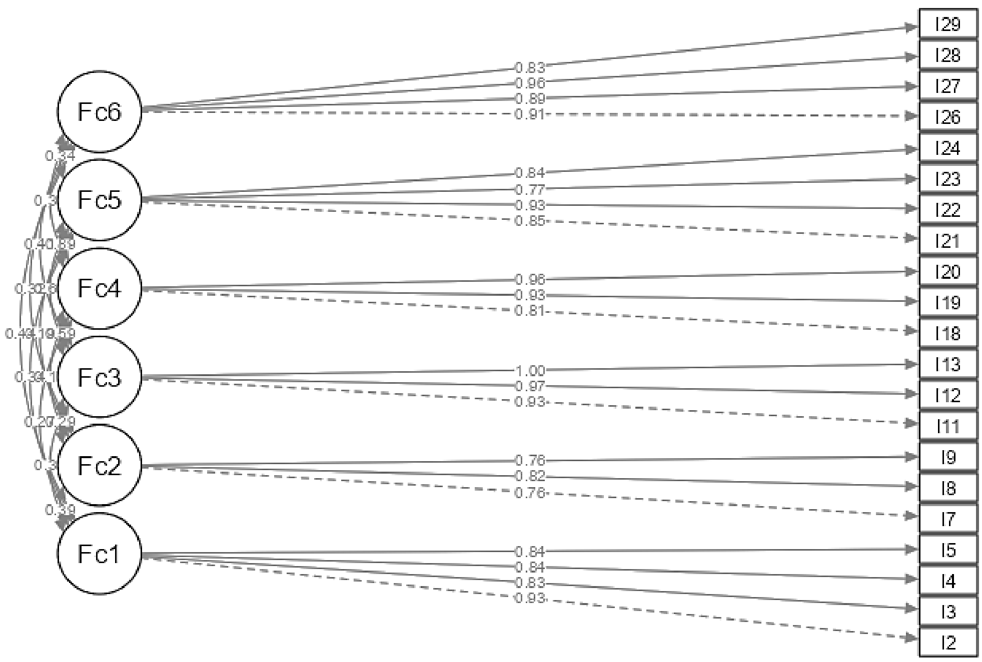

Figure 2. Standardized six-factor structural model of the Health Belief Model for pharmacological adherence (HBM-FA) scale [Final model]

Notes: Fc1 (Perceived susceptibility); Fc2 (Cues to action); Fc (Perceived severity); Fc4 (Perceived benefits); Fc5 (Perceived barriers); Fc6 (Self-efficacy)

Internal consistency reliability and Test-retest reliability

The instrument was found to have a Cronbach's **α** value of 0,895. The reliability of perceived susceptibility construct was 0,938, for construct perceived severity was 0,749, for construct of perceived benefits was 0,801, for construct of perceived barriers was 0,836, for construct of self-efficacy was 0,921, and for construct of cues to action was 0,789. In Item-total score correlations, there was a strong correlation and statistical significance, and the correlations ranged from 0,120~0,886 (table 3), which suggested that the items all belonged to the scale. For the retest reliability, we evaluated the same group of subjects twice after an interval of two weeks using the same scale and then calculated the correlation coefficient of the two evaluation results. The retest reliability was 0,780. The obtained retest reliability value is greater than 0,7, which is acceptable.

Table 3. Covariance of the Constructs of the Health Belief Model for pharmacological adherence (HBM-FA) scale

	Fc1	Fc2	Fc3	Fc4	Fc5	Fc6
Fc1	-	0,378*	0,356*	0,226*	0,322*	0,410*
Fc2		-	0,272*	0,120	0,158*	0,306*
Fc3			-	0,526*	0,605*	0,394*
Fc4				-	0,886*	0,254*
Fc5					-	0,326*
Fc6						-

DISCUSSION

Blood pressure (BP) control in hypertension is recognized as a key measure in cardiovascular (CV) risk management and is a cornerstone of preventive strategies. To this end, pharmacological adherence is essential, as the factors that influence it are of great importance.[14] To our knowledge and taking into account the results of our review of existing studies, there is no tool that specifically measures the concepts addressed in the instrument developed in the present research.

This study developed and validated a scale based on the health belief model to measure behavior toward pharmacological adherence in hypertensive patients. The developed scale was informed by a multistage development process in accordance with the existing literature, which allowed for input from content experts (expert panel review). The final scale had 21 items, which were grouped into the six domains that responded to the constructs detailed in the conceptual framework of the health belief model (perceived susceptibility, perceived severity, perceived barriers, perceived benefits, cues to action, and Self-efficacy).

In regard to medication adherence, this model underscores the significance of confidence in the medication's efficacy and necessity, awareness of potential side effects, ease of medication accessibility, and effective communication with healthcare providers. Individuals are more likely to adhere to their prescribed medication regimen when they have faith in its benefits, face fewer obstacles, and receive adequate support to recall and correctly take their medication. By emphasizing these key elements, the model aims to enhance patient compliance through a comprehensive understanding of the factors that influence adherence. Moreover, the model suggests leveraging technological advancements, such as digital health tools and mobile applications, to further support and monitor adherence, ensuring patients remain on track with their treatment plans.[10,15]

The flexibility of the Health Belief Model (HBM) across diverse healthcare environments underscores its wide-ranging applicability. Nonetheless, acknowledging the model's limitations is crucial for enhancing its effectiveness. Despite these constraints, targeted educational interventions informed by the HBM, as illustrated by Wang et al.[16] can positively impact patient outcomes in various clinical contexts. This reinforces the model's potential when aptly tailored and executed, emphasizing its significance in health education and promotion.[17,18] Additionally, integrating modern technologies and continuous feedback mechanisms can further bolster the model's utility in contemporary healthcare settings.

In a study conducted by Yue et al.[9] the developed model was quite effective in predicting medication adherence among Chinese hypertensive patients, explaining 48,8 % of the variance with an accuracy of 82,8 %. When adjusting for control factors, the model explained 50,5 % of the variance with an accuracy of 86,2 %. Given this, the HBM is generally reliable in predicting and improving medication adherence in this group of patients. Despite this, the constructs of the model vary in importance between studies, with perceived barrier being the most consistent predictor of adherence, followed by perceived severity, perceived benefits, and perceived susceptibility.

Regarding content validity, the indices obtained in the present research after submitting the instrument to the expert panel showed that both the items and the scale as a whole were adequate. Larki et al.[15] detailed a similar finding when determining the content validity of the elements of the list they distributed to the experts recruited in their study. The mean content validity index (CVI) and the content validity rate (CVR) of the questionnaire developed by them were 0,94 and 0,91, respectively.

Regarding additional psychometric properties, after conducting the Confirmatory Factor Analysis (CFA) in studies performed in both China,[19] and the United States,[20] the fit indices of the models have exhibited values comparable to those documented in this research. Specifically, the tests for the CMIN/DF, RMSEA, SRMR, CFI, and TLI have all demonstrated robust indicators. These indices collectively indicate an adequate fit between the conceptual framework and the empirical data obtained through the scale's application. The alignment of these fit indices across diverse studies reinforces the reliability and validity of the scale, affirming its robustness and applicability in varied cultural contexts. Moreover, these findings underscore the efficacy of the scale in accurately measuring the intended constructs, thus contributing to the generalizability and credibility

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of the research outcomes.

The reliability calculations of the scale and Cronbach's alpha values were 0,71; 0,70; 0,70; 0,82 and 0,85 for perceived susceptibility, perceived severity, perceived barriers, perceived benefits and perceived self-efficacy, respectively.[15] These results are consistent with the data of the present research. In turn, The application of another similar instrument, in a pilot study developed by Kamran et al.[21] showed good reliability, with Cronbach's alpha values ranging between 0,82 and 0,92 for the different constructs that comprised it.

Limitations

The study highlights several strengths, including the development of a new instrument based on an extensive literature review, followed by subjecting the instrument to due validation by a panel of experts, as well as the application of a pilot study to assess its psychometric properties. The process followed the recommended steps, assessing construct and criterion-related validity, and confirming the factor structure and model fit with independent samples. However, there are limitations and recommendations for future research. The study relies on subjective ratings, not objective performance measures, and uses a cross-sectional design, which does not infer causality. Future research should consider longitudinal studies to observe adaptive leadership behavior over time.

CONCLUSIONS

The present scale is the first known scale of its kind in the national context to be developed and evaluated for specific use in hypertensive patients, based on the health beliefs model. The rigorous use of an expert panel enhanced the development of the HBM-FA scale, and reliability and validity assessments showed acceptable psychometric properties of the final model. These results present a useful scale that is acceptable for assessing the susceptibility, severity, perceived barriers and benefits, as well as cues for action and self-efficacy of the hypertensive patient, in terms of pharmacological adherence.

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