

Electronic games in child and adolescent health care: an integrative review

Jogos eletrônicos na atenção à saúde de crianças e adolescentes: revisão integrativa

Juegos electrónicos en la atención en salud de niños y adolescentes: revisión integradora

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Abstract

In the current context we find games that involve advanced technologies, such as the use of notebooks, smartphones and video games, whether in the hospital, outpatient, medical clinic, or home setting, these innovative devices are integrated into health promotion, prevention, treatment, and recovery. This study aimed to describe, using an integrative review, the use of electronic games in child and adolescent health care. This was a review of national and international literature; articles published between the years 2007 and 2017, which addresses the implications of electronic game usage. Data collection was performed between January and April of 2018, in the Virtual Health Library (VHL), selecting databases (MEDLINE, LILACS and BDENF) using the VHL Health Sciences Descriptors (DeCS). The following descriptors were used: "Criança hospitalizada/ Hospitalized Child"; "Jogos de vídeo/Video Games"; "Promoção da saúde/Health Promotion". The analysis was performed from the final sample of 11 articles. The literature addresses issues related to the use of electronic games. Issues related to health promotion, prevention, treatment and recovery in situations of chronic diseases, and the stimulation of physical activities were evidenced in the study. This findings showed the relevance for health professionals, especially nurses, to know that electronic games can help in the care for children with acute or chronic diseases, whether or not they are hospitalized.

Resumo

No contexto atual encontramos brincadeiras que envolvem tecnologias avançadas, como o uso de notebooks, smartphones e videogames, sejam no cenário hospitalar, ambulatorial, em clínicas ou em casa, esses dispositivos inovadores estão inseridos na promoção, prevenção, tratamento e recuperação da saúde. Diante do exposto, este estudo tem como objetivo descrever através de revisão integrativa a utilização de jogos eletrônicos na atenção à saúde da criança e adolescentes. Trata-se de uma revisão da literatura nacional e internacional, dos artigos publicados entre os anos de 2007 a 2017, que abordam as implicações do uso de jogos eletrônicos. A coleta de dados foi realizada no período entre janeiro e abril de 2018, por meio de consulta na Biblioteca Virtual em Saúde (BVS), selecionando-se as bases de dados (MEDLINE, LILACS e BDENF) utilizando os Descritores em Ciências da Saúde (DeCS), pela Biblioteca Virtual em Saúde (BVS). Foram utilizados os seguintes descritores: "Criança hospitalizada/ Child Hospitalized"; "Jogos de vídeo/Video Games"; "Promoção da saúde/Health Promotion". A análise foi realizada a partir da amostra final com 11 artigos. Diante dos achados, foi possível identificar que a literatura aborda questões relacionadas na utilização de jogos eletrônicos. Temáticas relacionadas com promoção, prevenção, tratamento e recuperação da saúde em situações de doenças crônicas e o estímulo de atividades físicas, foram evidenciados no estudo. Com isso, percebe-se a relevância que os profissionais de saúde, em especial os de enfermagem, têm em saber que os jogos eletrônicos podem auxiliar no cuidado de crianças com doenças agudas ou crônicas, que estejam ou não hospitalizadas.

Resumen

En el contexto actual, encontramos juegos que incluyen tecnologías avanzadas, como el uso de notebooks, smartphones y videojuegos. Ya sea en el escenario hospitalario, ambulatorio, en clínicas o en casa, estos dispositivos innovadores están incorporados en la promoción, prevención, tratamiento y recuperación de la salud. Ante lo expuesto, este estudio tiene el objetivo de describir, a través de revisión integradora, la utilización de juegos electrónicos en la atención en salud de niños y adolescentes. Se trata de una revisión de la literatura nacional e internacional de artículos publicados entre 2007 y 2017, que abordan las implicaciones del uso de juegos electrónicos. La recolección de datos se realizó en el período entre enero y abril de 2018, por medio de consulta en la Biblioteca Virtual em Saúde (BVS), donde se seleccionaron las bases de datos (MEDLINE, LILACS y BDENF) y se utilizaron los descriptores en Ciencias de la Salud (DeCS), de la Biblioteca Virtual em Saúde (BVS). Fueron utilizados los siguientes descriptores: "Niño hospitalizado/ Child Hospitalized"; "Videojuegos/Video Games"; "Promoción de la salud/Health Promotion". El análisis fue realizado a partir de la muestra final con 11 artículos. Entre los descubrimientos, fue posible identificar que la literatura aborda cuestiones relacionadas con la utilización de juegos electrónicos. En el estudio se observaron temáticas relacionadas con promoción, prevención, tratamiento y recuperación de la salud en situaciones de enfermedades crónicas y el estímulo de actividades físicas. De esta forma, se percibe la relevancia que los profesionales de la salud, en especial los de enfermería, tienen en saber que los juegos electrónicos pueden ayudar en el cuidado de niños con enfermedades agudas o crónicas, que estén hospitalizados o no.

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Introduction

Faced with the need for hospitalization of children and adolescents, ludic activities and playfulness can be strategies that benefit the understanding and promotion of health, and prevention, treatment and recovery. Playing is a childhood activity that is related to motor and emotional, mental and social growth and development. Playfulness and games help with personal training and potentiation of skills.⁽¹⁾

The forms of ludic activities have, over time, been modified due to the influence of the technological advances that present controversial positions in health professionals, with injury caused by excessive use of electronic games and exposure to digital media.⁽²⁾ However, it is undeniable that the number of industrialized and digital toys has been increasing. Children and adolescents currently use electronic equipment as a practice of entertainment, and these objects (television, computer, games and software) are mentioned by them, for ease of handling, as they do not need large spaces or physical activity to use them.⁽³⁾

The relationship of health with electronic devices refers to communication technologies that can cause behavioral change, impact the practice of physical activity and eating habits; it is a synonymous with health informatics, encompassing digital processes, practice of online care, as well as applications and capabilities of mobile devices. It involves services such as electronic medical records, information systems, and telemedicine, among others. One of the tools of electronic health is the electronic intervention, which consists of the promotion, prevention, treatment and management of physical and mental health, with or without the support of the human being, stimulating the child and the adolescent to have healthy behaviors and reduce the health problem. Among the interventions, electronic games are effective because of their attractiveness and entertainment for members of this population, improving the knowledge and abilities related to the care for their own health.⁽⁴⁾

In view of the above, it was defined as an objective to describe, by means of an integrative re-

view, the use of electronic games in the health care of children and adolescents.

Methods

This was an integrative review of the literature, a method that enables the collection and analysis of support in the literature, in a broad and systematized manner. Integrative review is a method that aims to synthesize findings obtained in research on a topic or issue, in an orderly and comprehensive manner.⁽⁵⁾

The six steps followed were: 1- Problem identification with description of the research question; 2- Search in database and virtual libraries using descriptors; 3- Tabulation of the studies; 4- Individual reading of the entire texts for critical analysis in relation to the objective of this research; 5- Interpretation of results; and 6- Synthesis of knowledge.⁽⁶⁾

The first step was problem identification with determination of the research question: what is the latest scientific evidence about implications of the use of electronic games in the promotion of health, and prevention, treatment and recovery?

The second step consisted of searching for articles in the Virtual Health Library (VHL) databases: Latin American and Caribbean Literature in Health Sciences (LILACS), Medical Literature Analysis and Recovery System (MEDLINE) and Nursing Database (BDENF). The time continuum included articles published between 2007 and 2017, in order to highlight the most recent publications on the subject. The search for articles was based on the selected descriptors, guided by the following inclusion criteria: articles in the Portuguese and English languages, addressing the main theme, involving video games for health promotion, prevention, treatment and recovery of children and adolescents, available in full text, and addressing the research question.

As exclusion criteria, studies not related to the research question, letters to the editor, duplicates, review articles, theses, dissertations, opinion articles, comments, trials, prior notes, and manuals were not included in the study. Data collection took

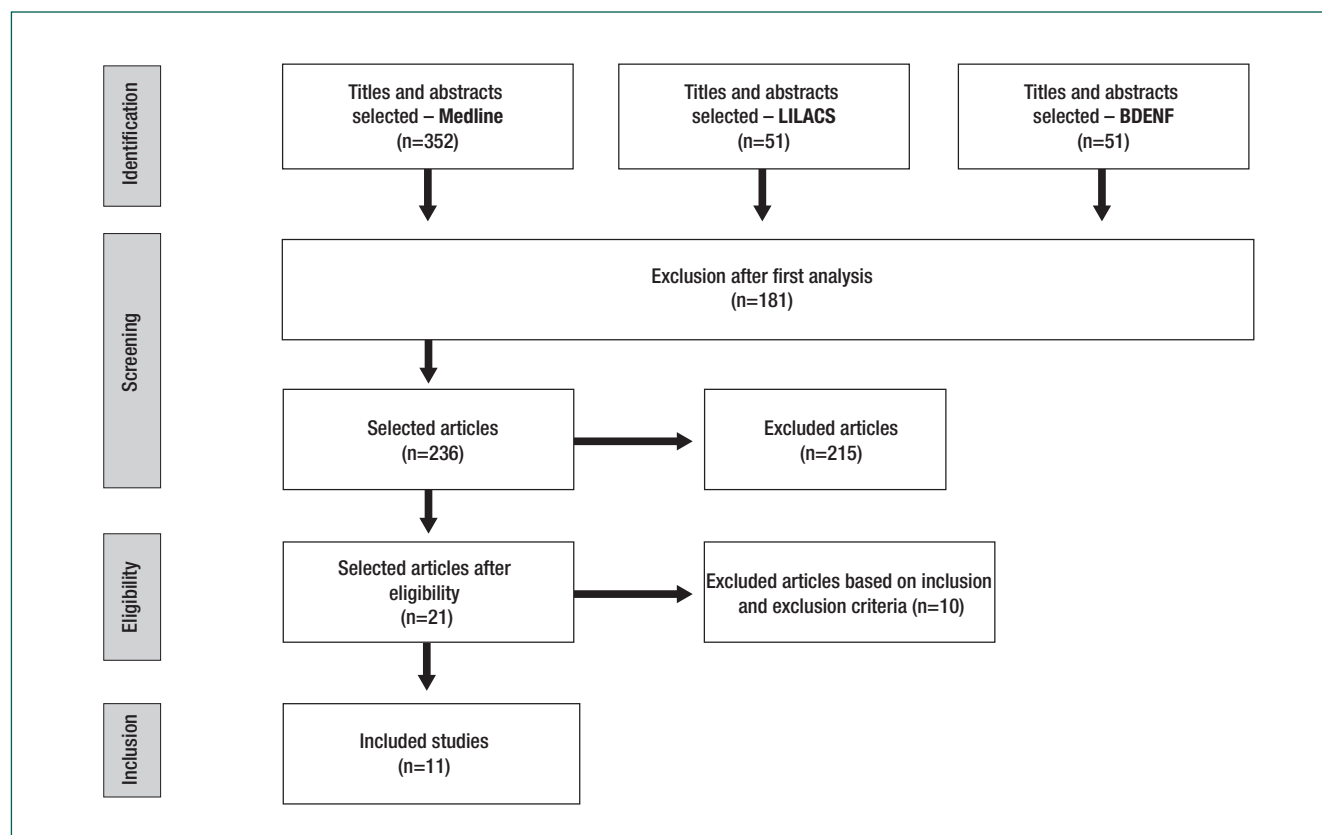


Figure 1. Flowchart of the search process and selection of the studies

place during the period of January through April of 2018. The survey was conducted using the health descriptors available in the Portal of Health Sciences Descriptors (DeCS) in the VHL.

The selection of the descriptors was guided by their proximity to the object in question. The following combinations were determined: *hospitalized children AND video games*; *hospitalized children AND health promotion*; *video games AND health promotion*; *hospitalized children AND video games AND health promotion*.

The third step consisted of tabulating the studies in Microsoft Excel® 2010 software, to organize and summarize the central information, constituting a database, enabling the analysis of the applicability of the review, which had the following variables: article number (N), title, authors, country of study, year of publication, types of games/conclusion, and use of video games in child and adolescent health care.

Next, the fourth step was composed of individual reading of the complete articles, for criti-

cal analysis in relation to their adherence to the object of this research. After defining the final number of articles to compose the review, the fifth and sixth steps were performed, which concerned the grouping of the findings (evidence) into internally homogeneous and heterogeneous categories, for later synthesis of knowledge. After the process of selection and identification of the studies, 11 articles were selected, demonstrated by figure 1.

Results

Chart 1 shows the descriptions, indicating the title, authors, country, year of publication, types of games, and findings. Among the 11 articles included in the study, three were from 2014, the year with most publications, two articles were published in 2013, as well as in the years 2015 and 2016, followed by the years 2012 and 2011, each with only one published article.

Chart 1. Articles, according to the title, authors, country, year, types of games and findings

N	Title	Authors	Country, year	Types of games/ Conclusion
1	Play as a care strategy for children with cancer.	Lima KYN, et al. ⁽⁶⁾	Brazil/ 2015	Types of games: Video games, use of television, computer, conventional toys, drawings, and activity in the toy library. Conclusion: Such activities provide fun, feelings of joy, distraction, and interaction with others by reducing the stressful effects of hospitalization.
2	Serious game development as a strategy for health promotion and tackling childhood obesity	Dias JD et al. ⁽⁷⁾	Brazil / 2016	Types of games: serious electronic games about healthy eating, practice of physical exercises, and changes in life habits. Conclusion: great educational potential (technologic resource) that can be used by the public in schools and health facilities.
3	Diabetic Mario: designing and evaluating mobile games for diabetes education.	Baghaei N, et al. ⁽⁸⁾	New Zealand, 2016	Types of games: mobile devices about healthy diet and lifestyle. Conclusion: Diabetes-related knowledge, using games, can facilitate children's talking with health professionals about their self-management practices
4	Preventing adolescents' diabetes: design, development, and first evaluation of "Gustavo in Gnam's planet"	Marchetti D, et al. ⁽⁹⁾	Italy/ 2015	Types of games: online games about healthy diet and prevention of metabolic diseases. Conclusion: Games about health can be effective in childhood and adolescence. Increased nutritional knowledge lead to possibilities of changes in food behavior.
5	Novel methods to collect meaningful data from adolescents for the development of health interventions	Hieftje et al. ⁽¹⁰⁾	2014	Types of games: video games for the guidance of sexually transmitted diseases for adolescents. Conclusion: Video games (storytelling using graphic illustration, my life and photo feedback project) are effective tools for the development of health interventions with adolescents
6	Active video game play in children with cerebral palsy: potential for physical activity promotion and rehabilitation therapies.	Howcroft J, et al. ⁽¹¹⁾	Canada, 2012	Types of games: Active video games (AVGs) to stimulate motor learning and neuromuscular reeducation in children with cerebral palsy. Conclusion: AVGs can be strategically chosen to address specific therapeutic goals.
7	Video game play, child diet, and physical activity behavior change a randomized clinical trial.	Baranowski T, et al. ⁽¹²⁾	Canada/2011	Game Types: epic video games, comparable to commercial quality video games about diabetes. Conclusion: Children who played these video games increased fruit and vegetable intake per day, but did not increase water consumption or physical activity.
8	Mixed reality virtual pets to reduce childhood obesity.	Johnsen K, et al. ⁽¹³⁾	United States, 2014	Types of games: Game with a virtual pet that was designed around the concept of a virtual animal clinic. where obese pets needed physical exercise. Conclusion: It is believed that these rewards are more likely to promote future and self-motivated physical activities, leading the children to have healthier weights.
9	An investigation of the impact of regular use of the Wi Fit to improve motor and psychosocial outcomes in children with movement difficulties: a pilot study.	Hammond J, et al. ⁽¹⁴⁾	United Kingdom, 2014	Types of games: active games that focus on balance and coordination. Conclusion: Use of balance games for 10 minutes, three times a week, in a school setting over a period of one month can lead to gains in motor proficiency, perception of motor skills, and emotional well-being.
10	Using a robot to personalize health education for children with diabetes type 1: A pilot study.	Blanson, HOA, et al. ⁽¹⁵⁾	The Netherlands, 2013	Types of games: Autonomous and programmable humanoid robot that contributes to the knowledge of childhood diabetes. Conclusion: Use of information technology is positively related to high levels of skill and control; high levels of challenge, fun, and excitement; motivation, attention, and focused engagement.

Discussion

Analyzing the findings of the sample, it was possible to identify that the literature addresses issues related to the use of electronic games and play activities that help in health promotion, and in prevention, treatment and recovery of children and adolescents, which enabled the demarcation of two categories: electronic games in chronic disease care, and electronic games in care related to physical activity.

First category: electronic games in chronic disease care

For composition of this category, studies of numbers one, two, three, four, seven, and ten were used. Our review included articles showing that, through electronic games, promotion and prevention related to healthy eating,⁽⁷⁻⁹⁾ and control of diabetes mellitus (DM)^(12,15) were sought. Childhood obesity and DM have gained national and international

recognition as public health problems, and threats to the future of our population. Therefore the results of our study show relevance with the use of electronic game technology, which through health education, seeks to improve control of these morbidities and future minor- macro- and micro-vascular complications.

Scientific evidence has been identified on the effectiveness of computer games and dynamics for health promotion, such as oral health education and eating habits; on prevention of diseases and injuries, such as the prevention of obesity and skin cancer; and for management of a chronic disease, such as asthma. In addition, the games also showed an improvement in the cognitive functioning of the child, and can be used in memory training, and the development of analytical and strategic skills.^(16,17)

A study in New Zealand found that patients using electronic games understood more about healthy diet and lifestyle, and also reported that the blood

sugar indicator was easy to understand, demonstrating that the game helped them better understand the changes in blood sugar levels, according to their choices.⁽⁸⁾ The knowledge related to one's own medical condition through the game simplifies the children's conversation with health professionals, developing in them the sense of self-management practices.

In addition, researchers report that health professionals, who used playing as a negotiating tool for approaches that represented the biomedical model in the care of hospitalized children, indicated that the method facilitates the work process to deal with suffering.⁽¹⁸⁾ In this sense, the use of an electronic robot toy can favor the perception of children, by assimilating knowledge about DM. This study aimed to evaluate the effectiveness of playful interventions as mediators in health education, promoting learning and behavior change.⁽¹⁵⁾

Second category: electronic games in care related to physical activity

For composition of this category, studies of numbers two, six, seven, eight, nine and 11 were used. It is already known from the literature that the practice of physical exercise improves circulation and prevents diseases in children, and that the advancement of technology and use of mobile phones can leave children with a propensity for a sedentary lifestyle.⁽²⁾

The study revealed a variety of serious health games that stimulate the practice of physical activity and have the potential to increase motor learning, and improve physical rehabilitation.^(11,19) In this aspect, we sought to verify the use of video games as a strategy for the practice of complex motor activities, in conventional physical therapy with children with cerebral palsy, it was found that video games enabled increased levels of activity, and improved confidence, social relationships, and abilities. The video game contributes to the development and maintenance of cognitive function and physical therapy, as it improves health care if the child with improved motor performance through postural control and balance, agility of movement, and communicative skills.⁽²⁰⁾

Contradicting that electronic games can make children more sedentary, an intervention was performed using games with dance, which concluded that this attitude adopted in schools can encourage positive behaviors at home.⁽¹⁶⁾ Therefore, children and adolescents in the digital age should be encouraged to promote healthy lifestyles using electronic games, associating the desire of playing with the need for physical activity. These attitudes can cause changes in the relationships, behaviors, and routines of all people. Identifying the possible benefits that these devices can bring to health care is essential, for professionals to use these resources as strategies for actions of promotion, prevention, treatment and recovery with children and adolescents.

Final considerations

The development of this study enabled an understanding of the implications of the use of electronic games that are currently influencing health promotion, and the prevention, treatment and recovery of children and adolescents. Most of the articles were related to health promotion and prevention of chronic diseases, essentially diabetes mellitus and obesity. In terms of treatment and health recovery, the use of electronic games that stimulated physical activity was especially revealing. A study on sexually transmitted diseases in the adolescent population was identified. This review contributed to the need for health professionals to be vigilant in assisting children and adolescents in using the latest technologies, so that their health/illness condition is improved or restored with the resources available in the current contemporary scenario. The importance of the multiprofessional team was identified, especially the nurse on several occasions while the child was hospitalized; she has the role of educator using therapeutic toys, encouraging play in the unit's available toy library, and motivating the interaction between children and families. This research can provide support for further research and future experimental studies in pediatric units. These findings showed the relevance that the health professional has in knowing that electronic games

bring different benefits to children who are or are not hospitalized, recognized these particularities and theoretically deepened the theme, and updated the provision of care in a resolute and integral method. The limiting factors of this study was the scarceness of controlled studies that evaluated the factors of electronic games in the process of health promotion, and prevention, treatment and health recovery of children and adolescents.

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