Original Article

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HEALTH EDUCATIONAL TECHNOLOGY FOR INCARCERATED WOMEN IN THE LIGHT OF HEALTH LITERACY

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ABSTRACT

Objective: to validate the content of educational videos for incarcerated women, in the light of health literacy.
Method: methodological study with development of three videos for incarcerated women with themes chosen by them (Menstrual Cycle, Arterial Hypertension and Epilepsy), developed in four stages: construction of storyboards, validation by expert judges, construction of videos and validation by the public. The validation process was performed by seven judges with the Health Educational Content Validation Instrument, the Suitability Assessment of Materials and readability analysis. For approval, it was established that the agreement between judges should be higher than 80%, and the adequacy, according to the SAM, should be 40-100%. The incarcerated women evaluated the videos in August 2022, in a women's public prison in Ceará, using the Assistive Technology Assessment Instrument, considering the level of agreement of the positive responses above 70%.
Results: the validation instrument result of the storyboards ranged from 0.92 to 1.0. In the Suitability Assessment, a percentage of 85.2% to 88.8% was reached, categorizing the materials as superior. As for readability, the values obtained (70.9 to 78.1) place the texts as easy or very easy to read. The evaluation by the target audience showed that the videos were adequate (97.8-100%).
Conclusion: the three videos constructed were suitable for incarcerated women, with evidence of content validity and may be used in health education actions for this public.

DESCRIPTORS: Validation studies. Health literacy. Prisoners. Audiovisual resources. Educational technology.

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TECNOLOGIA EDUCATIVA SOBRE SAÚDE PARA MULHERES PRIVADAS DE LIBERDADE À LUZ DO LETRAMENTO EM SAÚDE

RESUMO

Objetivo: validar o conteúdo de vídeos educativos para mulheres privadas de liberdade, à luz do letramento em saúde.
Método: estudo metodológico com desenvolvimento de três vídeos para mulheres privadas de liberdade, com temas por elas escolhidos (Ciclo Menstrual, Hipertensão Arterial e Epilepsia), desenvolvidos em quatro etapas: construção dos *storyboards*, validação por juízes *experts*, construção dos vídeos e validação pelo público. O processo de validação foi realizado por sete juízes com o Instrumento de Validação de Conteúdo Educativo em Saúde, o *Suitability Assessment of Materials* e análise de legibilidade. Para aprovação, foi estabelecido que a concordância entre juízes devia ser superior a 80%, e a adequação, segundo o Instrumento, devia ser de 40-100%. As mulheres apenadas avaliaram os vídeos em agosto de 2022, em uma cadeia pública feminina do Ceará, com uso do Instrumento para Avaliação de Tecnologia Assistiva, considerando o nível de concordância das respostas positivas acima de 70%.
Resultados: o resultado do Instrumento de validação dos *storyboards* variou de 0,92 a 1,0. Na Avaliação de adequação atingiu-se percentual de 85,2% a 88,8%, categorizando os materiais como superior. Quanto à legibilidade, os valores obtidos (70,9 a 78,1) colocam os textos como fáceis ou muito fáceis de ler. A avaliação pelo público-alvo demonstrou que os vídeos estavam adequados (97,8-100%).
Conclusão: os três vídeos construídos mostraram-se adequados às mulheres privadas de liberdade, com evidências de validade de conteúdo e poderão ser utilizados em ações de educação em saúde para este público.

DESCRITORES: Estudos de validação. Letramento em saúde. Prisioneiros. Recursos audiovisuais. Tecnologia educacional.

TECNOLOGÍA EDUCATIVA EN SALUD PARA MUJERES PRIVADAS DE LIBERTAD, A LA LUZ DE LA ALFABETIZACIÓN EN SALUD

RESUMEN

Objetivo: validar el contenido de videos educativos para mujeres privadas de libertad, a la luz de la alfabetización en salud.
Método: estudio metodológico con la elaboración de tres videos para mujeres privadas de libertad, con temáticas elegidas por ellas (Ciclo Menstrual, Hipertensión Arterial y Epilepsia), desarrollados en cuatro etapas: construcción de storyboards, validación por jueces expertos, construcción de videos y validación por el publico El proceso de validación fue realizado por siete jueces utilizando el Instrumento de Validación de Contenido de Educación en Salud, la Evaluación de Idoneidad de Materiales y el análisis de legibilidad. Para su aprobación se estableció que la concordancia entre jueces debe ser superior al 80%, y la adecuación, según la Evaliación de Idoneidad, debe ser del 40-100%. Las mujeres privadas de libertad evaluaron los videos en agosto de 2022, en una prisión pública femenina de Ceará, utilizando el Instrumento de Evaluación de Tecnología Asistiva, considerando el nivel de acuerdo de respuestas positivas superior al 70%.
Resultados: el resultado de la Herramienta de Validación de los guiones gráficos osciló entre 0,92 y 1,0. En la Evaluación de la idoneidad se alcanzó un porcentaje de 85,2% a 88,8% categorizando a los materiales como superiores. En cuanto a la legibilidad, los valores obtenidos (70,9 a 78,1) sitúan a los textos como fáciles o muy fáciles de leer. La evaluación por parte del público objetivo mostró que los videos eran adecuados (97,8-100%).
Conclusión: los tres videos construidos fueron aptos para mujeres privadas de libertad, con evidencias de validez de contenido y podrían ser utilizados en acciones de educación en salud para ese público.

DESCRIPTORES: Estudios de validación. Literatura saludable. Prisioneros. Recursos audiovisuales. Tecnologia educacional.

INTRODUCTION

In the world, there are more than 714,000 incarcerated women and girls. This number has been growing much faster than the levels of the male prison population since the year 2000, increasing by more than 50% in the female population, while the male population has increased by about 20%[1].

The female prison population has grown exponentially in Brazil, from 5,601 women incarcerated in the year 2000 to 42,355 inmates in 2016, denoting a growth of 525% in this period.[2] Currently, women make up 5.5% of the total Brazilian prison population, taking Brazil to fourth place among the countries that incarcerate women the most, with a total of 45,490 women in June 2022[3].

The World Health Organization highlights the neglect of the specificities of the health needs of this population, and the extent to which the prison situation interferes with the health conditions of people, especially women[4]. This fact is highlighted when evaluating the reports issued by the National Penitentiary Department, which only presents data on communicable diseases such as HIV, Syphilis, Hepatitis and Tuberculosis. Despite this, studies conducted in Brazil show that in addition to these diseases, incarcerated women have chronic non-communicable diseases, among others[5,6].

Thus, actions that encourage self-care and health protection need to be implemented to prevent the emergence of morbidities related to the period of incarceration and for healthy women to be returned to the labor market and to everyday life[7].

That said, health education in prisons is relevant, as it provides information to incarcerated women about resources to stop or mitigate harm to their physical health, respecting their reality, beliefs, values and knowledge. In addition, it facilitates the transition in a healthier way when returning to the community, allowing the reestablishment of relationships with family, friends, health professionals and institutions that facilitate access to housing and health care[8]. Among the various strategies for health education that can be used as tools that enhance autonomous learning, we can mention the educational video as a didactic and technological strategy, which provides knowledge, favors critical awareness and health promotion[9].

Providing these women with quality health education, based on health literacy and which provides self-care based on the demands of incarcerated women, may favor their future outside prison[10,11], as it will provide them with greater empowerment to care for their health. Thus, considering the above, incarcerated women are a priority group for the use of these educational materials. Thus, the aim of this study was to validate the content of educational videos for incarcerated women in the light of health literacy.

METHOD

Design, study location and period

The study was carried out in two female prisons, one located in the city of Cajazeiras, in the interior of Paraíba (*Cadeia Pública Feminina/Albergue de Cajazeiras*), and the other, located in the city of Crato, in the interior of Ceará (*Cadeia Pública Feminina do Crato*), both in Northeast Brazil. The study covered the period from November/2019 to August/2022.

Unfortunately, due to structural problems, the Cajazeiras prison needed to undergo renovation, which made it impossible for the women inmates in this institution to evaluate the videos, as they had to be transferred to other prison institutions in the state of Paraíba.

Preliminary stage

This stage was represented by the identification of health topics of interest to the MPL and by the diagnosis of their health and food literacy.

The identification of topics of interest took place in November 2019, based on the implementation of a MPL focus group at the women's prison in the city of Cajazeiras, in the interior of Paraíba. The most requested topics were Hypertension, Epilepsy and Menstrual Cycle.

The COVID-19 pandemic started soon after choosing the themes, which interrupted the continuity of the research for 20 months. When finally, at the end of 2021, external persons were allowed to enter the prison system, the health and food literacy of incarcerated women in the two aforementioned prisons was evaluated. This step was relevant to adapt the information programmed to appear in the videos to the level of understanding of these women, through the identification of their limitations and potential, related to literacy in health and food. It was decided to include the assessment of Food Literacy (FL), a subfield of health literacy, due to the fact that the chosen themes have specific content on nutrition and food.

To measure health literacy, the Health Literacy Questionnaire was used, in its version validated for Brazil (HLQ-Br). This instrument was created in Australia[12] and translated, validated and cross-culturally adapted in the study by Moraes *et al.,*[13], and for the measurement of nutritional literacy the Nutritional Literacy Scale, in the Brazilian version – NLS-Br, validated by Zanella et al.[14], from the original version developed in the United States, by Diamond [15].

The HLQ-Br was used under a license granted for its use (Swinburne University of Technology – License Number L20017IA).

Construction and validation of educational videos

The construction of the videos followed the recommendations of the methodological framework for the elaboration of audiovisual technologies, taking place in three phases: pre-production, production and post-production. In pre-production, scripts were prepared and storyboards were built, which consists of presenting the chronological flow of illustrations and information for each scene to be produced, promoting a preview of the layout of the final product[16].

The scripts were developed following both the theoretical framework of technical support to the contents of the proposed themes, as well as the fundamentals of health literacy for the elaboration of educational materials. Thus, the content referring to Arterial Hypertension followed the Guidelines of the Brazilian Society of Cardiology (SBC)[17] and the American Heart Association (AHA)[18].

The content reffering to epilepsy followed the Guidelines of the Brazilian Association of Epilepsy (ABE)[19]. Regarding the menstrual Cycle, the Guidelines of the Brazilian Federation of Gynecology and Obstetrics Associations (FEBRASGO)[20], of the Association of Obstetrics and Gynecology of the State of São Paulo (SOGESP)[21] and of the Brazilian Society of Endocrinology and Metabolism (SBEM) were followed[22].

For the three themes, the foundations of health literacy were applied, regarding the guidelines for the production of written materials, to make the language simple and clear, in the active voice, using short words and sentences with a maximum of 15 words, absence of or clear explanation of technical terms[23,24], for the formulation of storyboards following a logical and sequential order, in the presentation of the theme, illustrating each step[25].

Three storyboards about arterial hypertension were created, including the following content: importance of weight control, care with consuming salt and importance of the consumption of fruits, vegetables and legumes for the control of hypertension.

For the theme referring to epilepsy were also created three storyboards were also created, focusing on: what it is, and what the person who has epilepsy feels; how we can help those who have Epilepsy; and how we can help a person during an epileptic seizure.

Regarding the the theme menstrual cycle, four storyboards were created, dealing with what the menstrual cycle is; the changes that happen in the body of women during the menstrual cycle; what it is and when the fertile period occurs; and menopause.

The number of scenes was planned to allow the time spent reading the storyboards, as well as the duration of the videos, to meet the fundamentals of health literacy[23]. There is no consensus regarding this time, but a maximum time of 8 minutes, with the ideal limit being 3-5 minutes[26], and up to 2 minutes, was mentioned[27]. Thus, it was planned that each video would be around 2 to 3 minutes long.

The storyboards were made using the Canva Pro Program, where you can join the selected images with the information contained in the previously prepared scripts. The images were also selected in the Canva Pro Program and some were produced by the authors themselves, from photographs taken on a Motorola Moto One Vision model XT1970-1 cell phone.

Three storyboards on Hypertension were then created, including the following content: importance of weight control, care with consuming salt and the importance of fruit and vegetable consumption to control hypertension, which were left with 14, 22 and 10 scenes respectively.

For the theme regarding Epilepsy three storyboards were also created focusing on: what it is and what the person who has epilepsy feels; how we can help those who have epilepsy; and how we can help a person during an epileptic seizure, which were left with 22, 12 and 20 scenes, respectively.

Four storyboards were created dealing with the menstrual cycle; the changes that happen in the body of women during the menstrual cycle; what it is and when the fertile period occurs; and menopause. In this case, the storyboards were constructed with 20, 20 ,28 and 30 scenes respectively.

The validation of the content and appearance of the storyboards occurred through the evaluation of judges with training in the health area and with expertise in health literacy (HL) in order to produce adequate material and provide the best possible communication with the target audience.

The size of the sample of judges was in accordance with Pasquali's guidelines[28], with 7 judges selected by consulting the Lattes Platform. The inclusion criteria used were the following: having a doctorate degree and having at least one scientific production on the HL theme in the last 5 years. At least one of the following situations was considered scientific production: authorship of a dissertation or thesis on the HL theme; dissertation or thesis supervision on the HL theme; authorship or co-authorship of books or book chapters on the subject of HL; authorship or co-authorship of an article on the HL theme; responsibility for a postgraduate course (Master's or Doctorate) on the subject of HL.

The validation process was conducted between November 2021 and February 2022. For this stage, two forms were used, the Instrument for Validation of Educational Content in Health (IVCES), proposed by Leite *et al*.[29], and the Suitability Assessment of Materials (SAM) instrument, in the Portuguese version [30] to evaluate the scripts regarding the fundamentals of health literacy, as well as instructions for the interpretation of SAM topics [31]. The invitation to the judges to participate in the study, as well as the submission of the forms, was made by means of an electronic mail, containing a link to Google forms to access the Term of Free and Informed Consent, the two forms and the storyboards.

The IVCES uses a Likert scale, with a score ranging from zero to two, and the following options are used for evaluation: 0 – I disagree; 1 – I partially agree; and 2 – I totally agree and, in addition, the evaluators are asked to record the criticisms or suggestions for the improvement of the content[29].

For content validation by IVCES, the Content Validity Index (CVI) was used. To obtain the satisfactory CVI for each storyboard, the minimum agreement of 0.80 (domain and general) was considered, which was established by the following calculation, sum of the answers "partially agree (1) and fully agree (2)" divided by the sum of all the answers[32].

In the case of disagreement of any item, the experts filled in a space for observations and suggestions for modifications. The items that obtained agreement of 0.80 or more were considered validated. Those with averages between 0.75 and 0.80 were modified according to the experts' suggestions to be considered validated[33,34].

The SAM is an American instrument, adapted to the Portuguese language, and consists of a list or checklist, with six categories, content, text comprehension, graphic illustration, presentation, motivation and cultural adaptation, distributed in 22 items. A score of zero to two can be assigned to each item, with 0 being inadequate, 1 adequate, and 2 totally adequate[30].

Regarding the analysis by SAM, the adequacy of the material evaluated to the fundamentals of health literacy was verified. The total score was calculated from the sum of the scores obtained, divided by the total number of items in the questionnaire and multiplied by 100, to transform it into a percentage. This is categorized into: 70 – 100%; superior material; 40 – 69% suitable material; and 0 – 39% inadequate material[31].

The professional profile of the judges was organized in the Excel 365 software to perform the descriptive analysis, with calculation of absolute and relative frequencies, in addition to measures of central tendency (mean) and dispersion (standard deviation).

Validation of videos by incarcerated women

After validating the storyboards by the judges and making the adjustments proposed by them, the video production phase began. For this, narration was used in audios, images and videos of the narrator. The audios were produced by light informative voiceover, performed by the author herself through a free cell phone application called Voice Recorder version 3.18 18 and, after recording, the audios were sent to the computer.

The videos in which the narrator appears, were recorded with *a* Smartphone, edited in the InShot 1.815.1352 application, and sent to the computer. After all the parts that make up the videos were ready, the program Wondershare Filmora 11 was used to convert edits of images, videos and audios into the video format. The final encoding format was MP4, and the devices for storage were DVD, pendrive and notebook.

In order to evaluate the videos by the target audience, the following criteria were used to select the participants: not being in isolation cells or detention cells and having good behavior. For women who met these criteria, they were informed that educational videos on the topics, hypertension, epilepsy and menstrual cycle would be shown, inviting everyone to participate and those who accepted the invitation were included in the study. In order for the selection to be carried out properly and to have the least risk for the researchers, the prison management appointed prison officers to carry out this selection and the invitation.

This stage was carried out at the Women's Public Prison of Crato with the participation of 92 MPL, in August 2022. The videos were evaluated using the Assistive Technology (AT) assessment instrument developed and validated by Guimarães, Carvalho and Pagliuca[35], as mentioned by Sterns and Riley[36], educational videos created from the perspective of low health literacy can be characterized as an assistive technology.

The instrument consists of 19 items and were characterized by six attributes: objectives, access, clarity, structure and presentation, relevance and effectiveness, interactivity. The participant must assign a score of 0, when she considers the item inadequate, 1 – partially adequate or 2 – when she considers the item adequate. To consider the questionnaire valid, it is important that all items are answered[35].

The following categorization was performed: partially adequate and adequate responses were grouped as adequate and inadequate responses as inadequate.[35] The evaluation instrument used does not establish a cutoff point regarding the agreement of judges. In this way, the level of agreement of positive responses above 70% was considered for the validation of videos by incarcerated women[37].

The videos were reproduced through a projector and the audio through a high-quality speaker. The women were accommodated in a space used to develop educational activities, with chairs and space for everyone to be seated. Right after the presentation of each video, the MPL were asked to fill out the form referring to the video they had just watched. The videos were presented in the following order: Breast Cancer (videos 1 and 2), Arterial Hypertension (videos 1, 2 and 3), presented in the morning; Epilepsy (videos 1, 2 and 3) and Menstrual Cycle (videos 1,2, 3 and 4), presented in the afternoon.

The video evaluations were all carried out in a single day at the request of the Institution's management, due to organizational issues. In addition to the evaluation form, women were encouraged to ask questions, clarify doubts or express their opinion about the video, as the instrument used for evaluation does not have space for observations and suggestions for modifications. These reports were recorded in a field diary.

The sociodemographic profile of the participants was organized using the Excel 365 Software, to perform the descriptive analysis, with the calculation of absolute and relative frequencies, in addition to measures of central tendency (mean) and dispersion (standard deviation).

Ethical aspects

The study complied with Resolution n°466/12 of the National Health Council and was approved by the Research Ethics Committee of the State University of Ceará. All study participants signed an informed consent form.

RESULTS

According to the validation carried out by the judges and the evaluation of the MPL, the educational videos underwent changes to become more attractive, instructive, interactive and adequate to the women's level of health literacy and food literacy. Figure 1, 2 and 3 presents some scenes of the storyboards produced for each theme.

In the validation of the Arterial Hypertension theme of the items evaluated by the IVCES, all of them had agreement between the judges, reaching a CVI of 1.0. The theme Epilepsy had a total CVI of 0.92 and the theme Menstrual Cycle had a CVI of 0.99, as shown in Table 1.

Despite the agreement of the judges on the subject of Arterial Hypertension, some requested changes to some images, such as the one that showed a thin person, which could influence thinness as a standard that was difficult to achieve, and those that illustrated sodium and salt by images without the NaCl symbols, being replaced by an image of a salt shaker spilling salt. The changes requested by the judges in the storyboards of the three themes were accepted and are described in Chart 1.

For the theme reffering to epilepsy, adjustments were made both in the change of image and in the writing of the information, as some judges made suggestions to make the information clearer and an image more adequate to the text. In the menstrual cycle theme, despite the items referring to the illustrations and literacy requirement not having received any "inadequate" evaluation, suggestions were made by the judges to make the information clearer and the images more appropriate, as shown in Chart 1.

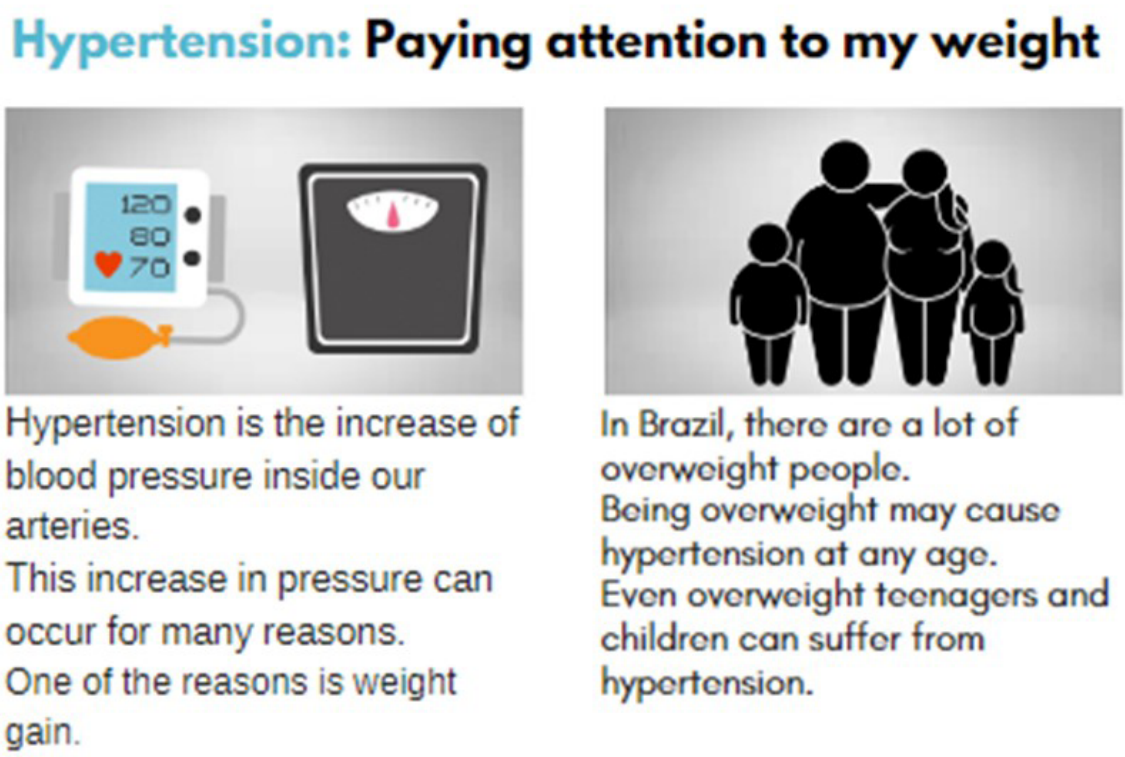

Figure 1 – Parts extracted from the storyboards on Hypertension. Fortaleza, Ceará, Brazil, 2022.

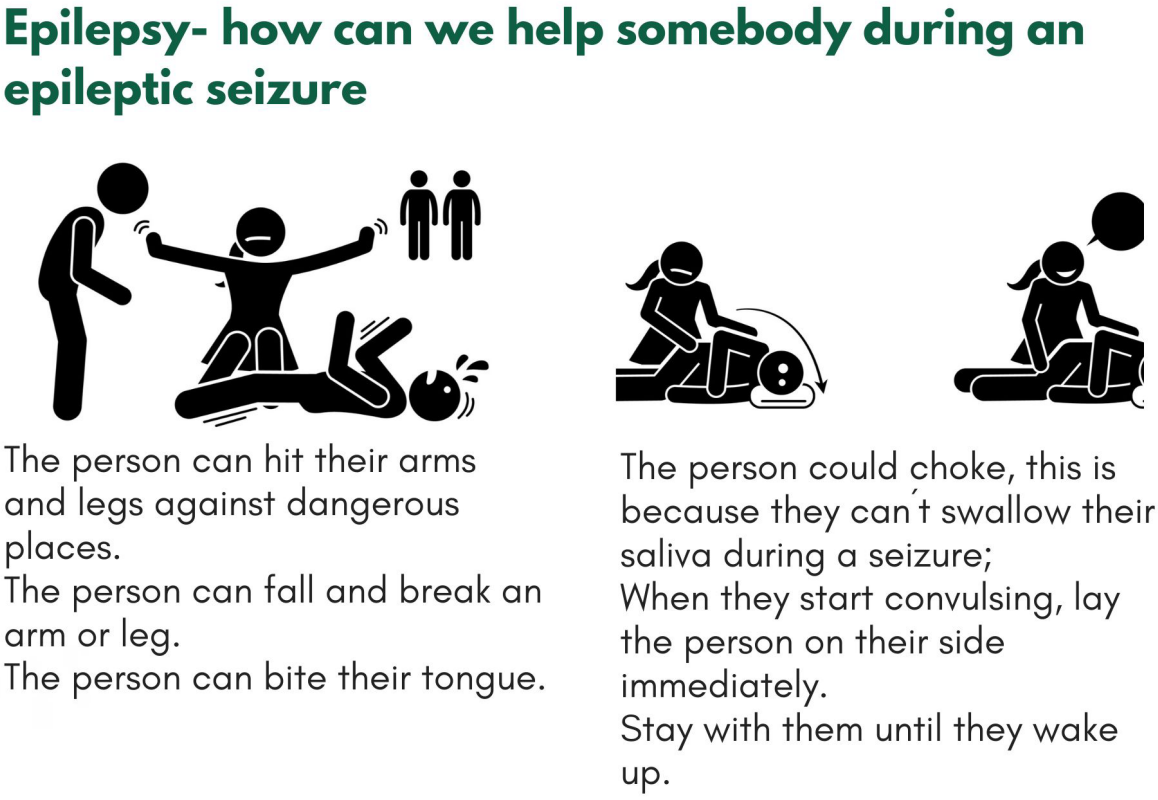

Figure 2 – Parts extracted from the storyboards on Epilepsy. Fortaleza, Ceará, Brazil, 2022.

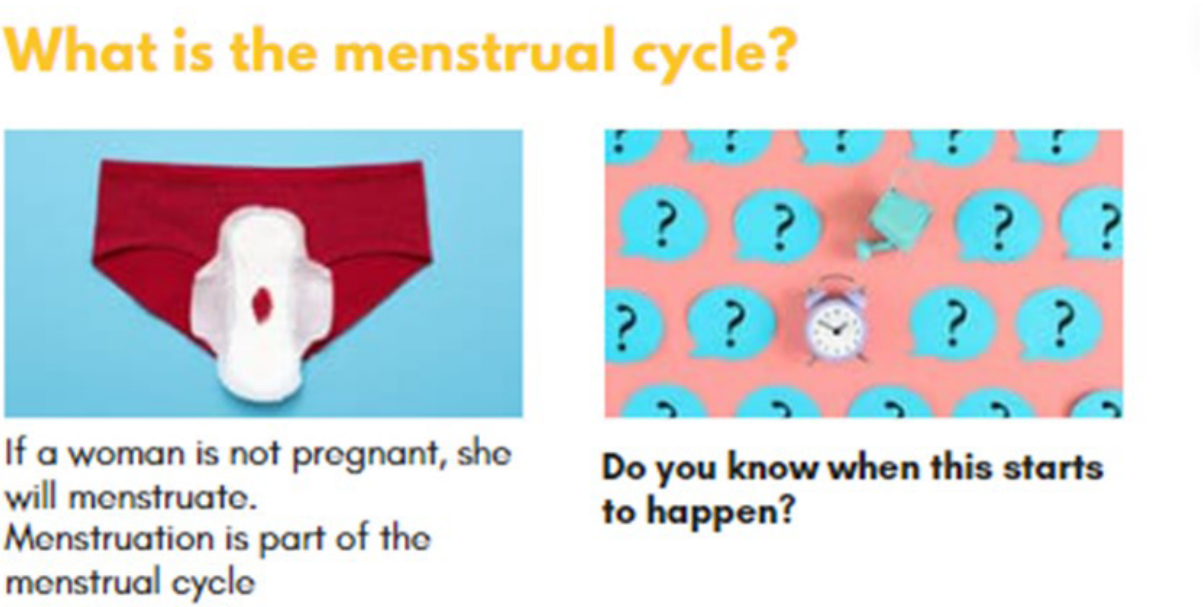

Figure 3 – Parts extracted from the storyboards on Menstrual cycle. Fortaleza, Ceará, Brazil, 2022.

Table 1 – Calculation of the Agreement Validity Index of the judges of the domains Objectives, Structure/Presentation and Relevance contained in the Instrument for Validation of Educational Content in Health. Fortaleza, Ceará, Brazil, 2022.

Topics	Hypertension		Epilepsy		Menstrual Cycle	
Domains	**I partially agree and I totally agree**	**CVI***	**I partially agree and I totally agree**	**CVI***	**I partially agree and I totally agree**	**CVI***
Objectives	100	1	99	0.94	100	1
Structure/Presentation	100	1	99	0.96	99	0.96
Relevance	100	1	97	0.86	100	1
Total	300	1	295	0.92	299	0.99

* Concordance Validity Index.

Chart 1 – Changes in the information contained in the storyboards suggested by the judges. Fortaleza, 2022.

Hypertension		Epilepsy		Menstrual Cycle	
Before	**After**	**Before**	**After**	**Before**	**After**
What does high blood pressure have to do with weight?	How is high blood pressure influenced by weight?	But that may not happen either.	None of the things I said may not happen.	Do you know how our menstrual cycle works?	Every month the woman having menstruation a few days is called menstrual cycle. Do you know how our menstrual cycle works?
Then you ask: how do I decrease sodium?	Then you ask: how do I decrease the amount of salt eat every day?	As it appears from time to time, we call it an epileptic seizure.	As these symptoms appear from time to time, we call them epileptic seizures.	So don't forget. Do not have sex or use a condom	So don't forget. Ask your partner to use a condom or do not nve sex.

The analysis of the data obtained through the SAM is presented in Table 2. It was found that the overall SAM score was higher than 80%, classifying the storyboards as superior material for the theme Arterial Hypertension (85.2%), Epilepsy (88.8%), and Menstrual Cycle (87.8%).

Table 2 – Evaluation of the judges regarding the content, literacy requirement, illustrations, layout and presentation, stimulation/motivation of learning and cultural adequacy of the two *storyboards* built on Arterial Hypertension, Epilepsy and Menstrual Cycle and intended for incarcerated women. Fortaleza, Ceará, Brazil, 2022.

Topics	Hypertension		Epilepsy		Menstrual Cycle	
Items evaluated	Classification		Classification		Classification	
	Adequate %	Very good %	Adequate %	Very good %	Adequate %	Very good %
1 Content						
1.1 The purpose is evident	28.6	71.4	14.3	71.4	14.3	85.7
1.2 Content deals with behaviors	42.9	57.1	42.9	57.1	14.3	71.4
1.3 Content is focused on purpose	28.6	71.4	14.3	71.4	14.3	85.7
1.4 The content highlights the main points	28.6	71.4	14.3	71.4		71.4
2 Literacy requirement						
2.1 Reading level	28.6	71.4	14.3	85.7	42.9	57.1
2.2 Uses writing in the active voice	28.6	71.4	14.3	85.7	28.6	71.4
2.3 Uses vocabulary with common words in the text	14.3	85.7	14.3	85.7	28.6	71.4
2.4 Context comes before new information	28.6	71.4		85.7	28.6	71.4
2.5 Learning is facilitated by topics	14.3	85.7		85.7	28.6	71.4
3 Illustrations						
3.1 The purpose of the illustration referring to the text is clear	28.6	71.4	28.6	71.4	28.6	71.4
3.2 Types of illustrations	42.9	42.9	28.6	71.4	28.6	71.4
3.3 Figures/illustrations are relevant	28.6	57.1	14.3	85.7	28.6	71.4
- 3.4 Lists, tables, etc. have explanation	28.6	28.6		42.9	42.9	42.9
3.5 Illustrations have caption	28.6	28.6		57.1	14.3	42.9
4. *Layout* and presentation						
4.1 Layout feature	42.9	57.1	14.3	85.7	14.3	85.7
4.2 Size and font	14.3	57.1	14.3	57.1	28.6	57.1
4.3 Subheadings are used	14.3	57.1		57.1	14.3	42.9
5 Stimulation/Motivation of learning						
5.1 Uses interaction		71.4		85.7	14.3	71.4
5.2 The guidelines are specific and give examples	28.6	71.4	14.3	85.7	28.6	71.4
5.3 Motivation and self-efficacy	28.6	71.4	14.3	71.4	14.3	71.4
6. Cultural Appropriateness						
6.1 It is similar to your logic, language and experience	14.3	71.3		85.7	14.3	71.4
6.2 Cultural image and examples	28.6	57.1		71.4	28.6	71.4

After validation of the storyboards by the judges and their adequacy regarding the requested suggestions, the videos were evaluated by MPL with a mean age of 32.3±10.0 years (ranging from 19 – 60), who self-declared as brown (69.0%), single, divorced or widowed (72.7%), with complete primary education (51.9%), with only 13.2% having completed secondary education.

Regarding the level of health and food literacy, they had low HL averages, with limitations in having enough information to take care of their health, taking active care of their health, being able to find good information about health and being able to navigate the health system. On the other hand, they showed the potential to have social support for health, understanding and support from health professionals and understanding health information and knowing what to do with it. Regarding FL, 85% of them had adequate food literacy and none had inadequate FL (Table 3).

Table 3 – Health and food literacy of incarcerated women. Fortaleza, Ceará, Brazil, 2022.

	Overall Average (SD)
Health literacy	
Understanding and support of health professionals	2.79(0.80)
Enough information to take care of health	2.10(0.76)
Active health care	2.56(0.69)
Social support for health	2.90(0.87)
Evaluation of health information	2.72(0.68)
Ability to actively interact with healthcare professionals	3.49(1.08)
Navigating the healthcare system	3.43(1.05)
Ability to find good health information	3.18(1.07)
Understand health information and know what to do	3.04(1.17)
Food literacy	**N(%)**
Adequate	93(85.0)
Marginal	16(15.0)

Regarding the assessment of language regarding adequacy to the literacy level of the MPL, for the subject Arterial hypertension, an index of 81.0 was found before and 78.1 after the judges' assessment, who classified the information contained in the storyboards as a very easy Text, requiring a 1st to 5th grade education. The theme Epilepsy had an index of 71.2 before and 70.9 after, being classified as easy to understand, requiring a 6th to 9th grade education. Regarding the Menstrual Cycle theme, an index of 71.0 before and 73.6 after was obtained, thus classifying the storyboards as material of easy understanding.

All videos were considered adequate, according to the evaluation of the MPL, since the agreement of the answers varied between 97.8 and 100%, results superior to those established to consider approval (Table 4). Of the four domains evaluated, clarity was the one that obtained the highest number of positive responses, leaving only the item "allows you to reflect on the content presented" in video 3 on Arterial Hypertension with 98.9%.

Table 4 – Evaluation of videos on Arterial Hypertension, Epilepsy and Menstrual Cycle by incarcerated women in a female public prison in the interior of Ceará. Fortaleza, Ceará, Brazil, 2021.

Attributes/Items	Hypertension			Epilepsy			Menstrual Cycle			
	Video 1 (n=91)	Video 2 (n=90)	Video 3 (n=92)	Video 1 (n=91)	Video 2 (n=90)	Video 3 (n=88)	Video 1 (n=88)	Video 2 (n=88)	Video 3 (n=89)	Video 4 (n=89)
1.Interactivity										
1.1 The content is suited to your needs	100	100	100	97.8	97.8	97.8	100	100	100	100
1.2. Offers interaction and involvement in the educational process	100	100	100	100	100	100	100	100	100	100
1.3. Allows access to the topics presented	100	100	100	98.9	100	100	100	100	100	100
1.4. Provides autonomy to the user in relation to its operation	100	100	100	100	100	100	100	100	100	100
2. Objectives										
2.1. Encourages learning about covered content	100	100	98.9	100	100	100	100	100	100	100
2.2. Encourages learning of new concepts	100	98.9	100	100	100	100	100	100	100	100
2.3. Allows you to search for information without difficulties	100	100	97.8	98.9	97.8	100	98.9	100	100	100
2.4. Has an attractive presentation strategy	100	100	100	100	100	100	100	100	100	100
3. Relevance and effectiveness										
3.1. Provides adequate resources for use	100	100	98.9	100	100	100	100	100	100	100
3.2. Arouses interest to use it	100	98.9	100	100	100	100	100	100	100	98.9
3.3. Encourages behaviour change	100	100	98.9	100	100	100	100	100	100	100
3.4. Reproduces the content covered in different contexts	100	100	100	100	100	100	100	100	100	100
4. Clarity										
4.1. Presents information in a simple way	100	100	100	100	100	100	100	100	100	100
4.2. Allows you to reflect on the content presented	100	100	98.9	100	100	100	100	100	100	100

DISCUSSION

The results showed high levels of agreement among specialists regarding the content produced (92.0-100%) and the quality of the material (above 80.0%), in addition, the videos were considered adequate by the target audience with agreement between 97, 8-100.0%, which allowed considering valid videos to promote educational actions with MPL.

The production of video content was based on national and international guidelines[17–22], which scientifically supported the construction of educational materials on each topic.

Research aimed at the production of educational technologies for the incarcerated public in Brazil is still incipient. A study that sought to identify the types of educational technologies used to address the topic of Sexually Transmitted Infections within women's prisons in the literature, showed that only one study was Brazilian and used printed material and a genital simulator, while studies carried out in the United States, for example, used various types of materials such as: videos and interactive games on computers[38].

In addition, a recent publication about female prisons in Brazil demonstrated that the main topics in the area of health sciences studied by Brazilian universities are related to the prevalence of health problems[32], thus demonstrating the need to address topics that propose the development of educational technologies and health education strategies for this population, a fact also pointed out by another Brazilian study[38].

Thus, for the teaching-learning process to be effective, it is necessary to use validated educational technology, as it grants greater reliability both in the use of the material and provides greater security for the instructions provided[39].

In addition, it is known that even individuals who can read and write may be unable to understand and interpret information related to health, with a mismatch between what is said and what is actually understood by the user[40–41]. For this reason, it was concerned with developing health literacy educational videos based on the demands identified in the study's target population.

The MPL's HL had limitations, making it necessary to provide simple and understandable educational materials for the population, as well as improving verbal communication, avoiding information that was difficult to understand[42]. Therefore, the content of the videos developed in this study sought to include health topics of interest to these women, taking into account their needs to receive information and their level of HL and FL.

The validation process of the educational video proposed in this research maintained methodological rigor in all its stages, from the construction of the script and storyboard to the production of the video itself. Studies[38,43] demonstrate the importance of content evaluation being carried out by professionals with expertise in the area of interest, as they contribute to the material containing correct, objective information and with the necessary highlights to ensure the clarity of the content[39].

In view of this, the judges evaluated the storyboards with positive responses, resulting in CVI's with high reliability and agreement, in accordance with what is advocated by the literature and by studies that validate educational materials, thus evidencing the suitability of the material to the public to which it is intended.

Regarding the SAM scores, the storyboards reached higher scores, thus being suitable for use by the MPL, demonstrating that the presentation, illustrations and layout are attractive and understandable, proving to be a gain for the public and for the professional educator, since that validated educational materials provide greater quality to the teaching-learning process, reinforcing the reliability of the guidelines presented, emphasizing the degree of coherence of the information in meeting the proposed objectives[44].

Technologies aimed at health education must take into account the popular context of the target audience[45], optimizing the text so that the language is not confusing, incomprehensible or difficult to visualize. Thus, with the changes made, an attempt was made to create an attractive format, with content presented in a clear and simple way, so that the material was suitable for health education in MPL. This aspect was corroborated by the evaluation of the women who judged the videos.

Another recommendation made by the judges was the replacement of some images. In the Arterial Hypertension storyboard, it was requested to replace an image that showed a thin person to another with a more common thin body. In the Epilepsy storyboard, it was requested to replace an explanation by the narrator with an image that demonstrates the type of seizure in which the person stands still with a fixed gaze, which is more common in children. In the Menstrual Cycle storyboard, the image of a calendar that appeared diagonally was replaced by another that appeared in front of the screen, in this way the visualization was better.

It is worth noting that the MPL were included from the beginning of the storyboard creation process by listening to their health information needs and the way they would like to receive this information, in addition to seeking to identify the level of health and food literacy to adapt the information to the level of understanding of these women. This is due to the fact that it is believed that knowing the reality of the public for which the educational material is intended makes the approach more participatory, communicative and collective. The concern to approach the themes with an appropriate language at the level of understanding of these women, improves the effectiveness of the educational material and allows a greater reach of the strategy[34,46].

To prevent the material from having a very advanced language at the women's level of understanding, the texts were produced following the instructions found in two guides for the preparation of digital materials[23,47,48]: using clear, short, simple words that are familiar to the public; use of short sentences, with a maximum of 40 to 50 characters; avoid technical terms and, if it is impossible to avoid them, explain the term; use active voice; address the user when describing actions; clearly identify at least one action that the user can perform, breaking it down into explicit, easy-to-follow steps; use visual aids to facilitate understanding; follow a logical and sequential order in the presentation of the theme, illustrating each step.

In this regard, a study evaluated the online patient education materials of the American Academy of Orthopedic Surgeons (AAOS), which serve to improve the health literacy of orthopedic patients, and demonstrated that the materials had a very advanced level of readability for many of the patients to understand, emphasizing that efforts should be made to adjust the materials to the patient's readability level[49].

In order to achieve a high degree of readability, the fundamentals of health literacy were used, having been improved after the judges' evaluation, leaving the storyboards with an excellent level of understanding of the information, which will enable the understanding of the material by people with low literacy, as well as those with a higher level. In this way, it is believed that learning limitations as a result of low education or a low level of health literacy have been minimized, which gives the material greater credibility[30].

As the videos are aimed at MPL health education, it became necessary that, in addition to the judges, representatives of the target audience evaluate the material. This evaluation is necessary, because it offers the opportunity for suggestions from the people targeted by the technology, in order to allow for the correction of misunderstandings and adaptations. Studies carried out in the United States and Germany showed that the educational technologies built, although considered by professionals, were not understood by the target audience[49–50].

CONCLUSION

The educational videos produced and validated in this study were considered suitable for use in educational actions with MPL, becoming a reliable technology to help guide and stimulate self-care and the prevention of diseases such as hypertension, in addition to promoting knowledge about epilepsy and the characteristics of the menstrual cycle.

The study is a pioneer in several aspects: construction of literate health educational material, for the female incarcerated population and for not restricting the topics addressed to the reproductive period, in this way, the material can serve as a support for several female prison institutions to promote health education.

In addition, the feasibility of the material for use by the MPL, observed in this study, can encourage the production and validation of educational technologies aimed at the needs of these women, aiming to facilitate learning during the incarceration period and promote better self-care and a better quality of life. As a way of enabling access to the material produced, they were made available free of charge on a video platform that can be accessed through cell phones, televisions, tablets and notebooks, in addition to sending the access link to both the management of the two units prisons and to the Secretariat of Security of the State of Ceará.

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NOTES

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CONFLICT OF INTEREST

There is no conflict of interest.

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