



## ORIGINALES

### Design and validation of educational material aimed at improving the knowledge and self-care of pregnant women in the face of hypertensive disorders of pregnancy

Diseño y validación de material educativo dirigido a mejorar el conocimiento y autocuidado de la mujer gestante ante los trastornos hipertensivos en el embarazo

Iliana Milena Ulloa Sabogal<sup>1</sup>  
Edier Mauricio Arias Rojas<sup>1</sup>

<sup>1</sup> Faculty of Nursing. University of Antioquia. Medellín, Colombia. [iliana.ulloa@udea.edu.co](mailto:iliana.ulloa@udea.edu.co)

<https://doi.org/10.6018/eglobal.562251>

Received: 23/03/2023

Accepted: 17/04/2023

#### ABSTRACT:

**Introduction:** Hypertensive disorders of pregnancy are one of the main causes of maternal and perinatal morbidity and mortality worldwide. Therefore, it is important to have validated materials that strengthen health education activities during the prenatal stage.

**Objective:** To design and validate an educational material to improve the knowledge and self-care behaviors of pregnant women in the face of hypertensive disorders of pregnancy.

**Materials and methods:** Methodological study carried out in two phases: 1) design and 2) technical and population validation of the educational material. The construction incorporated the characteristics for the design of written health education materials. The criteria of attraction, understanding, acceptance, identification and induction to action were evaluated, with the participation of 5 experts and 20 pregnant women. A percentage equal to or greater than 70% in each criterion was considered as a point of approval.

**Results:** The design of the educational booklet was based on the literature and the Theory of Planned Behavior. The technical and population validity showed a positive approval level with an average of 90.58% and 98.07% respectively. The qualitative recommendations provided improvements to the final version of the material in terms of the use of simpler language, more representative illustrations of the content, and the incorporation of reinforcement activities.

**Conclusions:** The booklet met the criteria of efficacy in its validation process; therefore, it can be used as a didactic resource in educational activities aimed at improving the knowledge and self-care behaviors of pregnant women in the face of hypertensive disorders of pregnancy

**Keywords:** Knowledge, Self-care, Health education, Validation study, Hypertension, Pregnancy-Induced.

#### RESUMEN:

**Introducción:** Los trastornos hipertensivos del embarazo son una de las principales causas de morbilidad y mortalidad materna y perinatal en todo el mundo. Por lo tanto, es importante contar con

materiales validados que fortalezcan las actividades de educación para la salud durante la etapa prenatal.

**Objetivo:** Diseñar y validar un material educativo para mejorar los conocimientos y comportamientos de autocuidado de la mujer gestante ante los trastornos hipertensivos del embarazo.

**Materiales y métodos:** Estudio metodológico realizado en dos fases: 1) diseño y 2) validación técnica y poblacional del material educativo. La construcción incorporó las características para el diseño de materiales escritos de educación en salud. Se evaluaron los criterios de atracción, comprensión, aceptación, identificación e inducción a la acción, con la participación de 5 expertos y 20 gestantes. Se consideró como punto de aprobación un porcentaje igual o mayor a 70% en cada criterio.

**Resultados:** El diseño de la cartilla educativa se sustentó en la literatura y la Teoría del Comportamiento Planificado. La validez técnica y poblacional evidenció un nivel de aprobación positiva con una media del 90,58% y 98,07% respectivamente. Las recomendaciones cualitativas aportaron mejoras en la versión final del material en el uso de lenguaje sencillo, ilustraciones más representativas del contenido y la incorporación de actividades de refuerzo.

**Conclusiones:** La cartilla cumplió con los criterios de eficacia en su validación; por lo tanto, puede ser utilizada como un recurso didáctico en las actividades de educación orientadas a mejorar los conocimientos y comportamientos de autocuidado de la mujer gestante ante los trastornos hipertensivos del embarazo.

**Palabras clave:** conocimiento; autocuidado; educación en salud; estudio de validación; hipertensión inducida en el embarazo.

## INTRODUCTION

Hypertensive disorders of pregnancy (HDP) include chronic hypertension, gestational hypertension, preeclampsia or eclampsia, and chronic hypertension with super-added preeclampsia <sup>(1)</sup>. This group of clinical conditions complicate up to 10% of pregnancies and are one of the leading causes of maternal, fetal, and neonatal morbidity and mortality worldwide <sup>(2)</sup>. Currently, the exact etiology of HDP remains unknown, which is why it has been considered a disease of a heterogeneous and multifactorial nature <sup>(3)</sup>. In this regard, Ahmed et al., <sup>(4)</sup> describe that in order to prevent or control the risk of HDP, interventions that address a wide range of factors are required through the implementation of actions aimed at pregnant women's self-care and lifestyle modification.

In this sense, the available scientific evidence reports that education is one of the most frequent strategies in intervention studies aimed at improving perinatal maternal health outcomes in women with or without a diagnosis of HDP <sup>(5-8)</sup>. Several authors <sup>(7,9,10)</sup> affirm that health education programs have a positive impact on pregnant women's level of knowledge and attitudes towards HDP, as well as on their self-care behaviors, allowing lifestyle changes in the face of modifiable risk factors and the early identification of their signs and symptoms. This results in the timely detection and treatment of this condition, and most likely, in the reduction of its negative consequences.

Intervention studies <sup>(7,8,11)</sup>, carried out in women with HDP or at risk of developing this complication, have produced a wide variety of educational materials constructed according to the objectives proposed in the studies; however, there is little evidence about processes and criteria used in the design and validation of the material used. Among the educational materials used are brochures, graphic cards, stickers or magnets, flipcharts, primers, videos and mobile applications. It is important to highlight that most of these resources are aimed at improving the level of knowledge about HDP and its risk factors, signs and symptoms, complications, diagnosis, and treatment. Also, very few of them are aimed at improving self-care behaviors which are

considered to be a fundamental component in the reduction or control of the risk of the disease.

In relation to the above, health education, as one of the main strategies of health promotion and disease prevention, requires that the content and design of the educational material be validated, so that it adapts to the characteristics and needs of the target population, facilitates the transmission of the message, favors teaching-learning strategies, strengthens knowledge, and promotes self-care <sup>(12)</sup>. Therefore, the present study seeks to have an educational material oriented to improving not only pregnant women's knowledge but also their self-care behaviors in the face of HDP.

According to Herrera et al., <sup>(13)</sup> there is a need to design educational materials based on theoretical frameworks, so that the information is not only technically sound, but is guided by theories that have demonstrated effectiveness during their application in various populations. For this reason, the educational material designed in this study is based on the Theory of Planned Behavior (TPB) <sup>(14)</sup>. The TPB was selected due to its ability to describe, explain, and predict the behavior of pregnant women in specific health situations, including HPD <sup>(8)</sup>. The TPB poses that a person's intention to perform a behavior is influenced by three factors: The first of them is of a personal nature and is called *attitudes*; the second one is related to social pressure and is known as *subjective norms*, and the last one focuses on the control of factors and is known as *perceived behavioral control* <sup>(14)</sup>. In this way, the analysis of the theory allowed to identify motivational support (willingness to achieve a behavior), behavioral (behaviors) and educational (knowledge) factors as key components that contribute to promoting a better level of knowledge and health behaviors in pregnant women in the face of HDP.

Once the forms of support were established, this study opted to design an educational booklet aimed at strengthening pregnant women's positive attitudes, social and family support, control over behavioral factors and intention to carry out self-care behaviors in the face of HDP. In addition, the booklet is expected to improve pregnant women's level of knowledge about the characteristics of the disease and its self-care behaviors, in order to support health actions aimed at preventing or reducing the risk of HDP.

From this perspective, the importance of this study lies on making available an educational material that can be used by health professionals responsible for women's care during the prenatal stage. In addition, the design of this material responds to the need to have nursing care tools that are based on theories, as explained by Herrera et al., <sup>(13)</sup>, because they strengthen nursing identify through the scope of greater autonomy that can be seen reflected in the exercise of their professional work <sup>(15)</sup>. Therefore, the TPB, as a theoretical framework that serves as the basis for the educational material proposed in this study, seeks to promote the development of knowledge, research and practice around perinatal maternal care. Accordingly, the objective of this study was to design and validate an educational material to improve the knowledge and self-care behaviors of pregnant women in the face of hypertensive disorders of pregnancy.

## MATERIALS AND METHODS

Methodological research developed between January 2022 and January 2023 in the city of Bucaramanga, Colombia. The process was carried out in two phases: 1) design and 2) validation of the educational material.

### Phase 1. Design of the educational material

The educational booklet was prepared in accordance with the recommendations given by Hoffmann <sup>(16)</sup> for the design of effective written health education materials, in terms of the characteristics of content, organization, language, illustration, design, learning, and motivation. This phase lasted 10 months and included the following stages:

*Search of scientific literature:* the MEDLINE, LILACS and CINAHL databases were explored in search for intervention studies, design and validation of educational materials related to HDP. To select of the literature, the limits of Spanish, English and Portuguese languages were applied. Also, only articles with publication year between 2012 and 2022 were selected. The search strategy used a combination of the following keywords: "Hypertension, Pregnancy-Induced", "Pre-Eclampsia", "Self-Care", "Health Education", "Patient Education as Topic" and "Validation Study". In this search, 22 articles were identified. Additionally, national <sup>(17,18)</sup> and international <sup>(19-21)</sup> clinical practice guidelines on prevention, detection, diagnosis, and treatment of HDP were reviewed.

*Selection and development of the contents:* after the search and selection of the literature, the information was organized and the following contents were defined: (a) characteristics of HDP, (b) nutritional recommendations, (c) strategies to facilitate sleep and rest, (d) physical exercise, and (e) mental health promotion. An item related to the components of TPB was also included. The texts were written in a clear, precise language and used a writing style that was easy to read and understand for the target audience.

*Design of the illustrations:* this stage sought to have a graphic design which included harmonious, attractive and representative images of the information contained in the texts, and that allowed to apply what was learned. A professional in graphic design and advertising made the creation and layout in Adobe Illustrator.

### Phase 2. Validation of educational material

The validation phase lasted two months and was led by one of the researchers. The technical and population validation of the booklet was carried out in accordance with the provisions of the "Methodological guide for the validation of informative, educational, communicative materials - IEC" by United Nations Children's Fund (UNICEF) <sup>(22)</sup>.

The technical validation sought to have experts in the thematic area who could review, comment and approve the content of the educational material <sup>(22)</sup>. To select the experts, health professionals with clinical, teaching or research experience in the area of perinatal maternal care were considered. An invitation to participate, which included a description of the purpose of the study, the informed consent, the instructions for the

validation process, and the data collection instrument, was sent via email to each of the experts. In addition, experts were sent the booklet in digital format through an online link. After the technical validation, the experts' observations were analysed and adjustments were made to the first version of the booklet.

After the technical validation, a population validation was carried out. This consisted of checking, among a representative group of the target population, if the content, language, design and organization of the material worked <sup>(22)</sup>. This process included pregnant women enrolled in the prenatal control program, who were residents of urban or rural areas, who belonged to any chronological and gestational age, and who had or had not had complications during pregnancy. The participants were recruited in a health institution where they received prenatal care. The objectives of the validation process were explained to each participant and an informed consent form was completed. The validation was carried out in person and individually. The booklet was delivered in printed format, and participants were given the time necessary for the review of the material. Subsequently, the validation instrument was applied.

The instruments used in the technical and population validation processes were designed by the researchers considering the criteria for the validation of educational materials by Ziemendorff and Krause <sup>(23)</sup>: (a) attraction: the material arouses interest in the target audience; (b) comprehension: the contents and messages are clear and understandable; (c) acceptance: the ideas and proposals are pertinent and accessible to the public; (d) identification: the target audience feels represented by the content; and (e) induction to action: the proposed behavior or attitude is identified and possible to achieve. The technical and population validation instruments were structured with 34 and 26 items respectively, grouped into the five criteria. These criteria were evaluated on a scale of 0 to 2, where 0 meant totally disagree and 2 meant totally agree. In addition, the instrument incorporated an open space to describe the recommendations in detail. The analysis of the information followed the indications provided by UNICEF in its "Methodological Guide for the Validation of Materials". This guide establishes that the material must demonstrate favorable responses in the five criteria listed above, in a percentage equal to or greater than 70% <sup>(22)</sup>.

The experts' academic and professional information, the participants' sociodemographic and obstetric data, and the information obtained from the technical and population validation were recorded in two databases designed in Microsoft Excel. The descriptive analysis of the continuous variables was performed with frequency distributions and measures of central tendency. The categorical variables were analyzed from the calculation of absolute and relative frequencies.

This study adhered to the scientific, technical, and administrative standards for health research contemplated in Resolution 008430 of 1993 of the Colombian Ministerio de Salud y Protección Social <sup>(24)</sup>. Approval from the Research Ethics Committee at the Faculty of Nursing, Universidad de Antioquia (Act No CEI-FE 2021-31) and from the health institution was obtained, along with a written informed consent from the research participants.

# RESULTS

## Phase 1. Design of the educational material

During the construction of the booklet “I decide to take care of myself in the face of hypertensive disorders of pregnancy”, the researchers on several occasions reviewed, modified and proposed changes in the texts, illustrations and design of the booklet. Finally, the booklet presents 45 pages on the front and back; it contains cover, back cover, presentation, table of contents, notes pages, and content organized into five learning units. Each unit is structured with a title, objectives, content, motivational phrases and a space for the generation of commitments from attitudes, social or family support and control over behavior in the prevention of HDP. In order to achieve greater interactivity between the booklet and the pregnant women, reinforcement activities were incorporated with illustrations to paint, sentences to complete, and games of selection and relationship of contents.

## Phase 2. Validation of educational material

Five experts participated in the technical validation, including four nurses and a psychologist. Two of them had undergraduate academic training, one had specialization studies, one held a master's degree, and one had a doctorate. The experts had an average of 18.1 years of work experience in the healthcare area, 16 years teaching, and 5 years of research

Table 1 presents the items in the technical validation instrument, the number of experts and the percentage of agreement. In the results obtained, the criterion of induction to action reached a level of approval of 100%; the criteria of attraction, acceptance and identification got between 80% and 100% approval; and the criterion of comprehension obtained between 20% and 100% approval. In the latter, item 11, which as related to the use of clinical terminology, presented the lowest percentage of approval, with observations aimed at avoiding the use of abbreviations and technical terms, and incorporating the definition of concepts, as described in Table 2. In general, the approval level of the experts reached an average of 90.58%, which is considered favorable in the technical validation of the booklet.

**Table 1. Results of the technical validation of the booklet**

Validation criteria and items formulated	Totally agree n (%)	Partially in agree n (%)	Totally disagree n (%)
<b>Attraction</b>			
1. The overall look or appearance of the educational material is attractive	5 (100)		
2. The font size of the educational material is adequate and makes it easy to read	4 (80)	1 (20)	
3. The font type (style) of the educational material is pleasant and easy to read	5 (100)		
4. The font color of the educational material is pleasant and easy to read	5 (100)		

5. The colors, shapes and sizes of the illustrations are appropriate	5 (100)	
6. The length (size) of the paragraphs of the educational material is adequate	4 (80)	1 (20)
7. The colors of the educational material attract attention	5 (100)	
8. The quality of the spelling, punctuation and writing of the content of the material is appropriate	4 (80)	1 (20)
<b>Comprehension</b>		
9. The educational material is aimed at the proposed objective	4 (80)	1 (20)
10. The educational material uses a common and everyday language for the target population	4 (80)	1 (20)
11. Medical terminology is used to contextualize the population with the terms, and when they are used, they are defined	1 (20)	4 (80)
12. The writing style facilitates the understanding of the text	5 (100)	
13. The content of the educational material is presented in a logical sequence	4 (80)	1 (20)
14. The content has clear and comprehensible headings or subheadings	4 (80)	1 (20)
15. The content is clear and easily comprehensible	4 (80)	1 (20)
16. The educational material uses elements to highlight key aspects (e.g., boxes, bullets, bold, larger font, colors)	4 (80)	1 (20)
17. The educational material consists of elements of synthesis of the message or content	5 (100)	
18. The illustrations of the educational material reinforce the understanding of the content	5 (100)	
19. The illustrations present the visual message by themselves	5 (100)	
20. The illustrations are consistent with the message conveyed by the text	5 (100)	
<b>Acceptance</b>		
21. The message of the educational material is clear and concise	4 (80)	1 (20)
22. The educational material addresses important issues for the target population	5 (100)	
23. The extent of educational material is adequate	4 (80)	1 (20)
24. The material does not contain elements that offend or cause discomfort to the target population	5 (100)	

<b>Identification</b>		
25. The proposed educational material is focused on the target population	5 (100)	
26. The educational material responds to the educational needs of the target population	4 (80)	1 (20)
27. The content allows the person to have interaction	5 (100)	
28. The educational materials is culturally appropriate for the target population	5 (100)	
<b>Induction to action</b>		
29. The material describes health behaviors that the target population can develop	5 (100)	
30. The material is addressed directly to the population when describing health behaviour	5 (100)	
31. The material explicitly presents health behavior	5 (100)	
32. The material recommends the person to perform the health behavior	5 (100)	
33. The material provides tools (e.g., menu planners, check cards) that can help the person to acquire the behavior	5 (100)	
34. The material uses illustrations that guide the performance according to the instructions	5 (100)	

The comments issued by the experts were satisfactory and included the following comments: "It is an educational material that is easy to implement in prenatal control and in maternity courses", "it is a useful booklet in the practice of perinatal maternal nursing care", "it is an interactive resource that supports and motivates pregnant women to know and apply care actions in the face of HDP". Table 2 presents a synthesis of the improvement observations made by the experts in regards to the criteria of attraction, comprehension and acceptance.

**Table 2. Observations of the technical validation of the booklet**

<b>Validation criteria</b>	<b>Observations</b>
<b>Attraction</b>	-Review the length of some paragraphs, since it is important to consider short and concise readings. -Check writing and spelling. -Use a more striking color and a larger font size in reminder messages.
<b>Comprehension</b>	-In Unit 1, include the concept of arterial hypertension, which may be unknown to the population. -In the title of Unit 2, aspects related to women's self-esteem could be included as support in carrying out self-care behaviors. -The use of the abbreviation HDP and technical terms make it difficult to understand and transmit ideas.
<b>Acceptance</b>	- The material can be clearer and more concise, which will reduce its length.



The population validation was carried out with the participation of 20 pregnant women, with a minimum age of 17 years and a maximum of 43, mean of 25.15 years. Most of them Colombian nationality (80%), resided in the urban area (85%), were in a free union (80%), took care of their homes (70%), had high school degrees (75%) and belonged to a 2 (low) socioeconomic stratum (65%), according to the classification of the National Administrative Department of Statistics (DANE) <sup>(25)</sup>. In the obstetric history, most of the participants were multigravid (60%), with a minimum gestational age of 13 weeks, and a maximum of 37.5, with a mean of 24.77 weeks. The results of the population validation of the booklet show approval rates between 80% and 100%, with an average score of 98.07% in the five criteria evaluated, as evidenced in Table 3.

**Table 3. Results of population validation of the booklet**

<b>Validation criteria and items formulated</b>	<b>Totally agree n (%)</b>	<b>Partially in agree n (%)</b>	<b>Totally disagree n (%)</b>
<b>Attraction</b>			
1. The overall look or appearance of the booklet is attractive and attract your attention	17 (85)	2 (10)	1 (5)
2. The font size of the booklet is adequate and makes it easy to read	20 (100)		
3. The font of the booklet is pleasant and easy to read	20 (100)		
4. The font color of the booklet is pleasant and easy to read	20 (100)		
5. The colors, shapes and sizes of the images/figures are appropriate	20 (100)		
6. The size of the paragraphs in the booklet is adequate	20 (100)		
7. The colors of the booklet attract attention	19 (95)	1(5)	
8. The contents of the booklet are in an orderly manner	20 (100)		
<b>Comprehension</b>			
9. The content of the booklet is clear and easy to learn	20 (100)		
10. The content has clear and comprehensible headings or subheadings	20 (100)		
11. The booklet uses a common language, everyday and easy to understand	16 (80)	4 (20)	
12. The booklet uses elements to highlight key points (e.g., boxes, bullets, bold, larger font, colors)	20 (100)		
13. The images/figures of the booklet reinforce the understanding of the content	20 (100)		
14. Images/figures are clear and eye-catching	19 (95)	1(5)	
<b>Acceptance</b>			
15. The message of the booklet is clear and precise	20 (100)		

16. The educational booklet addresses important issues	20 (100)	
17. The extension or size of the booklet is adequate	19 (95)	1(5)
18. The booklet does not contain elements that offend or cause discomfort	20 (100)	
<b>Identification</b>		
19. The content is interesting and motivates you to read the booklet	20 (100)	
20. The booklet responds to your knowledge needs and self-care behaviours	20 (100)	
21. The content of the booklet allows you to have interaction (e.g., review activities, questions, making commitments)	20 (100)	
<b>Induction to action</b>		
22. The primer describes self-care behaviors in pregnancy that you can develop	20 (100)	
23. The booklet clearly explains self-care behavior	20 (100)	
24. The booklet recommends you to perform the self-care behavior	20 (100)	
25. The booklet provides you with examples of nutritional menus, exercises, relaxation or others, which can help you acquire self-care behavior	20 (100)	
26. The booklet uses images/figures that guide self-care behavior according to the instructions in the text	20 (100)	

The assessments made by the participants during the population validation process highlighted the following: "the booklet contains everything that is required to know about high blood pressure in pregnancy", "the illustrations are very beautiful, colorful and complement the information in the texts", "practical activities are a way to interact with the booklet and strengthen what you have learned", "the colors that identify each unit are quite striking", "the information contained in each unit is very well organized". The main observations on improving population validation focused on the criteria of attraction, comprehension and induction to action. These are presented in detail in Table 4.

**Table 4. Observations of the population validation of the booklet**

<b>Validation criteria</b>	<b>Observations</b>
<b>Attraction</b>	-The dark blue color that identifies Unit 5 should be more striking.
<b>Comprehension</b>	-The use of the abbreviation HDP is difficult to remember. -Modify or eliminate unknown terms, e.g., hypertensive disorders of pregnancy, pelvic floor, antioxidants, protein in urine, sodium, periodontal, stew, neonates, assisted reproduction, diabetes mellitus, post-traumatic stress syndrome.

**Induction to action**

- Modify in the title the phrase hypertensive disorders of pregnancy.
  - The illustration on the cover is not in relation to the content of the booklet.
  - In Units 3, 4 and 5 include a daily control of the care that is performed, this would be more motivating to comply with them.
- 

The final version of the booklet was made taking into account the qualitative observations of the experts and the pregnant women who considered that the material in its initial version required reforms in the following aspects: a) the title "I decide to take care of myself in the face of hypertensive disorders of pregnancy" was modified by "I decide to take care of myself in the face of high blood pressure in pregnancy"; b) the abbreviation HDP and the terms periodontal, antioxidants, assisted reproduction, protein in urine and mellitus were eliminated; the terms hypertensive disorders of pregnancy were replaced by high blood pressure in pregnancy, stewed for stews, sodium by salt, neonates by newborns, pelvic floor by perineum, and post-traumatic stress syndrome by alterations in mental health, these adjustments were made in order to improve the comprehension of the material; c) the illustrations on the cover and main page of units 1 and 5 were modified to make them more representative of the content; d) units 3, 4 and 5 included a form for the daily recording of behaviors performed by the pregnant women in relation to nutrition, rest, exercise and mental health; e) the length of the paragraphs included a maximum of 5 lines; f) grammar, spelling, and punctuation were checked and corrected; and g) the blue color of unit 5 was changed to a lighter shade. Once the final version of the booklet was obtained, registration with the Colombian Book Chamber was carried out and the editorial process was started.

## DISCUSSION

The identification of women's needs during the prenatal stage and the capacity of the health sector to respond to the current challenges of maternal and perinatal morbidity and mortality due to obstetric complications, specifically by HDP, demand health education strategies that are solidly constructed and rigorously validated, in which it is essential to design and use relevant and effective educational materials for the target audience <sup>(26)</sup>. In this sense, the results achieved in this study show that best practice principles should be considered in the design and validation of written health education materials <sup>(16)</sup>, in order to obtain a material that allows pregnant women to increase their knowledge and to acquire self-care behaviors in the face of HDP.

In the first phase of this study related to the design process of the booklet "I decide to take care of myself in the face of high blood pressure in pregnancy", the fulfillment of the characteristics proposed by Hoffmann <sup>(16)</sup> in terms of content, organization, language, illustration, design, learning and motivation is highlighted. These findings are important considering the results of similar studies, such as that conducted by Cáceres et al., <sup>(27)</sup>, which report that an adequate review of the scientific evidence and attention to detail related to writing, design and illustration, allowed them to obtain a valid material to provide education on humanized childbirth to pregnant women and their families, reaching an average Content Validity Index of 0.94 in the technical validation and an average of 97.9% in the population validation.

The technical and population validation phase of this study was carried out with the participation of 5 experts and 20 pregnant women, reaching a score of more than 70% in the five criteria proposed by Ziemendorff and Krause <sup>(23)</sup>. These findings are

consistent with those obtained in the studies by Velazquez et al.,<sup>(28)</sup> Herrera et al.,<sup>(13)</sup> and Correa<sup>(29)</sup>, in their results they demonstrated approval rates higher than 70% in the technical validation, and 60% in population validation. We agree with these authors, especially in the design of an educational material aimed at a target population with a specific health situation and according to the recommendations described in the literature for the construction of health materials, as well as the use of the same criteria for the technical and population validation of written, educational, and communication materials.

Establishing a comparison between the technical and population validity indices of the studies cited above, in this study, the technical validity scores are lower than those reported by the pregnant population. However, it is important to highlight that, although the validity of the booklet has the accepted values for this test ( $\geq 70\%$ ), the experts made observations and recommendations that allowed identifying points of improvement in the criteria of attraction, understanding, and acceptance. In this regard, authors such as Canul et al.,<sup>(12)</sup> and Salazar et al.,<sup>(30)</sup> have documented that educational materials should be reviewed by expert personnel in the subject in order to unify judgments of both form and content, which allow if necessary to reformulate the information, to organize the content, to modify terms or images, and to ensure not only the clarity and comprehension of the message, but also the applicability and quality of the educational material.

Similarly, the population validity allowed us to identify that the criteria of acceptance, identification and induction to action were the best qualified, with the recommendation in this last criterion of the inclusion of a daily record format of the care described inside the booklet. In the characteristics of attraction and comprehension, a minimum percentage referred to the need for adjustments in terms of color, illustrations, and terminology. These results are similar to those obtained by Canul et al.,<sup>(12)</sup> in their validation study of educational materials on healthy eating. They found that modifications were required in several aspects: in the criterion of attraction, in terms of the use of more striking colors and images according to the cultural context; in the criterion of comprehension, in regards to the use of a more comprehensive language; and in the criterion of induction to action, in relation to reinforcing eating behavior with foods typical of the region. These aspects highlight the need for educational materials to not only transmit information and be visually attractive, but also to strengthen and propitiate behavior changes depending on the context in which the individual is located<sup>(12)</sup>. In this sense, it is important to recognize that it is the sociocultural characteristics of people that determine their vision of the world, shape their own conceptions of health and disease, and influence their interests and abilities to learn<sup>(26)</sup>.

The results of this study confirm the importance of designing and validating educational materials under a participatory approach and with a rigorous and structured methodology, which allows for the identification of points of improvement and the implementation of pertinent modifications. This would guarantee the creation of educational materials that are in accord with the characteristics and needs of the population, and the fulfillment of the objectives proposed in health education interventions<sup>(12)</sup>.

This study allowed for the construction and validation of a booklet with strengths in its content language, organization, illustration and design, conditions that induce learning and arouse the interest of pregnant women to acquire self-care behaviors in the face

of HDP. The booklet also met the validity criteria of educational materials in health; therefore, it can serve as a potential resource in educational processes aimed at improving the level of knowledge and self-care practices of pregnant women in the face of HDP. Finally, this educational material constitutes a contribution to the application of the Theory of Planned Behavior in the practice of perinatal maternal care, by improving in pregnant women the intention to acquire health behaviors from their attitudes, social and family support, and the control over their own behavior.

Among the limitations, it is important to highlight the lack of validation studies of educational materials aimed at strengthening pregnant woman's knowledge and self-care behaviors in the face of the HDP, as well as the unification of the evaluation criteria that would allow contrasting the findings obtained in this study. Another limitation is that the booklet was built on the sociocultural characteristics of a single Colombian environment, which may lead to the need for future cultural, nutritional, and lifestyle adaptations that identify pregnant women in other national and international contexts.

## CONCLUSIONS

The construction of the booklet "I decide to take care of myself in the face of high blood pressure in pregnancy" was supported by the scientific evidence available in HDP and TPB. The validation process showed scores greater than 70% in the criteria of attraction, comprehension, acceptance, identification, and induction to action used by experts and pregnant women. The recommendations made by these were incorporated in the final version of the booklet. In this way, a valid and reliable material was obtained that can be used by nursing and other health professionals in the development of interventions aimed at strengthening the knowledge and self-care of pregnant women in face of the HDP.

However, the construction and validation of the booklet is only a model of how nursing professionals can design and develop new educational resources for the implementation of health education interventions based on theories. As such, this study contributes to the expansion of the Theory of Planned Behavior and strengthens its usefulness in teaching, research, and practice of women's care during the prenatal stage.

## REFERENCES

1. Melchiorre K, Thilaganathan B, Giorgione V, Ridder A, Memmo A, Khalil A. Hypertensive Disorders of pregnancy and future cardiovascular health. *Front. Cardiovasc. Med.* 2020; 7:59. <https://doi.org/10.3389/fcvm.2020.00059>
2. Dachew BA, Scott JG, Mamun A, Fetene DM, Alati R. Maternal hypertensive disorders during pregnancy and the trajectories of offspring emotional and behavioral problems: the ALSPAC birth cohort study. *Ann Epidemiol.* 2021; 53:63-68. e1. <https://doi.org/10.1016/j.annepidem.2020.08.015>
3. Badrov MB, Park SY, Yoo JK, Hieda M, Okada Y, Jarvis SS, et al. Role of corin in blood pressure regulation in normotensive and hypertensive pregnancy. *Hypertension.* 2019;73(2):432-439. <https://doi.org/10.1161/HYPERTENSIONAHA.118.12137>
4. Ahmed Mohamed E, Youness E, Kamel H, Hasab Allah M. Impact of self-Care guidelines on women's awareness and identification of early signs and symptoms of

- preeclampsia. *Minia Scientific Nursing Journal*. 2022; 12(1): 2-9. <https://doi.org/10.21608/msnj.2022.151345.1028>
5. Alnuaimi K, Abuidhail J, Abuzaid H. The effects of an educational programme about preeclampsia on women's awareness: a randomised control trial. *Int Nurs Rev*. 2020;67(4):501-511. <https://doi.org/10.1111/inr.12626>
  6. Chaudhari MK, Dandade SP, Borkar SD, Borkar SK, Teltumbde A. A study to assess the effectiveness of planned teaching programme on the knowledge regarding management of pre-eclampsia among antenatal mothers. *J. Pharm. Res. Int*. 2021; 33(58A): 595–603. <https://doi.org/10.9734/jpri/2021/v33i58A34156>
  7. Strassberg ER, Fisher S, Mackeen AD, Sun H, Paglia MJ. Comparison of different methods of patient education on preeclampsia: a randomized controlled trial. *J Matern Fetal Neonatal Med*. 2022;35(13):2507-2511. <https://doi.org/10.1080/14767058.2020.1786524>
  8. El Sayed HAE, Said SA, Mohy HF, Emam AM. Efficacy of an Intervention Based on Theory of Planned Behavior on Self-Care Management among Women with Pregnancy Induced Hypertension. *IOSR J Nurs Health Sci*. 2020; 9 (1): 7–20. <https://doi.org/10.9790/1959-0901030720>
  9. Parsa S, Khajouei R, Baneshi MR, Aali BS. Improving the knowledge of pregnant women using a pre-eclampsia app: A controlled before and after study. *Int J Med Inform*. 2019; 125: 86–90. <https://doi.org/10.1016/j.ijmedinf.2019.03.001>
  10. Indrawati ND, Puspitaningrum D. Efektifitas penyuluhan terhadap tingkat pengetahuan dan sikap ibu hamil tentang preeklampsia di wilayah kerja puskesmas kedungmundu kota semarang. *J. Midwifery Sci. Health*. 2016;7(1):31–46. <https://doi.org/10.52299/jks.v7i1.23>
  11. Afefy NA, Kamel AD. Effect of an educational module on the knowledge and self-care of women suffering from pre-eclampsia. *IOSR J Nurs Health Sci*. 2019;8(2):33–42. <https://doi.org/10.9790/1959-0802103342>
  12. Canul Tamay NM, Barradas Castillo MR, Lendechy Grajales AC, Pavía Carrillo EF. Validación de materiales didácticos sobre alimentación saludable en el sur de Yucatán. *Revista Salud Pública y Nutrición*. 2022; 21 (1): 19-27 <https://doi.org/10.29105/respyn21.1-3>
  13. Herrera Guerra EP, Céspedes Cuevas VM. Diseño y validación de material educativo dirigido a adultos con falla cardíaca. *Rev. cienc. ciudad*. 2020; 17(1):31-42 DOI: <https://doi.org/10.22463/17949831.1366>
  14. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50(2):179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
  15. Carvajal EY, Sánchez B. Los modelos de enfermería aplicados en la práctica clínica: revisión integrativa. *Archivos de Medicina*. 2018; 18(1): 86-96. <https://doi.org/10.30554/archmed.18.1.1701.2018>
  16. Hoffmann T, Worrall L. Designing effective written health education materials: considerations for health professionals. *Disabil Rehabil*. 2004;26(19):1166-1173. <https://doi.org/10.1080/09638280410001724816>
  17. Ministerio Salud y Protección Social, Colciencias. Guía de Práctica Clínica para la prevención, detección temprana y tratamiento de las complicaciones del embarazo, parto o puerperio para uso de profesionales de Salud. Guías No 11- 15. Bogotá, Colombia. 2013. Disponible en: <https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/INEC/IETS/Guía.completa.Embarazo.Parto.2013.pdf>
  18. Alcaldía Mayor de Bogotá. Guía de trastornos hipertensivos del embarazo. Secretaría Distrital de Salud. 2014 Disponible en:

[http://www.saludcapital.gov.co/DDS/Publicaciones/Guia%20Maternidad-Trastornos\\_baja.pdf](http://www.saludcapital.gov.co/DDS/Publicaciones/Guia%20Maternidad-Trastornos_baja.pdf)

19. Poon LC, Shennan A, Hyett JA, Kapur A, Hadar E, Divakar H, et al. The International Federation of Gynecology and Obstetrics (FIGO) initiative on pre-eclampsia: A pragmatic guide for first-trimester screening and prevention. *Int J Gynaecol Obstet.* 2019;145(S1):1–33. <https://doi.org/10.1002/ijgo.12802>
20. National Institute for Health and Care Excellence (NICE). Hypertension in pregnancy: diagnosis and management. 2019 Available from: <https://www.nice.org.uk/guidance/ng133>
21. Ministerio de Salud Pública de Ecuador. Trastornos hipertensivos del embarazo. Guía de Práctica Clínica (GPC). Segunda edición. 2016. Disponible en: [https://www.salud.gob.ec/wp-content/uploads/2017/03/MSP\\_Trastornos-hipertensivos-del-embarazo-con-portada-3.pdf](https://www.salud.gob.ec/wp-content/uploads/2017/03/MSP_Trastornos-hipertensivos-del-embarazo-con-portada-3.pdf)
22. Fondo de las Naciones Unidas para la Infancia - UNICEF. Guía metodológica y video de validación de materiales informativos, educativos, comunicacionales. Perú. 2003. Disponible en: <https://www.unicef.org/peru/media/2436/file/Video%20Validaci%C3%B3n%20de%20Materiales.pdf>
23. Ziemendorff S, Krause A. Guía de Validación de Materiales Educativos (con enfoque en materiales de educación sanitaria). Programa de Agua y Saneamiento PROAGUA/GTZ. Primera edición. Perú. 2003. <https://doi.org/10.13140/RG.2.1.3560.1129>
24. República de Colombia. Ministerio de Salud. Resolución Número 008430 de 1993, por la cual se establecen las normas científicas, técnicas y administrativas para la investigación en salud. Santa Fe de Bogotá: El Ministerio; 1993. Disponible en: <https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/RESOLUCION-8430-DE-1993.PDF>
25. Departamento Administrativo Nacional de Estadística (DANE). Estratificación Socioeconómica – Preguntas frecuentes. Bogotá: DANE; 2021. Disponible en: <https://www.dane.gov.co/index.php/116-espanol/informacion-georreferenciada/2421-estratificacion-socioeconomica-preguntas-frecuentes>
26. Franco-Aguilar A, Alzate-Yepes T, Granda-Restrepo DM, Hincapié-Herrera LM, Muñoz-Ramírez LM. Validación de material educativo del programa “Niñ@s en Movimiento” para el tratamiento de la obesidad infantil. *Rev. Fac. Nac. Salud Pública.* 2018;36(3):109-119. doi: 10.17533/udea.rfnsp.v36n2a11
27. Cáceres-Manrique FM, Nieves-Cuervo GM, Lizarazo-Castellanos AD. Elaboración y validación de una cartilla sobre parto humanizado. *Enferm. glob.* 2020; 19(60): 64-84. <https://dx.doi.org/10.6018/eglobal.412771>.
28. Velazquez-Moreno E, González-Velázquez MS, De la Peña-León B. Diseño y validación de material didáctico para una intervención educativa de enfermería en cuidadores primarios. *Enferm. univ.* 2020; 17(4): 390-402. <https://doi.org/10.22201/eneo.23958421e.2020.4.787>
29. Correa KJ. Diseño y validación de material para una intervención educativa en pacientes con implante de Stent coronario. *Perspectivas Educativas.* 2014; 7(1): 159-170. Disponible en: <http://revistas.ut.edu.co/index.php/perspectivasedu/article/view/674>
30. Salazar AA, Shamah T, Escalante EI, Jiménez A. Validación de material educativo: estrategia sobre alimentación y actividad física en escuelas mexicanas. *Rev Esp Comun Salud.* 2012; 3(2): 96-109. Disponible en: <https://e-revistas.uc3m.es/index.php/RECS/article/view/3375>

ISSN 1695-6141

© [COPYRIGHT](#) Servicio de Publicaciones - Universidad de Murcia