



BMJ Open Effect of a board game about sexually transmitted infections on imprisoned women's knowledge: protocol for a quasi-experimental study

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ABSTRACT

Introduction The prevalence of sexually transmitted infections in imprisoned women is high. In the prison school context, education in health is one of the best strategies to achieve positive indicators in terms of health promotion and disease prevention. The use of educational technologies, such as board games, can aid in the process of knowledge acquisition on a given subject matter. This article describes the protocol of a health educational intervention that addresses content about sexually transmitted infections directed to imprisoned women in a prison school.

Methods and analysis A quasi-experimental study to test the effect of a board game on 64 imprisoned women's level of knowledge about sexually transmitted infections. The Prevena board game was specifically created and validated for these women. The primary outcome will be the level of knowledge on sexually transmitted infections, measured using a score obtained after the assessment conducted during the initial interview, immediately after the intervention and after 15 days.

Ethics and disclosure This study was approved by the Research Ethics Committee of the Federal University of Pernambuco (Opinion No. 3.986.050 and CAAE: 30035520.7.0000.5208). The results will be presented to the school and to the Federal University of Pernambuco, as part of the activities of a PhD Thesis in Nursing, and will be disclosed in peer-reviewed journals and scientific events.

Trial registration number RBR-2JWS7DV.

INTRODUCTION

Due to the space limitation, imprisonment produces significant changes in people's social organisation. The unfavourable conditions of coexistence in prison settings make these people vulnerable in coping with a series of communicable diseases, such as sexually transmitted infections (STIs).¹ In terms of factors associated with STI transmission, it is necessary to consider that current knowledge for the general population can be different from that for the prison population, due to the very condition of being

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This protocol uses a board game on sexually transmitted infections developed for incarcerated women.
- ⇒ The board game addresses prevention behaviors and risk behaviors related to sexually transmitted infections.
- ⇒ The fact that the study was conducted only with imprisoned women who attend the school may not reflect the reality of the prison unit.
- ⇒ There is a high turnover of women in the prison unit, which can impact the follow-up.

people deprived of their freedom. In the case of women¹, imprisonment can exert an influence on various aspects regarding vulnerability to acquiring an STI, either due to lower access to knowledge about transmission and prevention or to exposure to sexual violence, altered perception of sexual risk or restricted access to condoms or appointments with a health professional.² Despite some advances in terms of public policies, a number of studies show that the prevalence of STIs in imprisoned women is high, with the following numbers: from 1.93% to 14.5% for HIV,³⁻⁸ from 5.7% to 25.2% for Syphilis,^{4,8,9} 7.4% for hepatitis B,³ from 14.47% to 19% for hepatitis C,^{3,5,6} 16.3% for HPV,⁴ 1.6% for herpes,¹⁰ from 0.8% to 7.6% for gonorrhoea,^{3,10} and 11% for chlamydia.³

In Brazil, up to 2017, the year when the last national survey on penitentiary information was conducted, the states with the highest numbers of imprisoned women were São Paulo (12 520), Minas Gerais (3365) and Paraná (2758). Of the total number of

¹[1]In this study, the target population considered consisted in women based on their biological sex at birth and transgender women in the prison unit.

imprisoned women in the country, 45.33% corresponded to young individuals (up to 29 years old), brown-skinned (48.04%), with incomplete elementary school (44.42%), single (58.55%), with 2 children (28.27%), and convicted for crimes associated with drug trafficking (59.98%).¹¹ With regard to sexual and reproductive health, one of the ways to help coping with these diseases is conducting institutional interventions. In addition to other aspects, these interventions must foster self-care, coaccountability and health protection, both individual and collective. With this, it is possible to contribute to reducing or even preventing the onset of certain comorbidities which, during imprisonment, can exert a significant impact on the quality of life of these women, even on their social reintegration.¹²

In this scenario, education in health emerges as one of the best strategies for the achievement of positive indicators in terms of health promotion and disease prevention within the school environment.¹³ The use of technologies may assist in the process of acquiring knowledge on a given subject matter, provided that their elaboration and applicability are grounded on solid scientific bases and have clearly defined goals. However, it is necessary to consider that, although presenting positive results in terms of improvements in condom use skills and psychosocial aspects, the educational interventions targeted at imprisoned women and which included STIs as content do not exert a significant effect in reducing sexual risk.^{14,15}

Introduction of games, for example, into the learning field allows for the students' greater involvement through the integration between knowledge construction and entertainment. Furthermore, games can be an effective tool in the knowledge acquisition process when compared with traditional methods, enabling greater student's interaction, development of new skills and encouragement of critical thinking.¹⁶

A type of game that can be used for educational purposes is the board game. This game modality is characterised by gathering people around rules, a game surface and chips, which are resources that ease the players' interaction. The very nature of the game makes the players look at the board and at each other. This constitutes a major difference in relation to digital games, which have an interface that sometimes facilitates interaction with a given system rather than with other players.¹⁷

Board games are acknowledged as learning facilitating tools, as they enable learning several contents, encourage the players' motivation, and promote engagement in learning and understanding of complex contents.¹⁸

A game board on STIs for imprisoned women was developed and validated, called *Previna*. The validation process involved health and education professionals, as well as designers and imprisoned women. This game has 1 board, 5 pawns, 1 dice, 1 instruction manual and 52 cards, distributed in true-false, questions, information, challenge and prevention or risk. The content addressed in the cards includes microorganisms, signs and symptoms, forms of transmission, prevention strategies, risk

behaviours and vulnerability associated with imprisoned women.

It is noted that no educational intervention that uses a board game about STIs created and validated for imprisoned women was identified in the literature.¹⁹ Therefore, this study aims at assessing the effect of a board game about STIs on imprisoned women's knowledge level. The study presents the hypothesis that using the game in a classroom can raise the level of knowledge about STIs in the women who take part in the educational intervention.

METHODS

Study design

A quasi-experimental and single-armed study will be conducted to test the effect of the *Previna* board game on knowledge about STIs among imprisoned women who study in a prison school. Representative samples will be selected from all the schooling levels offered in the school, which has classes distributed in modules I, III, V, VII, 1st and 3rd year. The protocol was written based on the Standard Protocol Items: Recommendations for Interventional Trials guidelines.²⁰

Participants and settings

The study will include all classes of the Olga Benário Prestes State School, which operates inside the Colônia Penal Feminina Prison Unit located in the city of Recife, Pernambuco, Brazil. The school serves the Youth and Adults Education modality and offers elementary and high school courses. It has 10 classes with a mean of 12 students per class and operates during all three shifts, with 1 class in the morning, 5 in the afternoon and 4 at night. It is noted that only the women who are released to attend the classroom will take part in the intervention, always using masks, and that alcohol gel will be provided for use during the intervention. In addition to that, to access the prison unit, all those involved in the research need to present their COVID-19 vaccination card, and such access will only be released when the local sanitary conditions allow external people to enter this type of environment. All these measures aim at minimising the additional risk of contamination by COVID-19 as a result of the global pandemic.

Inclusion criteria for the participants

Imprisoned women, regularly enrolled in the school selected that operates inside the prison unit, aged at least 18 years old, literate and with an expected minimum length of stay of 15 days in the prison unit.

Exclusion criteria for the participants

Women who were not authorised by the prison unit managers or by the school board, due to any behaviour that would pose any risk to the researchers involved; pregnant women, as they have access to information about STIs during their prenatal appointments, which can be considered a bias; and those who had already took part in the semantic evaluation stage for the STI knowledge assessment instrument or for the game board.

Loss or withdrawal criteria for the participants

Women who withdraw from the course (school evasion) after data collection has been initiated; who have their imprisonment sentence suspended or concluded; who are transferred to another prison unit; or who die.

Sample size

Sample size was calculated based on the formula for studies with finite populations.²¹ A population comprised by 72 students was considered based on the existence of 6 modules and a mean of 12 students per class. The confidence level was 95%, the prevalence of the outcome variable was 0.5, and the sampling error was 0.05. A final sample of 61 students was obtained.

Recruitment was initiated on 1 June 2022, and will be finished by the end of December 2022 in a 1:1 allocation pattern.

Interventions

The educational intervention will correspond to application of the Previna board game, specifically created and validated for imprisoned women. The game will be applied only once in each group. This will take place

after conducting the initial interview. CVC=0.966 and CVC=0.917 were obtained in the content validation process by the health professionals/teachers and by the designers, respectively. The material was also analysed by the imprisoned women in terms of general aspects, playability and design, with room for suggestions.

The Previna board game consists of a board, in addition to 2 squares corresponding to the start and end of the game, 52 cards, an instruction manual, 5 pawns, and 1 dice. The game was planned to be played by a minimum of two women and a maximum of five. The board contains squares with an exclamation mark to draw the attention to risky or preventive behaviours, which have corresponding cards (yellow in colour). The other cards are classified as follows: true and false question (blue); multiple choice question (green); challenge (red) and information (pink) (figure 1).

The content about STIs—signs and symptoms, transmission, prevention, main STIs, diagnosis, treatment and vulnerability—will be addressed on the basis of situations related to the imprisoned women’s everyday life.



Figure 1 Previna game board Photo credit: Isaiane da Silva Carvalho.

The intervention will be conducted by the researcher in charge with the support of research assistants, and always with the presence of the class teacher. A 5 min long presentation about the game, its objectives, rules and division of the groups will be initially conducted. As each class has from 10 to 12 students, it is normally expected that they are divided into two or three groups.

Both the researcher and an assistant will be present during each game to support the women regarding clarification of doubts about the board game. The participant who wins each game will be invited to keep supporting her other peers, so that all of them finish the path. At the end, in case any card is left, it will be discussed so that all the content proposed is addressed. In addition to that, it will be made clear that the main objective is knowledge construction and subsequent learning. It is estimated that each game will last a mean of 50 min. Once the game is over, a new assessment of the knowledge about STIs will be performed 15 days after the initial date.

Outcomes

The primary outcome will be the level of knowledge about STIs, measured through a score obtained in the initial interview and, subsequently, at day 15. The initial interview consists in answering two instruments: (1) Sociodemographic characterisation, prison status, sexuality and STI; (2) Knowledge about STIs. This last instrument consists of 32 questions with the following answer options: 'Right', 'Wrong' and 'I don't know'. A score of 1 will be assigned to each correct answer and each question answered incorrectly or with the 'I don't know' option will be assigned a score of 0. Knowledge will be assessed based on the mean score obtained. The content of the questions involved signs and symptoms, transmission, prevention, main STIs, treatment and vulnerability. The instrument was previously validated in terms of content with an overall CVC of 0.948 and of 0.936 for representativeness and clarity, respectively; $\alpha=0.92$ (95% CI 0.84 to 0.98). After this stage, it was evaluated by the imprisoned women in terms of clarity and need for changes, with minimal modifications being proposed.

Data collection and management

Through an agreement with the school principal, data collection will be scheduled for the shifts and classes, with creation of a previous schedule of activities, collectively elaborated with the school board so as not to jeopardise the academic calendar of activities performed. Data collection will take place in three stages:

Stage 1

After selecting the women by applying the eligibility criteria, they will be verbally invited in the classroom to take part in the research. At this moment, guidelines about the research objective and the procedures adopted for data collection will be provided. In case of acceptance, the free and informed consent form will be read and signed. Subsequently, they will be invited to

answer questions from the data collection instrument in a structured individual interview. The interview will be conducted individually, in a private environment and in a specific room for this purpose, and will last approximately 20 min. It is noted that participation or non-participation in the research will imply no institutional consequences for the women, with voluntary participation and granting the possibility to withdraw in any of the research phases for those who initially agreed to take part.

At the end of the interview, it will be explained that knowledge about STIs will be assessed at another two moments: immediately after the intervention and at day 15. Subsequently, the women will be led to a classroom where the board game will be applied. Each game will be started as groups of 2–5 students are assembled. In an attempt to minimise losses, the educators will be asked to inform the women 2 days before their next evaluation dates.

Stage 2

The intervention proposed for this study will consist in applying the Previna board game in a classroom. The game board will be applied by the researcher in charge, in a classroom and after the initial interview, to groups with a maximum of five students. It is noted that all the women that were present in the classroom and volunteered their time underwent the intervention.

Stage 3

The STI knowledge instrument will be reapplied immediately after the intervention and at day 15. This time was suggested by the school board due to the high turnover in the prison unit, which might imply significant losses in the follow-up phase in case such period of time was longer. This application will take place individually, in a classroom, and will be aided by research assistants. The questions from the STI knowledge instrument will be discussed in the classroom after the end of the data collection stage.

Statistical methods

For the variables related to the women's social and demographic characterisation, prison status, sexuality and sexual infections, a descriptive analysis will be performed with presentation of absolute and relative frequencies, mean, median and SD. Knowledge about STIs will be assessed according to the mean values obtained.

Friedman's test was employed to compare the mean values obtained across all three application moments. In turn, the sum presented normal distribution in each of the periods analyzed; therefore, the difference of means analysis was performed via the ANOVA test for repeated samples. The Tukey HSD post-hoc test was used to identify the differences, as well as their significance, across all moments when the instrument was applied. All the analyses were performed in the Stata software, version 16.0. A 5% significance level will be adopted for all p values.

Monitoring

The objective of this study is to increase knowledge about a given subject and, therefore, should not imply risks for those involved; we also consider it unlikely that the current intervention can worsen existing knowledge. A follow-up group will not be created due to lack of any intermediate analysis and very low risk for the participants, but an independent test steering group will be created to oversee the trial, review the progress made and decide on any changes in the protocol.

Participants and public involvement

The participants were involved during the board game validation phase. No participants were involved in the design, recruitment or conduction of the study.

Ethics and dissemination

This study was approved by the Research Ethics Committee of the Federal University of Pernambuco (CAAE: 30035520.7.0000.5208). The results will be disclosed through publications in peer-reviewed scientific journals and scientific events. The results will also be presented to the funding agency (Science and Technology Support Foundation of the State of Pernambuco).

The game board will be made available for use by the school teachers. All the information obtained in the study will be exclusively used for scientific purposes. Before data collection, the participants will be guided and sign the free and informed consent form after reading it.

DISCUSSION

The relationship between learning and board games has been shown in different fields of knowledge, as this tool is used to mediate learning of several disciplines, such as those related to mathematics,²² the environment²³ and health.^{24 25}

This study will be the first to involve application of a board game with the purpose of increasing imprisoned women's knowledge about STIs in a Brazilian prison school. In case the effect of the game is found to be significant, and considering the vulnerability associated with this population group, the game can be widely spread to the other female prisons in the country.

The following limitations of this study must be considered: it will be conducted only in two female prisons from the state of Pernambuco. Although these prisons are the largest ones, they may not represent the reality of the entire female prison population, whether in the country or worldwide; because of the characteristics of the intervention, it is not possible to blind the participants or the woman in charge of applying it; and, despite randomisation, the particularities of the prison environment and the women's confinement situation can favour contamination of the sample.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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