

BOARD GAME ON SYPHILIS PREVENTION FOR WOMEN IN DETENTION

Valéria Alexandre do Nascimento¹ 
Hallana Laisa de Lima Dantas¹ 
Vilma Costa de Macêdo¹ 
Luciana Pedrosa Leal¹ 
Tatiane Gomes Guedes¹ 
Francisca Márcia Pereira Linhares¹ 

¹Universidade Federal de Pernambuco, Programa de Pós-Graduação em Enfermagem. Recife, Pernambuco, Brasil.

ABSTRACT

Objective: to develop and analyze evidence of content and appearance validity of a board game for the prevention of syphilis in women deprived of their liberty.

Method: methodological study conducted in three stages: 1) Board game development by means of a theoretical-bibliographical foundation and game design; 2) Content validation by 22 health specialist judges, 10 education specialists and a graphic designer; 3) Appearance evaluation by the target audience of 10 women deprived of their liberty. Data was collected between March 2021 and January 2022, and the psychometric analysis was based on the Likert scale to calculate the Content Validity Coefficient and Intraclass Correlation Coefficient.

Results: the board game developed was called "Race against Syphilis" and consisted of 50 squares and 34 question cards. When it came to content validation, the judges from the health sector agreed on 13 items, while those from the education and graphic design sectors agreed satisfactorily on all items. After the adjustments, the second version of the board game was sent to the 22 health judges, seven of whom responded, reinforcing the judges' agreement, which was satisfactory in all items. In the appearance assessment with the target audience, all items received 100% agreement.

Conclusion: the game that has been developed shows evidence of validity, being attractive, dynamic and playful, so that it can help build the knowledge of women in prison about the prevention and syphilis control.

DESCRIPTORS: Syphilis. Women. Prison. Experimental games. Education in health. Educational technologies.

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RESUMO

Objetivo: desenvolver e analisar evidências de validade de conteúdo e de aparência de um jogo de tabuleiro para prevenção da sífilis em mulheres privadas de liberdade.

Método: estudo metodológico conduzido em três etapas: 1) Desenvolvimento do jogo de tabuleiro por meio de fundamentação teórico-bibliográfica e elaboração do jogo; 2) Validação de conteúdo por 22 juízes especialistas em saúde, 10 especialistas em educação e designer gráfico; 3) Avaliação de aparência pelo público-alvo com 10 mulheres privadas de liberdade. A coleta dos dados ocorreu entre março de 2021 e janeiro de 2022, e a análise psicométrica baseou-se na escala Likert para cálculo de Coeficiente de Validade de Conteúdo e Coeficiente de Correlação Intraclasse.

Resultados: o jogo de tabuleiro desenvolvido foi denominado “Corrida contra a Sífilis”, composto por 50 casas e 34 cartas-perguntas. Na validação de conteúdo, os juízes da área da saúde apresentaram concordância em 13 itens; e os da área da educação e design gráfico tiveram concordância satisfatória em todos os itens. Após os ajustes, foi enviada a segunda versão do jogo de tabuleiro para os 22 juízes da área da saúde, dos quais sete retornaram, robustecendo a concordância dos juízes, que foi satisfatória em todos os itens. Na avaliação de aparência com o público-alvo, todos os itens obtiveram concordância de 100%.

Conclusão: o jogo construído apresenta evidências de validade, sendo atrativo, dinâmico e lúdico, de modo que poderá favorecer a construção do conhecimento das mulheres em privação de liberdade sobre a prevenção e controle da sífilis.

DESCRITORES: Sífilis. Mulheres. Prisão. Jogos experimentais. Educação em saúde. Tecnologias educacionais.

JUEGO DE MESA SOBRE PREVENCIÓN DE SÍFILIS PARA MUJERES PRIVADAS DE LIBERTAD

RESUMEN

Objetivo: desarrollar y analizar pruebas de validez de contenido y apariencia de un juego de mesa para la prevención de la sífilis en mujeres privadas de libertad.

Método: estudio metodológico realizado en tres etapas: 1) Desarrollo del juego de mesa mediante fundamentación teórica y bibliográfica y elaboración del juego; 2) Validación de contenido por 22 jueces especializados en salud, 10 especialistas en educación y un diseñador gráfico; 3) Evaluación de apariencia por el público objetivo con 10 mujeres privadas de libertad. Los datos fueron recolectados entre marzo de 2021 y enero de 2022, y el análisis psicométrico se basó en la escala de Likert para el cálculo del Coeficiente de Validez de Contenido y el Coeficiente de Correlación Intraclase.

Resultados: el juego de mesa desarrollado se denominó “Carrera contra la sífilis” y constaba de 50 casillas y 34 tarjetas de preguntas. En la validación de contenido, los jueces de salud coincidieron en 13 ítems y los jueces de educación y diseño gráfico coincidieron satisfactoriamente en todos los ítems. Después de los ajustes, la segunda versión del juego de mesa fue enviada a los 22 jueces de salud, siete de los cuales regresaron, reforzando el acuerdo de los jueces, que fue satisfactorio en todos los ítems. En la evaluación de la apariencia con el público objetivo, todos los ítems obtuvieron 100% de acuerdo.

Conclusión: el juego desarrollado presenta evidencias de validez, y resulta atractivo, dinámico y lúdico, por lo que podría favorecer la construcción de conocimiento de las mujeres privadas de libertad sobre la prevención y el control de la sífilis.

DESCRIPTORES: Sífilis. Mujeres. Prisión. Juegos experimentales. Educación en salud. Tecnologías educativas.

INTRODUCTION

Syphilis remains a public health problem, despite the campaigns and programs to control the infection in Brazil, even though it is preventable, easy to diagnose and accessible treatment in the Unified Health System (Sistema Único de Saúde, SUS). When not treated early and properly, it can affect various organs such as the nervous system, cardiovascular system, bones, liver, muscle tissue, skin and eyes¹.

The female population needs special attention, since women have a direct impact on reproductive and fetal health (during pregnancy), with the possibility of vertical transmission. Congenital syphilis is a sentinel event and a marker of the quality of care. In this sense, we can observe the seriousness of the clinical repercussions for the mother-child binomial, such as miscarriage, premature birth, low birth weight and blindness².

The risk factors prior to incarceration, added to the precarious conditions of the prison environment, such as overcrowding, an unhealthy environment and inadequate infrastructure, result in a greater predisposition to sexually transmitted infections (STIs), including syphilis. Other phenomena are observed as social determinants of health, the most prevalent being the lack of educational activities for prevention and guidance in prisons, the low quality of prenatal care and the lack of investment in the health of this population^{1,3}.

Health education practices are tools that nurses and other professionals can use to provide care. In addition, they can contribute to building the subject's autonomy by making them aware of the determinants of their health-disease process through health knowledge and literacy, so that they can adopt new habits and actively participate in therapeutic approaches. The use of games as a playful approach to health stands out for its efficiency and effectiveness⁴.

Game theory is a field of study in mathematics and economics that explores how decisions made by different participants affect each other, based on their choices, interests and objectives. It is often used to analyze situations that require strategy (e.g. board games), helping to understand how different choices can lead to different outcomes and how players can maximize their gains or minimize their losses⁵⁻⁶.

In the development of strategies for the prevention and control of diseases, especially transmissible diseases, game theory can help to model the way in which people make decisions about risk behaviors, such as vaccination, the adoption of preventive measures and/or adherence to therapeutic treatment. This can guide the creation of effective public policies, identify barriers to access and measures to improve equity in health care^{5,7}.

Educational Technologies (ET) provide interaction, knowledge acquisition, cognitive skills development and exchange of experiences. In addition, they encourage participants to reflect by enabling them to relate the content to the reality in which they find themselves, so that they can seek to transform it. It should be emphasized that the games must be simple and motivating, have language that is understandable to the individuals they are aimed at and be used to improve the proposed theme⁷⁻⁸.

Women in prison present unique challenges for health promotion, such as difficulties in accessing information and health services. In addition, the negligence and precariousness of inmates' health care culminates in few health promotion and education interventions. Given that there are few studies on educational methods for empowerment and self-care that overcome the conditions imposed by prison, the creation of a board game aimed at this population could fill this gap⁸⁻⁹.

It is important to provide an effective syphilis prevention tool, capable of contributing to health education and thus reducing the disease's transmission, promoting the health of women deprived of their liberty and possibly preventing its spread to the community after release. This streamlines the health education process in prisons.

Therefore, this study aimed to develop and analyze evidence of the content and appearance validity of a board game for the syphilis prevention in women deprived of their liberty.

METHOD

This is a methodological study focusing on the development, validation and evaluation of an educational technology. It was carried out between March 2021 and January 2022, in three stages: board game development; content validation by judges; and appearance evaluation by the target audience.

The results of three integrative reviews (IRs) were used to choose the educational technology, as well as its content and method of development. The first helped to define the board game as the type of educational technology to be built¹⁰; the second verified the most used strategies for the prevention and control of syphilis in the population deprived of liberty¹¹; and the third summarized the gaps in the target population's knowledge on the subject.

Once this data was available, work began on the board game, which relied on an adapted methodological framework¹²⁻¹⁵ and stages called design, pre-production and prototype. The conception stage began with the idea of developing an educational game to promote syphilis prevention among women in prison.

In pre-production, the game proposal was drawn up, consisting of identifying the high concept, theme, objective, target audience, genre, mechanics and conflicts. The game contained a board (80 cm × 50 cm), made up of 50 squares, two of which had a STOP sign, which referred to a punishment of staying one round without playing, and 20 squares with questions. The questions were distributed on 30 cards measuring 11.5 cm × 9.5 cm.

The gameplay was a demonstration of what the participants can do when they start the game and how much fun it will be. It was carried out remotely, on the Google Meet platform. Sampling was by convenience. Teachers and students who were present during a meeting of the research group "Women's health in the context of women's and family health" at the Federal University of Pernambuco were selected as participants. The board game was presented, followed by a discussion on the coherence of the rules, the suitability of the difficulties to the participant's repertoire, the surprise and predictability that can encourage the participant to stay in the game and the importance of clear information on the subject for acquiring knowledge.

To make the game, the study involved a graphic designer, who was responsible for the illustrations, layout and vectorization.

Finally, there was the prototype stage, the result of pre-production that allowed the first version of the board game to be visualized. The initial prototype was analyzed by the judges, and adjustments were made by consensus. Next, the board game was adapted to the objective, target audience and mechanics, and then the final prototype was created.

Content validation was carried out by judges who were nurses and physicians specializing in women's health and prison health. The inclusion criteria were based on the adapted expert classification system¹⁴, related to academic background, professional performance and scientific production.

The judges were selected by purposive sampling through consultation of their Lattes CVs on the platform of the National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico, CNPq), and the snowball technique was used. A total of 75 invitations were sent by e-mail. The 22 who agreed to take part in the research were sent the Informed Consent Form (ICF), the instrument for content validation and the first board game version; they were given 20 days to answer the instrument.

The instrument for content validation was adapted from instruments used in validation studies¹⁵⁻¹⁷. The questions were distributed in blocks containing items such as: objectives, structure/presentation and relevance. The instrument for technical validation was adapted from educational technology instruments^{15,18} and structured around the following topics: objective, presentation/organization and visual style.

In the technical content validation with education and graphic design professionals, the pedagogical and technical aspects of the game were observed. For the sample of these judges, whose recommended number is between 9 and 15 experts¹⁸, a set of requirements for defining an expert were inclusion criteria¹⁹. Sampling was by convenience and snowball type. A total of 88 invitation letters were sent by e-mail: 10 accepted and were sent the instrument for technical evaluation, the ICF and the board game.

The agreement rate was assessed using answers containing “yes” or “no”; and the relevance level, using Likert-type answers (single choice): irrelevant, partially relevant, really relevant and very relevant. In each item of the instrument, there were spaces reserved for the judges to make suggestions²⁰⁻²¹.

The appearance assessment was carried out with ten women deprived of their liberty at the Recife Women’s Penal Colony (Colônia Penal Feminina do Recife, CPFR). Those in a closed or semi-open regime were included and those not authorized by prison management to leave their cell were excluded. Sampling was by convenience, and they were selected by the CPFR management. Data was collected individually after signing the informed consent form. The women answered the personal characterization questionnaire and then the appearance assessment instrument, which was constructed and adapted from instruments used in validation studies^{15-17,20}. The instrument was organized in blocks with questions related to the appearance and understanding of the board game’s content, as well as a field for suggestions. Agreement was analyzed by means of “yes” or “no” answers.

The database was entered into Microsoft Excel[®] and transferred to Stata software version 16.0. The judges’ sociodemographic and career characteristics were analyzed by calculating frequencies for categorical variables and measures of position and dispersion for quantitative variables.

To analyze the agreement rate between the judges, the number of agreeing answers was taken as the total number of judges, for each item and for the set of items. A binomial test was applied to each item, with the null hypothesis being a minimum percentage of agreement of 85% and a significance level of 5%; and the alternative hypothesis being agreement of less than 85%. Results that showed a *p-value* greater than 0.05, i.e. that did not allow the null hypothesis to be rejected, were considered adequate²¹.

The Content Validity Coefficient (CVC) was calculated based on the methodological criteria¹⁵, in which the CVC of the items is obtained from the means provided by judges for each of the items and then divided by the maximum point of the Likert scale used, which in this study is 4. To arrive at the adjusted CVC, the index for expert polarization (Pei) was subtracted. The cut-off point adopted to determine adequate content validity was ≥ 0.85 ²¹.

The sociodemographic characteristics of the women were analyzed by calculating frequencies for the categorical variables, and position and dispersion measures for the age variable, which is quantitative. The concordance index took into account the number of concordant answers divided by the total number of women, for each item and for the set of items.

The board game’s copyright was registered with the National Library under protocol number: 000984.0097559/2024.

RESULTS

With the results of the IR, the aim was to organize the board game's theoretical content according to the etiology of the disease, clinical manifestations, forms of transmission, diagnosis, treatment and preventive measures, in order to fill the gaps in knowledge about syphilis. In order to contemplate and integrate these aspects, national and international documents were researched.

In the pre-production phase, a proposal was drawn up for an educational, trail-type board game entitled "Race against Syphilis", aimed at women deprived of their liberty, which considered the game's objective to be the acquisition of knowledge to encourage self-care.

The production relied on a professional graphic designer, who was responsible for creating the logo and all the versions of the game. In the first version, the game contained a board (80 cm × 50 cm) and 50 squares, two of which had a STOP sign, with a punishment of staying one round without playing. In addition, 20 squares had question marks, indicating the need to answer a question about syphilis.

The questions were distributed on 30 cards (11.5 cm × 9.5 cm). They were of the "true or false" type and were constructed in multiple choice format. They covered the disease concept, clinical manifestations, transmission, diagnosis, prevention, treatment, gestational and congenital syphilis, complications and reinfection (Figure 1).



Figure 1 – Examples of question cards from the "Race against Syphilis" board game – Recife, PE, Brazil.

Also included in the game is the “Player Instructions” manual, in folder format, which covers the rules in detail, describes the target audience, the game’s genre, the number of participants and the materials.

After developing the first version, the board game underwent content validation by judges from the health, education and graphic design fields. Twenty-two health judges took part, 81.82% (n=18) of them nurses and 18.18% (n=4) physicians. The majority were female, 86.36% (n=19), whereas 13.64% (n=3) were male. As for the regions where these judges lived, 31.81% were from the Northeast, 27.27% from the North, 27.27% from the Midwest, 9.0% from the Southeast and only 4.54% from the South. In relation to age, the mean obtained was 40.54 (SD±11.13), ranging from 26 to 64 years. The mean training period was 15.0 years (SD±9.36), ranging from 5 to 41 years. In terms of education, 100% (n=22) of the judges were specialists, of whom 54.55% had a master’s degree and 31.82% a doctorate. In relation to teaching, 90.91% had experience as a teacher, 100% had developed studies in the area of women’s health and prison health, and 50% had experience in developing or evaluating educational technologies.

A total of ten judges from the field of education and graphic design took part, 50% of whom were from the field of education and 50% from the field of graphic design. Of the total, 70% were female and 30% male. The mean age was 41.0 (±15.81) years. As for the training period, the mean was 19.0 (±16.31) years. Considering the highest educational level, 30% were specialists; 20%, masters; and 50%, doctors. In relation to teaching, 80% had teaching experience and 100% had experience in developing or evaluating educational technologies.

The agreement rate of the health judges was satisfactory for most of the items, with the exception of item 8 “Presents a coherent language for the understanding of women in deprivation of liberty”, which received a negative evaluation from five judges. On the other hand, the education and design judges had a satisfactory agreement rate on all items, with values greater than or equal to 90% regarding the suitability and relevance of the board game.

As for relevance using the Content Validity Coefficient (CVC), the data from the health judges was greater than or equal to 0.85; and the data from the education and graphic design judges was greater than or equal to 0.92. This ensured the content validity of the technology, as shown in Tables 1 and 2.

The judges suggested modifications, additions of illustrations and adjustments to the board game. Due to the need for a mediator throughout the game and also as one of the judges’ suggestions, the “Mediator’s Instructions” manual was drawn up (Figure 2). The content on syphilis is covered scientifically in order to train the mediator.

After adjustments, the second board game version (Figure 3) was submitted to the appearance evaluation with the target audience. A total of ten women deprived of their liberty took part in this stage, 60% (n=6) of whom declared themselves to be brown, single and from the metropolitan region of Recife-PE. Only 10% (n=1) reported not being from the state of Pernambuco. The mean age was 31.7 (SD ±10.01) years and the median age was 30 (IQR 12) years.

In relation to education, 60% (n=6) had incomplete higher education; 20% (n=2) had completed elementary school; 10% (n=2) had completed high school; and 10% had completed higher education. All the items evaluated by the target audience were judged satisfactory.

Table 1 – Concordance Index and Content Validation Coefficient presented by health judges regarding the relevance of the “Race against Syphilis” board game — Recife, Pernambuco, Brazil, 2022.

Item	Agreement n (%)	p [‡] value	CVC [†]
Objectives			
1. The game covers the proposed theme.	22 (100%)	1.0	1.0
2. The information/content is suitable for the teaching-learning process.	22 (100%)	1.0	0.95
3. Clarify any doubts about the topic.	22 (100%)	1.0	0.94
Structure/Presentation			
4. The information presented is scientifically correct.	22 (100%)	1.0	0.94
5. Addresses the issue clearly and objectively.	21 (95.45%)	0.97	0.93
6. The game’s content is suitable for women in prison.	20 (90.91%)	0.86	0.92
7. There is a logical sequence of the content proposed.	20 (90.91%)	0.86	0.92
8. It presents a coherent language for understanding women in deprivation of liberty.	17 (77.27%)	0.22	0.89
9. The game rules are well described.	19 (86.36%)	0.66	0.95
10. The images are appropriate.	22 (100%)	1.0	0.89
11. The illustrations motivate you to understand the content.	21 (95.45%)	0.97	0.85
12. The number of squares on the board is adequate for the proposed content.	22 (100%)	1.0	0.92
13. The size of the headings and topics is appropriate.	21 (95.45%)	0.97	0.93
Relevance			
14. It encourages women in prison to learn about the issue.	22 (100%)	1.0	0.93

[‡] Binomial test. [†] Discounting the judges’ bias error of 0.000012.

Table 2 – Concordance Index and Content Validation Coefficient presented by judges in the field of education and graphic design regarding the relevance of the “Race against Syphilis” board game — Recife, Pernambuco, Brazil, 2022.

Item	Agreement n (%)	CVC [†]
Objective		
1. The game’s objective is clear.	10 (100%)	1.0
Presentation/Organization		
2. The game has a social impact.	10 (100%)	1.0
3. The conflict created around syphilis prevention is consistent with reality.	10 (100%)	0.95
4. The narratives that develop increase interest in the game.	10 (100%)	0.97
5. The information is well structured in terms of agreement and spelling.	9 (90%)	1.0
6. The presentation information and rules/instructions are coherent.	9 (90%)	0.92
Visual style		
7. The size of the headings and topics is appropriate.	10 (100%)	0.97
8. The illustrations are expressive and sufficient.	9 (90%)	0.92
9. The size of the (printed) material is appropriate. Board: 80 cm × 50 cm and cards: 11.5 cm × 9.5 cm	9 (90%)	0.97
10. The number of squares on the board is adequate.	10 (100%)	0.97
11. The visual composition is attractive and harmonious.	9 (90%)	0.97
12. The type, size and color of the font used in the texts make the content easier to read.	9 (90%)	0.97

[†] Discounting the judges’ bias error of 0.000012.

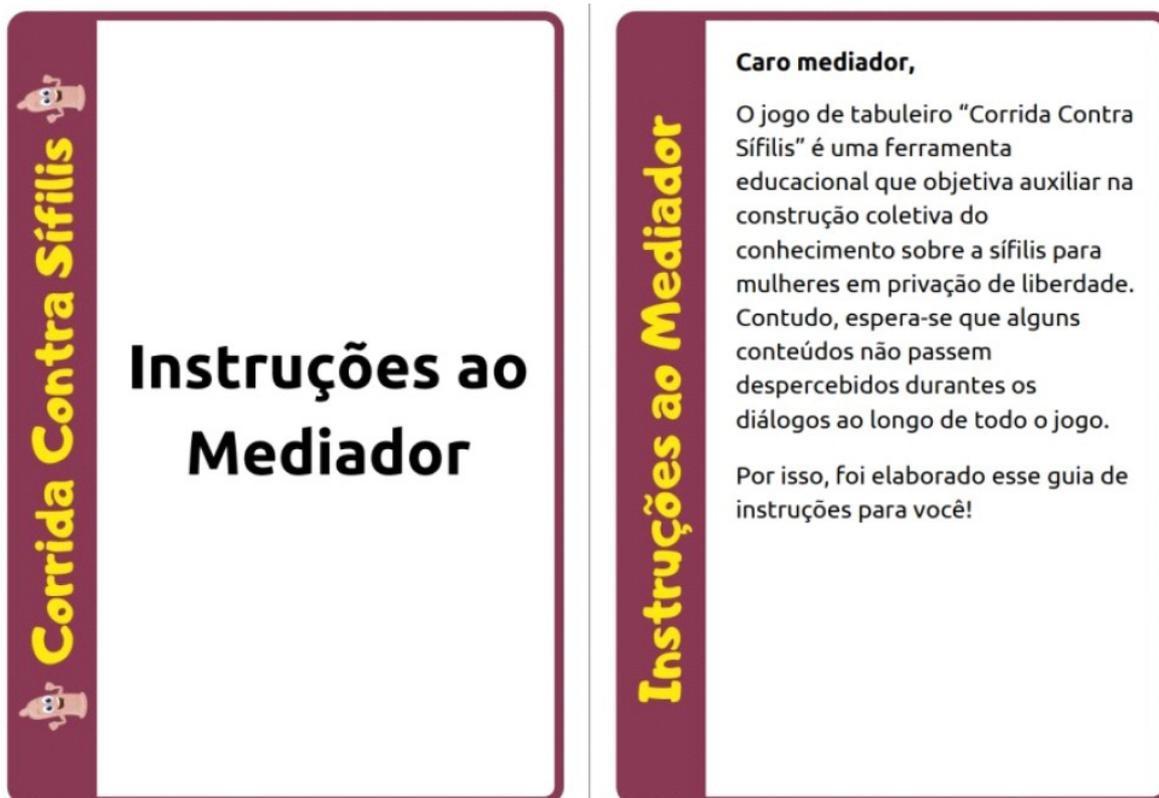


Figure 2 – “Mediator’s Instructions” manual, “Race against Syphilis” board game — Recife, PE, Brazil.

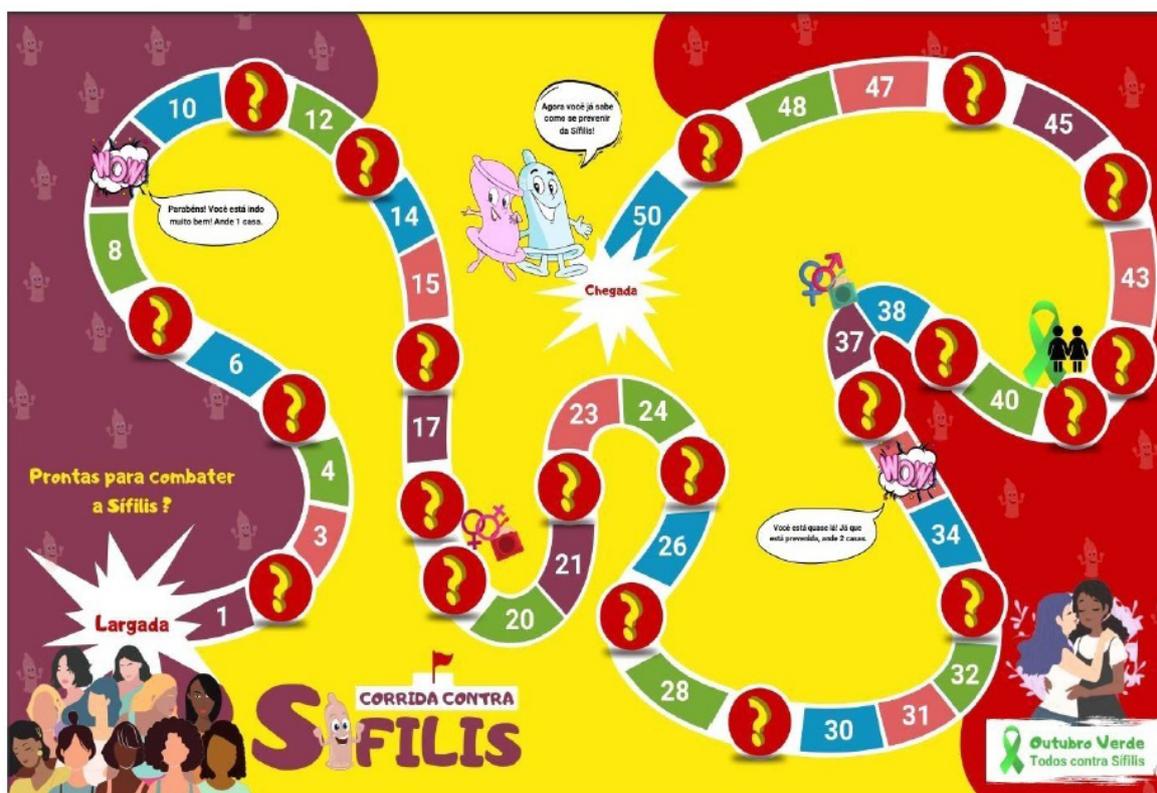


Figure 3 – Second version of the “Race against Syphilis” board game after adjustments suggested by the content validation judges – Recife, PE, Brazil.

DISCUSSION

The development, validation and evaluation of the game enabled the final version to address the issue in a simple and clear way. The bibliographic survey on syphilis preventive measures provided the theoretical framework for the board game content, in line with the United Nations document called the “Bangkok Rules”, which established that incarcerated women should receive education and information on how to prevent STIs²².

The game is one of the educational tools that can be used in the prison environment and is an important didactic material for the collective construction of knowledge within the prison. Educational games respond to playful, intellectual and emotional needs, as well as encouraging socialization and contributing to the teaching-learning process, as they are seen as fun, thought-provoking, interactive and illustrative activities²⁰.

The experts' involvement in validating the game's content and appearance was a fundamental step in ensuring its quality and effectiveness. The professional diversity involved, including specialists in health, education and graphic design, provided a comprehensive material evaluation, ensuring its suitability to the needs and characteristics of the target audience²⁰.

The evaluation by the women in detention revealed that the game is able to effectively promote learning about syphilis prevention. Research indicates that this is due to a playful and interactive approach: the game stimulates the motivation of the participants and facilitates the understanding and retention of the content. It promotes positive behavioral changes in relation to health and content learning, and is also applied in the formative teaching-learning process^{23–25}.

Other studies have found that the use of educational games makes it possible to memorize information, favoring learning, greater involvement⁹, and can be used at various stages of the teaching-learning process²⁵. In addition, it can be used as a tool for the prevention and control of specific diseases, such as HIV²⁶. Therefore, behavioral changes in terms of health can be achieved through interactive and dynamic conduction²⁷.

Gamification has proven to be a highly applicable and effective approach to health promotion and education in vulnerable populations, and it is essential for confusing and difficult-to-understand approaches to be readapted and made appropriate to the understanding of the population they are aimed at²⁸.

Board games have proven to be accessible and do not require sophisticated electronic equipment or internet access. This makes them suitable for communities with limited resources, including vulnerable populations who may not have regular access to technology. They are easily adapted to reflect the culture and specific contexts of the target populations, valuing their unique skills and experiences, regardless of their level of prior knowledge^{24–25}.

This welcome can be decisive for the individual's self-responsibility and autonomy over the health care process, thus influencing habits for a better quality of life²⁴. The setbacks and problems presented in the games stimulate reflection and mirror the resolution of real-life problems, facilitating the internalization and retention of the proposed knowledge²⁵.

Finally, the board game is an innovative pedagogical proposal for building knowledge about syphilis prevention, presented in a playful and interactive way, which can provide women with a more participatory, dynamic and contextualized relationship.

A study limitation was the physical educational resource's accessibility. In addition, it was carried out in just one region of the country and with women from just one women's prison, so other results can be obtained by replicating the methodology in other regions or with women from other prisons.

CONCLUSION

The board game “Race against syphilis” was developed according to the methodological framework. The content was validated by expert judges and the appearance was assessed as appropriate by the target audience.

Based on these arguments, the proposed study not only addresses a relevant health issue, but also introduces an innovative and promising approach to syphilis prevention in a challenging context. The validity evidence sought in the study suggests the quality and efficiency of the intervention, so that it represents an important step in promoting the health and well-being of women deprived of their liberty.

It should be noted that the game could be used in different contexts, in addition to the prison environment, in order to make the health education process more fun and participatory. It is recommended that a semantic evaluation be carried out with the target audience at a later date, as well as experimental research in the form of clinical trials to assess the effectiveness of the board game in preventing syphilis in the female population deprived of their liberty.

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Study design: Nascimento VA, Linhares FMP, Guedes TG.

Data collection: Nascimento VA, Linhares FMP.

Data analysis and interpretation: Nascimento VA, Linhares FMP, Guedes TG.

Discussion of the results: Nascimento VA, Linhares FMP, Guedes TG, Leal LP, Macêdo VC, Dantas HLL.

Writing and/or critical review of the content: Nascimento VA, Linhares FMP, Guedes TG, Leal LP, Macêdo VC, Dantas HLL.

Review and final approval of the final version: Nascimento VA, Linhares FMP, Guedes TG, Leal LP, Macêdo VC, Dantas HLL.

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CORRESPONDING AUTHOR

Valéria Alexandre do Nascimento.

valeria.anascimento@ufpe.br

