Board game about psychoactive drugs for visually disabled people

Jogo de tabuleiro sobre drogas psicoativas para pessoas com deficiência visual

Juego de tablero sobre drogas psicoactivas para personas con discapacidad visual

Monaliza Ribeiro Mariano Grimaldi[1] https://orcid.org/0000-0002-8718-4783
Adriana Sousa Carvalho de Aguiar[2] https://orcid.org/0000-0002-2726-8707
Paulo César de Almeida[2] https://orcid.org/0000-0002-2867-802X
Morgama Mara Nogueira Lima[1] https://orcid.org/0000-0003-1012-0738
Kariane Gomes Cezario Roscoche[3] https://orcid.org/0000-0002-2097-2478
Paula Marciana Pinheiro de Oliveira[1] https://orcid.org/0000-0001-9091-0478
Francisco Mayron Morais Soares[4] https://orcid.org/0000-0001-7316-2519
Lorita Marlena Freitag Pagliuca[5] https://orcid.org/0000-0001-9110-8102

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Corresponding author
Morgama Mara Nogueira Lima
E-mail: morgamamara@gmail.com

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(https://orcid.org/0000-0001-6915-6781)
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, SP, Brazil

Abstract

Objective: Evaluate the learning of visually disabled people after participating in an educational game about psychoactive drugs.

Methods: Quasi-experimental research, conducted in an association of the blind and in an experimental laboratory of health teaching at a university, involving 60 blind people over the age of 18, blind or with low vision, literate in Braille or able to read texts with enlarged letters. The educational board game "Drugs: playing fair" was applied, which covers content on the concept, types of drugs, harms, risk factors, situations involving the use of drugs and protection/prevention factors. Learning was evaluated in an individual interview, before and after the application of the game, with questions organized by levels of complexity. Comparison of the number of hits evaluated using the McNemar test.

Results: Questions of low complexity presented a significant difference (p=0.0001) in the hits after using the game and a high index of hits before and after (81.7% and 98.3%). There was no statistical difference in the medium and high complexity questions.

Conclusion: The game *Drugs: playing fair,* significantly contributed to the learning of people with visual disabilities, representing a strategy to include individuals with disabilities in the access to information.

Resumo

Objetivo: Avaliar o aprendizado de pessoas com deficiência visual após participação em jogo educativo sobre drogas psicoativas.

Métodos: Pesquisa quase-experimental, realizada em uma associação de cegos e em laboratório experimental de ensino de saúde de uma universidade, com 60 cegos maiores de 18 anos, com cegueira ou baixa visão, alfabetizados em Braille ou capazes de ler textos com letras ampliadas. Foi aplicado o jogo educativo de tabuleiro "Drogas: jogando limpo", que contempla conteúdo sobre o conceito, tipos de drogas, prejuízos, fatores de risco, situações envolvendo o uso das drogas e fatores de proteção/prevenção. Aprendizagem foi avaliada em entrevista individual, antes e após aplicação do jogo com questões organizadas por níveis de complexidades. Comparação do número de acertos avaliados pelo teste McNemar.

Resultados: Questões de baixa complexidade apresentaram diferença significativa (p=0,0001) nos acertos após uso do jogo e elevado índice de acertos antes e após (81,7% e 98,3%). Não houve diferença estatística nas questões de média e alta complexidade.

[1]Universidade da Integração Internacional da Lusofonia Afro-Brasileira, Acarape, CE, Brazil.
[2]Universidade Estadual do Ceará, Fortaleza, CE, Brazil.
[3]Universidade Federal do Paraná, Curitiba, PR, Brazil.
[4]Faculdade Uninta Itapipoca, Itapipoca, CE, Brazil.
[5]Universidade Federal do Ceará, Fortaleza, CE, Brazil.
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Conclusão: O jogo *Drogas: jogando limpo,* contribuiu, de forma significativa, para a aprendizagem das pessoas com deficiência visual, representando estratégia de inclusão de individuos com deficiência no acesso à informação.

Resumen

Objetivo: Evaluar el aprendizaje de personas con discapacidad visual después de la participación en juego educativo sobre drogas psicoactivas.

Métodos: Investigación cuasi experimental, realizada en una asociación de ciegos y en un laboratorio experimental de enseñanza de salud de una universidad, con 60 ciegos de más de 18 años, con ceguera o con baja visión, alfabetizados en Braille con capacidad para leer textos con letras ampliadas. Se aplicó un juego educativo de tablero "Drogas: jugando limpio", que contempla contenidos sobre el concepto, tipos de drogas, perjuicios, factores de riesgo, situaciones que involucran el uso de drogas y factores de protección/prevención. El aprendizaje fue evaluado en entrevista individual, antes y después de la aplicación del juego con preguntas organizadas por niveles de complejidad. Comparación del número de aciertos evaluados por la prueba McNemar.

Resultados: Preguntas de baja complejidad presentaron diferencias significativas (p=0,0001) en los aciertos después del uso del juego y elevado índice de aciertos antes y después (81,7 % y 98,3 %). No hubo diferencia estadística en las preguntas de mediana y alta complejidad.

Conclusión: El juego *Drogas: jugando limpio,* contribuyó, de forma significativa, para el aprendizaje de las personas con discapacidad visual, lo que representa una estrategia de inclusión de personas con discapacidad para el acceso a la información.

Introduction

The abuse of psychoactive drugs is a severe public health problem, arousing concern on the international scene. Among the types of drugs, legal drugs stand out, especially tobacco and alcohol, due to the legalization of their consumption. Their use is superior to that of illicit drugs such as marijuana, cocaine and crack.[1]

Although adolescents, due to the phase of life that is characterized by risk behaviors, impulsive acts and for being more exposed to multiple risk factors for drug use,[2,3] are susceptible to drug use and abuse, all individuals, regardless of age, race, nationality, education or economic level, are vulnerable to drug abuse, which includes the visually disabled. These can experience the same complications due to drug use and abuse, with greater risk for violence in its different forms, because disabled people who use some psychoactive substance are more likely to be victims of moral, psychological and institutional violence when compared to their peers without disabilities.[4]

Valuing diversity is one of the principles that should guide educational practices in health. Strategies that eliminate barriers and seek inclusion contribute to the health promotion of these clients, who in many situations have limited accessibility to services and information. Health promotion, which are actions and strategies to prevent diseases, reduce damage and improve individuals' quality of life, has health education as its main tool, and aims to empower them to decide on their health autonomously and confidently.[2]

The viable strategies to promote these people's health includes assistive technology, which comprises resources and services that make it easier for disabled and elderly people to perform activities of daily living, providing independence, autonomy and quality of life.[5] That is, any available resources, adapted to these clients can be considered an assistive technology.

In health education, accessible games are presented as a useful tool for people with visual impairments to have the same learning opportunity, that is, to apprehend

information, being considered an assistive technology. Concerning the theme of psychoactive drugs, accessible technologies in the format of games can be an excellent prevention strategy.

Health and education professionals share the idea that play, which is any activity aimed at fun, is one of the possible mediators of the teaching learning process. Through play, experiences and discussion can occur, which can produce knowledge.[6]

Thus, play integrates criteria for effective learning, in the sense of drawing attention to a certain subject; its meaning can be discussed among the participants and the knowledge generated can be transported to the field of reality.[6]

Visually disabled people use *online* and physical games for entertainment, while few are intended for health promotion. The board game *Drugs: playing fair* uses play to promote health by proposing problem situations that require immediate solutions, which favors creativity with experience exchange and interaction. The game, submitted to content

and face validation,[7] allows two players and consists of a route board, with start and end, five types of houses with different textures, which are colored along the route, cards with questions and answers on the subject, with tactile reading and enlarged letters, and a pin, fixed by pressure, which marks the evolution of the game.

Therefore, the objective was to evaluate the learning of visually disabled people after participating in an educational game about psychoactive drugs.

Methods

Quasi-experimental research conducted in an association of the blind and in an experimental health teaching laboratory of a university, both in the city of Fortaleza-Ceará, Brazil. The participants, being the first guests in the association of the blind, were aged 18 years or older, with blindness or low vision, literate in Braille or able to read texts with enlarged letters. People with multiple disabilities and those who had already used the game *Drugs: playing fair* previously in the evaluation phase were excluded.

The game *Drugs: playing fair* includes content on the concept, types of drugs, harm, risk factors, situations involving the use of drugs and protection/prevention factors.[7] This information was elaborated based on a validated educational text on drug prevention,[8] with adapted language and an attractive format. Questions/answers or short assertions were created, which favored dynamic and interesting reading. It consists of a board with a route formed by five types of houses, with different textures, a beginning and an end; cards with questions and answers attached and information about the use of psychoactive drugs; pieces (pins and chips); game instructions; instructions on how to play. The material is written in braille and ink, and the instructions are also available in audio. The houses on the board are arranged in House Drug, with a wavy texture; House Find Out More, with a rubberized texture; House Friends, with a velvety texture; House Enemies, with a rough texture; and House Pass the Turn, with a smooth texture. The content of these houses is related to the concept and classification of drugs, protective and risk factors and curiosities.

In the dynamics of the game, to start the match, each participant took a paper from a box identified with the word 'start'. The one who took the paper with 'first player' written on it started the game. Another box, identified with 'house numbers', contained square chips; each with a number, which ranged from 1 to 6, representing the number of houses the participant should walk on the board. The participant who started the game drew one of these chips and walked that number of houses, and so on, in each round. At the beginning of the game, each player had 'three lives', represented by the round chips located inside a box identified with 'lives'.

The houses have a reward or penalty, depending on whether the player got the question right or wrong; except House Find Out More, which contained information and/or a curiosity about the drug theme; in this house, there was no penalty, as there was no question. In *House Drugs* the player could walk two houses for a correct answer and should return one for a wrong answer; in *House Friends*, it was necessary to read the situation described and suggest a solution, 'saving' the friend. If the opponent considered the answer to be corrected, the participant earned a life; if he made a mistake, he skipped a turn. In House Enemies, there were questions about various types of drugs and their harm to health; again, if the opponent considered the answer to be correct, the participant did not lose any 'life', but if the answer was wrong, he should transfer a 'life' to the opponent. If the participant fell into the house with a smooth texture, he passed the turn to the opponent. Thus, the game continued until one of the participants reached the end, who was considered the winner.

The research was disseminated after the association of the blind had granted its authorization. Dissemination happened on a large scale and visually disabled people were invited to participate. To enlarge the sample, subjects were collected through the *snowball* technique, in which each participant indicates another one and so forth.

They were invited to visit the university and were organized in pairs, according to the structure

of the game. Thus, they received the game with its components, had free time to explore the material and read the instructions. The investigator did not interfere with the dynamics of the game, which lasted about 50 min, but merely observed the pair of players. The letter 'j' was assigned to the participants, followed by numerals (1, 2, 3...). In total, 30 pairs were constituted, involving 60 subjects, a limited number due to difficulties to join the pairs of players.

To evaluate background knowledge about psychoactive drugs, the researcher interviewed the participants individually and applied a pre-test. Then, the duo played and, soon after, the post-test was applied, also individually. The knowledge assessment instruments consisted of six questions, organized into low, medium and high complexity levels, that is, the higher the complexity, the more elaborate and difficult the question was. The topics covered the concept and classification of drugs, protective and risk Factors and curiosities; categorized into levels of complexity and validated in a previous study on psychoactive substances.[9] The ranking of the questions reveals the participants' level of learning, that is, to know if they have acquired knowledge in a superficial or in-depth way. Hence, in the future, health promotion strategies can be elaborated focused on this knowledge.

The question bank covered the topics of concept and classification, signs and symptoms, harms, protective factors and risk factors regarding drug use. Questions were categorized by level of complexity. For the Knowledge Assessment Tools on the pre and post-test, eight low, two medium and two high-complexity questions were drafted to be divided equally between the two tools, without repeating questions. Thus, each instrument contained a total of six questions, being four of low (B1, B2, B3 and B4), one of medium (M1) and one of high complexity (A1). These assertions should be assessed as true (T) or false (F).

The questions in the pre-test instrument were: B1 - The main reason that leads to drug use is the influence of friends (F); B2 - The population does not consider alcohol and slimming drugs as drugs (T); B3 - The only harm drugs use causes is family abandonment (F); B4 - Cocaine use by pregnant women can cause a miscarriage (T); M1 - People who live with smokers and do not smoke are at risk of developing smoking-associated diseases (F); A1 - The topic drugs should be discussed only in schools with young people, because these are the people who most use drugs (F).

The questions on the post-test were: B1 - Alcohol and tobacco are legal drugs (T); B2 - Parents' strictness can prevent children from using drugs (F); B3 - The practice of sports and participation in religious groups will help you to avoid the use of drugs, (T), B4 - People using injection drugs can be infected by the hepatitis B virus (T), M1 - The sale of so-called legal drugs is prohibited (F), A1 - Robbing, anxiety, restlessness, memory loss can be signs of occasional drugs use (T).

The learning analysis was computed comparatively by the number of hits on the pre - and post-test, when the McNemar test was applied.

This study met the national and international standards of ethics in research involving human beings. Approval was obtained from the Research Ethics Committee, Opinion No. 115.850, Certificate of Presentation for Ethical Assessment - CAAE, registration number 07173712.1.0000.5054.

Results

Sixty visually disabled people participated, with equal frequency of sex, predominant age group of 20 to 29 years (35%) and mean age of 31.5 ± 12.5 years. The predominant range of years of study was between 10 and 12 years (45%), with a mean of 10.8 ± 2.2 years. Next, the number of correct and wrong answers is presented according to the levels of complexity of the questions on the theme psychoactive drugs before and after the educational intervention (Table 1).

A statistically significant difference ($p<0.05$) is observed for the first three questions of low complexity before and after the use of the game. The increase in the number of correct answers after the intervention was greater for question B1 (53.3%). On the other hand, the medium and high complex-

Table 1. Distribution of the number of questions before and after the educational intervention, according to the level of complexity

Complexity	Before		After		p-value*
	Wrong n(%)	Correct n(%)	Wrong n(%)	Correct n(%)	
B1	36(60)	24(40)	4(6.7)	56(93.30)	<0.0001
B2	27(45)	33(55)	10(16.7)	50(83.3)	<0.0001
B3	11(18.3)	49(81.7)	1(1.7)	59(98.3)	<0.006
B4	1(1.7)	59(98.3)	2(3.3)	58(96.7)	1.000
M1	6(10)	54(90.0)	4(6.7)	56(93.3)	0.727
A1	2(3.3)	58(96.7)	3(5)	57(95.0)	1.000

* McNemar test. B - low complexity; M - medium complexity; A - high complexity

ity questions, even though the number of correct answers decreased for each question, did not present significant differences in the number of correct answers before and after, as percentages superior to 90% were obtained on both. Table 2 shows the percentage of correct answers before and after the use of the game, according to the age group.

Table 2. Distribution of the percentages of correct answers before and after educational intervention, according to the level of complexity and age group

Questions	Age Group			
	14-19 Before..After	20-29 Before..After	30-39 Before..After	40-49 Before..After
B1	45.5 81,8	47.6 100	36.4 81,8	29.4 100
*p-value**	0.125	0.001	0.063	0.000
B2	63.6 81,8	66.7 85.7	45.5 72.7	41.2 88.2
*p-value**	0.500	0.125	0.375	0.039
B3	81.8 100	85.7 95.2	81.8 100	76.5 100
*p-value**	0.500	0.625	0.500	0.125
B4	100 100	95.2 90.5	100 100	100 100
*p-value**	1.000	1.000	1.000	1.000
M1	100 72.7	90.5 95.2	81.2 100	88.2 100
*p-value**	0.250	1.000	0.500	0.500
A1	90.9 100	95.2 95.2	100 90.9	100.0 94.1
*p-value**	1.000	1.000	1.000	1.000

* McNemar test. B - low complexity; M - medium complexity; A - high complexity

In the age groups of 20 to 29 years and 40 to 49 years, the difference in accuracy between the pre- and post-test was statistically relevant (p=0.001; p=0.000) for the first question of low complexity, and in the subjects between 40 and 49 years for the second question (p=0.039). Questions B4, M1 and A1 showed a decrease by 9.1%, but these values were not statistically significant. Table 3 shows the difference in the number of correct answers between the pre and post-test, according to the number of years of study.

On the first low-complexity question, all year intervals obtained a statistically representative percentage of correct answers (p=0.002; p=0.000; p=0.031), with the largest number of correct answers in the range of 10 to 12 years, followed by 8 to 9 years and 13 to 16 years. On the second low-complexity question, only the interval between 10 and 12 years showed a statistically significant difference (p=0.000) between the number of correct answers before and after the educational intervention. In question B4, in the range from 10 to 12 years, and A1 in the range of 13 to 16 years of study, the number of correct answers decreased after the use of the game, but this was not statistically significant.

Table 3. Distribution as to the percentages of correct answers on the pre-and post-test, according to the level of complexity and years of study

Questions	Years of study		
	8 to 9 Pre-Post	10 to 12 Pre-Post	13 to 16 Pre-Post
B1	36.8 89.5	33.3 92.6	57.1 100
*p-value**	0.002	0.000	0.031
B2	47.4 63.2	48.1 92.6	78.6 92.9
*p-value**	0.508	0.000	0.500
B3	78.9 100	74.1 100	100 92.9
*p-value**	0.125	0.160	1.000
B4	100 100	100 96.3	92.9 92.9
*p-value**	1.000	1.000	1.000
M1	89.5 100	88.9 88.9	92.9 92.9
*p-value**	0.500	1.000	1.000
A1	100 100	92.6 96.3	100 85.7
*p-value**	1.000	1.000	0.500

* McNemar test. B - low complexity; M - medium complexity; A - high complexity

Discussion

The evaluations of the game were significant in terms of learning, but the study came with some limitations, such as the reduced number of participants, difficulty to gather two visually disabled people at the same time to play, small number of cards, which made it easier to memorize the contents, which can be corrected in future studies by expanding the amount of cards and the contents. The game in this study is low-cost and handmade, favoring its replication and use by health and education professionals, and even during Braille literacy classes for visually disabled people. It can also be elaborated with other themes of interest, broadening its possible uses in health and education institutions. As health educators, nurses need to use

artifacts such as educational games for the sake of health promotion.

In this study, most (45%) participants had between 10 and 12 years of education, which does not represent the reality of visually disabled people in Brazil, but may be related to the place where data collection started (association for the blind) and, consequently, to the "snowball" technique used to sample participants.

A similar educational profile was identified in a study involving 172 participants, which was focused on the quality of life of Dutch visually disabled young adults (18 to 25 years), in which 76.2% held a secondary education degree.[10]

It is known, however, that in Brazil, the disabled population in general has either none or unfinished basic education (61.1%).[11] This can be associated with difficulties to get access to school, adapted material and effective interpersonal relationships, which remain as barriers to inclusion.[12]

In this context, it is necessary to consider aspects that influence visually disabled people's access to health information, such as cognitive support (knowledge, skills and attitudes); social support, with dissemination of information about these clients' reality, family support and articulation of support groups; and technological support demands the dissemination of and access to assistive technologies. All these support axes will directly influence the health promotion of visually disabled people.[13]

Although not a characteristic of the participants in this study, low education is directly associated with drug abuse, which makes visually disabled people also a risk population for this problem.[8] The use of psychoactive drugs is not restricted to individuals with low education though.

Research with medical students showed the use of illicit drugs, marijuana and hashish being the most used both at any time in life (79.7%) and in the past 12 months (12%). Also, they reported on obtaining the drugs at parties (43.1%), with the purpose of relaxing (11.9%) and with frequent use in groups or with another person (77.4%).[14]

The application of the game *Drugs: playing fair* as a strategy to facilitate the collection of information on psychoactive drugs presented positive results, with an index of best answers, on most questions, after the use of the game.

Research with college students showed that they have the knowledge about vulnerability to drug use and the main reasons that lead them to use drugs, are: fun, escape valve, escape from reality, relieve stressful conditions and potentiate learning, attention and memory, pleasure, excitement or feeling of relaxation, emotional state, addiction, family relationship.[15] Still, that knowledge about signs and symptoms of drugs is acquired through third parties, through the media, at school, with friends or in previous experiences.[16]

This acquisition of information needs guidance so as to avoid errors. Playful educational strategies that instigate curiosity and motivation of learning are effective tools for the acquisition of targeted knowledge, which is perceived in the application of "Drugs: playing fair".[17]

Protective factors such as: access to information, dialogue with parents, sports, religiosity are relevant in this context. Health professionals can appropriate these aspects to prevent the use of psychoactive drugs or to rehabilitate users. A study on drugs involving students pointed to religious practice as a protective factor for drug use.[18]

This fact refers to visually disabled people's awareness about the countless damage drugs can cause, in health-related, psychological and psychosocial aspects. The game in this study contained information such as, for example: pregnant women who use cocaine may have a miscarriage because of the substance; individuals who use injectable drugs are at risk of contamination by hepatitis B, C and Aids.

There is still ignorance regarding some injuries though, a fact reported during the games. The players were surprised by some information, evidencing gaps related to the main damage drugs use can cause. Many had some, but superficial and limited knowledge about the harms of drug abuse, but they were unaware of more severe physiological and mental changes. They acknowledge their mistaken perception about the legal drugs used in social life, a fact that may be associated with the lower level of education and with the fact that the pre - and post-test contained only one question of medium complexity, which limits a deeper assessment of learning.

Despite the association between low education and knowledge about licit drugs, realities with better levels of education can show the impact of the use of socially and legally permitted drugs. A study involving 250 Jamaican college students in the areas of Social Sciences, Humanities and Health identified alcohol use in the last twelve months (27.2%) and moderate to high problematic use (10.8%), with a direct association between alcohol use and impaired academic performance (p=0.028).[19]

In the knowledge assessment instrument, there was a question that mentioned the school as the only place where the theme drugs should be discussed. This question revealed the participants' disagreement, who argued that discussion in other places was needed.

The discussion on drug use should not be restricted only to schools and universities, as it permeates a wide range of social spheres. The debate at school on various topics, including drugs, as a form of prevention and early intervention, is important, school being the gateway to adult life.[20]

In Brazil, there are drug prevention programs, but teacher training is necessary.[21] It is expected that, through health education and drug prevention activities with children, they will become adolescents and adults who are less vulnerable to risk behaviors, including drug abuse.

The individuals were able to acquire information about drugs and the questions instigated reflections on the topic in the course of the game. This means that it allowed access to information, and can be used in the learning process and as a health education tool.[7] It is emphasized, however, that just acquiring knowledge is not enough to prevent harmful and abusive drugs use, or even mitigate the recreational use of licit drugs.

During the learning process, some factors can cause either positive or negative interference. Thus, it is relevant to evaluate, in this study, the influence of the age group and education on information acquisition through strategic play. In some questions, the age group was related to the increase in the rate of correct answers between the pre and post-tests. This statistically significant difference prevailed in the age groups of 20 to 29 years and 40 to 49 years, as both age groups showed little knowledge about the subject drugs before the game intervention. This may be related to the fact that individuals in the first age group have already passed the adolescence phase and think they no longer need to have knowledge on the subject or are not at risk of getting involved with drugs. Nevertheless, the study emphasizes that both adolescents and young adults are vulnerable, even if in the academic sphere.[22]

In the age group between 40 and 49 years, it was assumed that the participants would already have greater knowledge about psychoactive drugs and that the game would not stimulate them or contribute to learning, but that was not what came out. It was in this age group that the highest rate of increase in the number of correct answers was found between the pre-and post-tests.

The punctual correct answers given to some questions decreased when related to the age group. Considering that the questions were different in the pre-and post-test, the reduction in the number of correct answers may have been due to misunderstanding of the assertions when the researcher read them or actually to lack of knowledge on the content of that question, which was not even present in the pre-test and may not have been drawn for reading during the dynamics of the game. This decrease was no statistically relevant though.

In this age range, most already have children, nephews, godchildren and feel responsible for knowing the subject, in order to prevent them from getting involved with drugs. The family, which is considered a protective factor, cares about how to educate them, guide them, and how to lead them safely throughout life.[23]

Despite the absence of statistically significant differences at the other complexity levels of the questions assessed, there was an overall increase in the index of correct answers in all age groups after the game, which increases the chance of interest and learning at all ages, showing a valid strategy for health education and health promotion. Not only nurses, but also some other health professionals can use it, as well as educators.

The development of assistive technologies for visually disabled people permeates the interdisci-

plinary contribution, and, when elaborating them, health professionals need to consider the specific needs of each public. In turn, this intersectoral perspective allows reflections in that that there are several usage strategies and formats to construct these technologies. It is up to the professionals to discern the most appropriate to their clientele.

The game is recurrently used as a health education strategy for preventing psychoactive drug abuse.[24,25] Thus, as an assistive technology, it provides the insertion of the visually disabled person in a not only playful, but also informative universe.

Conclusion

The educational game *Drugs: playing fair* contributed significantly to the learning of visually disabled people on the topic of psychoactive drugs, and can be inserted in the health education process. Strategies are important that permit the inclusion of disabled people into information access, enabling them to decide on their health. Adapted educational games should be included in health education practices in any environment.

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Collaborations

Grimaldi MRM, Pagliuca LMF, Almeida PC participated in the conception and design or analysis and interpretation of the data. Grimaldi MRM, Aguiar ASC, Lima MMN, Roscoche KGC, Oliveira PMP, Soares FMM participated in the writing of the article or relevant critical review of the intellectual content. Pagliuca LMF gave the final approval of the version for publication.

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