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REVIEW

Educational technologies for health education on stroke: an integrative review

Tecnologias educativas para educação em saúde no acidente vascular cerebral: revisão integrativa

Tecnologías educativas para educación en salud en el accidente cerebrovascular: revisión integrativa

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ABSTRACT

Objective: to identify in the scientific literature the educational technologies used in the health education process related to stroke. **Method:** integrative review, whose eligibility criteria of the articles were: match the keywords "health education" and "stroke"; be a research paper; be in Portuguese, English and Spanish; be available electronically in the databases LILACS, PubMed/Medline, Scopus and CINAHL; year of publication between 2000 and 2016. **Results:** 24 publications were found. The analysis was carried out by means of analytical and interpretive readings. There were many educational technologies used in the health education process for stroke. **Final considerations:** the printed material for general public stood out, aiming to the recognition of alert signs of the disease and the emergency decision-making before suspicious cases of the disease.
Descriptors: Stroke; Education in Health; Educational Technology; Nursing; Care.

RESUMO

Objetivo: identificar na literatura científica as tecnologias educativas utilizadas no processo de educação em saúde relacionadas ao AVC. **Método:** revisão integrativa, cujos critérios de elegibilidade dos artigos foram: corresponder aos descritores "*health education*" e "stroke"; ser artigo de pesquisa; estar nos idioma português, inglês e espanhol; estar disponível eletronicamente nas bases de dados LILACS, PubMed/Medline, Scopus e CINAHL; ano de publicação referente ao período de 2000 a 2016. **Resultados:** encontraram-se 24 publicações. A análise ocorreu mediante leituras analítica e interpretativa. As tecnologias educativas utilizadas no processo de educação em saúde para o AVC foram múltiplas. **Considerações finais:** sobressaíram os materiais impressos destinados ao público em geral, visando o reconhecimento dos sinais de alerta da doença e a tomada de medidas emergenciais diante de casos suspeitos da doença.
Descritores: Acidente Vascular Cerebral; Educação em Saúde; Tecnologia Educacional; Enfermagem; Cuidado.

RESUMEN

Objetivo: identificar en la literatura científica las tecnologías educativas utilizadas en el proceso de educación en salud relacionadas al AVC. **Método:** la revisión integrativa, cuyos criterios de elegibilidad de los artículos fueron: corresponder a los descriptores "*health education*" y "*stroke*"; ser artículo de investigación; estar en el idioma portugués, Inglés y Español; estar disponible electrónicamente en las bases de datos LILACS, PubMed/Medline, Scopus y CINAHL; año de publicación para el período 2000 a 2016. **Resultados:** se han encontrado 24 publicaciones. El análisis ocurrió mediante lecturas analíticas e interpretativas. Las tecnologías educativas utilizadas en el proceso de educación en salud para el AVC fueron múltiples.

Consideraciones finales: se sobresalieron los materiales impresos destinados al público en general, buscando el reconocimiento de los signos de alerta de la enfermedad y la toma de medidas de emergencia ante casos sospechosos de la enfermedad.
Descriptores: Accidente Vascular Cerebral; Educación en Salud; Tecnología Educativa; Enfermería; Cuidado.

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INTRODUCTION

Stroke is a clinical syndrome of sudden development, resulting from the interruption of blood flow to the brain, due to a ischaemia or a bleed, causing focal or global neurological damage[1-2].

Today, stroke is the main cause of mortality in Brazil and the world, being responsible for a great number of hospital stays for adults and elderly. In addition to mortality, another equality important measure of stroke's impact are the neurological sequelae, since the great majority of victims of stroke develops full or partial defects[3-4].

Due to the high morbidity and mortality, in recent decades, there has been a concentration of efforts to make the stroke a medical emergency, for which it was provided clinical treatment for ischemic stroke by thrombolytic agents, in order to decrease or reverse physical disabilities[5]. Despite such therapeutic advances, the incidence of the disease has not decreased, indicating that actions of prevention and health promotion are indispensable, especially those that help to raise awareness about the disease, the risk factors and treatment[6].

Regarding the stroke, scientific evidences point that the prevention and health promotions action must be a priority. One of the reasons for this is the limitation of knowledge about the disease by the general public and among patients affected by the disease[6-7]. Thus, the use of educational technologies directed to health education on stroke becomes an important educational tool which, in addition to providing information, seeks to raise the individual behavior change in lifestyle, in control of modifiable risk factors and in adherence to drug treatment.

It is understood technology as a set of knowledge and practices related to products and materials that define therapeutics and work processes, as well as constitute tools to perform actions on health promotion. The technologies can be classified into: Educational Technologies (devices for measuring the processes of teaching and learning), *Care* Technologies (devices for measuring the processes of care) and Management Technologies (devices for measuring the processes of management in the various health systems)[8].

From this perspective, and in view of the complexity of the disease, the nurse who assists the patient with stroke is constantly challenged to develop and use educational technologies in order to make it easier the process of health education of patients, family members and caregivers. Such resources raise awareness about the disease and treatment, in addition to fostering self-care[9].

For this, it is necessary to deepen the theory about the theme. In this sense, the Evidence-Based Practice (EBP) has been an important ally, because it uses research findings on health care. In this, the integrative literature review is one of the research methods used and aims to gather and synthesize results of research on a particular theme or issue, in a systematic and organized way[10].

Based on the aspects mentioned, it is expected that this bibliographic research can contribute to the nurse's critical reflection on health promotion of patients with stroke and of their family members, as well as support the educational activities of nursing directed to this neurological disease.

OBJECTIVE

To identify in the scientific literature, the educational technologies used in the health education process related to stroke.

METHOD

Ethical aspects

The current study was not submitted to the Research Ethics Committee, because it is an integrative review.

Design, study location and period

This is a study of the integrative literature review type, which allows you to carry out the search, the critical evaluation and the synthesis of results of research on a topic studied, contributing to improve the knowledge and to implement effective interventions effective on health care[10].

To conduct this integrative review were followed the steps: to identify the research question (through the guiding question), to establish the criteria for inclusion and exclusion of studies, to define the information to be extracted from the studies, to evaluate the data, to present and understand the results[10].

The guiding question was: "Which are the educational technologies used in the health education process related to stroke?" For articles' selection, we used online access in four databases: LILACS (Latin American Literature in Health Sciences), PubMed/Medline (National Library of Medicine), Scopus - Multidisciplinary Database and CINAHL (Cumulative Index of Nursing and Allied Health Literature).

The articles' research was conducted between September and December of 2016, using the controlled keywords "health education" and "stroke", mediated by the Boolean operator "and", aiming to extend the qualitative of studies. The keywords were extract from DeCS (Health Sciences Descriptors of the portal BVS and MeSH (Medical Subject Headings) of National Library.

Samples, inclusion and exclusion criteria

Inclusion criteria established for the review were research articles: published between 2000 and 2016, written in Portuguese, English and Spanish, available online in full and which addressed the use of educational technologies related to health education of the stroke. Were excluded: editorials, letters to the editor, reflective studies, as well as studies that addressed themes relevant to the object of the study.

A total of 343 scientific articles were found in the four databases mentioned. However, the final sample consisted of 24 publications,

which met the criteria established. The articles were excluded for the following reasons: do not answer the guiding question of this study, be repeated and do not be considered a research article.

Study protocol

To analyze and synthesize the articles selected, it was used the form adapted from the study[11], which was filled out for each article of the final sample, consisting of the following information: article identification (article title, journal title, authors, country, language and year of publication), type of scientific publication, objectives, methodological features of the study (type of publication, objective, sampling, used/developed technology) and results.

Analysis of results and statistics

The data analysis was carried out based on exploratory, selective, analytic and interpretative reading of articles that composed the final sample of the integrative review. The results were presented by charts and tables and discussed in the appropriate literature.

RESULTS

Of the selected articles, 10 were found in basis CINAHL, 5 in PubMed/Medline, 3 in LILACS and 6 in Scopus. Among them, 14 were published in medical journals, 2 in nursing publications and 8 in publication of other areas. Eleven articles were drawn up by doctors, six for nurses in partnership with doctors, two by other health professionals and just one for nurses. In four publications, was not possible to identify the professional category of authors.

With respect to the methodological design, 7 articles were classified as controlled randomized clinical trial, 1 as quasi-experimental study, 9 as descriptive study with quantitative approach and 7 did not cite the type of study in the methodology. American publications were the prevalent, with a total of 13 articles. The English language prevailed in 21 studies. Only two articles were in Spanish and one in Portuguese. The year of publication prevalent was eight-2012, with 8 publications, followed by 2009 and 2008, with three publications each year.

Based on studies analysis, the characterization of the articles was made from the authors, year of publication, objective of the study, type of technology used and target audience involved. This characterization is presented in Chart 1.

Table 1 shows the types of technologies used in the studies of the review, in addition to the target audience involved in the educational process.

The themes approached in the educational technologies are shown in Table 2.

Chart 1 – Presentation of articles included in the integrative review according to the authors, year of publication, objective, technology/intervention developed and target audience, Fortaleza, Ceará, Brazil, 2016

Nº	Authors/year	Objective of the Study	Educational technology	Target audience
1	Ishigami, et al (2016)[12]	To evaluate the effectiveness of educational materials developed for children of elementary school in conveying information about stroke.	Lecture, video and comics	General population
2	Chan, *et al* (2015)[13]	To evaluate the effectiveness of methods in health education on stroke.	Video, manual and lecture	General population
3	Sakamoto, et al (2014)[14]	To evaluate the effectiveness educational materials in health education on stroke, for children.	Comics	General population
4	Miyamatsu N, et al. (2012)[15]	To evaluate the knowledge of the symptoms of stroke from televised education campaign.	Televised media	General population
5	Brown DL, et al (2012)[16]	To evaluate the effectiveness of an educational intervention in church to reduce risk factors of stroke.	Video, manual and lecture	General population
6	Santos AMB, Oliveira TP, Piemonte MEP (2012)[17]	To draw up and apply a manual of home exercises for stroke patients.	Manual	Patients with stroke
7	Williams O, et al. (2012)[18]	To evaluate the impact of a musical intervention and of other technologies in heath education about stroke, for children.	Music (Hip Hop), cartoons, electronic games, comics, lecture.	General population
8	Cruz TV, et al. (2012)[19]	To evaluate the impact of an educational intervention for early identification of symptoms of stoke.	Lecture and posters	Patients with stroke
9	Goldfinger JZ, et al (2012)[20]	To evaluate educational intervention in patients with stoke for controlling the modifiable risk factors.	Lecture	Patients with stroke
10	Williams, O, et al. (2012)[21]	To evaluate the impact of an educational program on parents of children applied for an intervention of orientation about stroke.	Music (Hip Hop), cartoons, electronic games, comics	General population
11	Williams O, et al (2014)[22]	To evaluate educational intervention based on an electronic game for improving the knowledge in children about stoke.	Electronic games	General population
12	Álvarez, et al (2011)[23]	To evaluate the effectiveness of an educational intervention for caregivers of stroke patients after hospital discharge.	Lecture and flyers	Caregivers
13	Holzemer EM, et al (2011)[24]	To evaluate educational plans for controlling the risk factors and lifestyle changing in post-stroke patients.	Flyers and telephone advice	Patients with stroke or TIA

To be continued

Chart 1 (concluded)

Nº	Authors/year	Objective of the Study	Educational technology	Target audience
14	Davis SM, et al (2009)[25]	To evaluate messages about stroke and long-term message retention.	Poster	General population
15	Müller-Nordhorn, et al (2009)[26]	To reduce delays in the search for emergency care through population-based educational intervention.	Flyers	General population
16	Bell M, et al (2009)[27]	To evaluate educational intervention in elderly for improving knowledge about acute myocardial infarction and stroke.	Lecture	General population
17	Kleindorfer D, et al (2008)[28]	To develop and evaluate educational intervention for black women in beauty salons.	Manual and flyers	General population
18	Skidmore ER, et al (2008)[29]	To evaluate the impact of an educational program about stroke in a rehabilitation clinic.	Lecture and flyers	Patients with stroke
19	Wall HW, et al (2008)[30]	To evaluate educational program for improving the knowledge about stoke among women between 40-64 years.	Video and flyers	General population
20	Green T, et al (2007)[31]	To evaluate the impact of individual patient-nurse interview on acquiring knowledge about stroke.	Manual	Patients with stroke
21	Villarroel, et al (2007)[32]	To report the experience of an educational lecture for caregivers of patients with stroke.	Lecture	Caregivers
22	Handschu R, et al (2006)[33]	To evaluate the knowledge about stroke and the risk factors after an educational lecture.	Lecture	General population
23	Jiang B, et al (2004)[34]	To evaluate the impact of an educational intervention in the post-stroke survival and the recurrence of the disease.	Lecture, manual and flyers	General population
24	Nassif KR, et al (2002)[35]	To evaluate the use of teleconference between health professionals.	Conference Call	Health professionals

Note: AVC – Acidente Vascular Cerebral.

Table 1 – Educational technology distribution according to the type and target audience present in the study of the integrative review, Fortaleza, Ceará, Brazil, 2016

Educational technology	n	%
Educational technology type		
Printed materials	17	70.8
Educational lecture	15	62.5
Electronic Materials	10	41.6
Music	2	8.3
Television	1	4.2
Phone call	1	4.2
Target audience of the educational process		
General population	14	58.3
Patients	6	25.0
Caregivers	3	12.5
Health professionals	1	4.2
Total of studies	24	

Table 2 – Themes about stroke featured in the educational technologies according to the articles of the integrative review, Fortaleza, Ceará, Brazil, 2016

Themes	n	%
Definition of stroke/ Organ affected in stroke	17	70.8
Identification of signal and symptoms of stroke	14	58.4
Modifiable risk factors for stroke	12	50.0
Attitude before a stroke	12	50.0
Preventive measures for stroke	10	41.7
Acute ischemic stroke treatment	6	25.0
Basic activities of daily living (ADL)	4	16.7
Total of studies	24	

Note: AVC – Acidente Vascular Cerebral.

DISCUSSION

In view of the complexity of stroke – being a disease that manifests suddenly, with high potential for sequelae and disabilities, and which has a significant social impact for patients and their family members[36] – the theme was addressed in the studies through educational interventions aimed to promote health and prevent the occurrence of new cerebrovascular events. In order to that, educational strategies were used to facilitate the dissemination of information on stroke, seeking meaningful learning[37].

In this context, the educational technologies were necessary and relevant, since they provided information that improves the knowledge and the combat of the patients, making them able to understand how their own actions influence their health standard[38].

Based on the findings, most studies used more than one type of educational technology. However, printed materials and lectures were more prevalent. It was observed that the application of technologies was followed by evaluations at different time intervals to evaluate the improvement of knowledge. The studies, in which the retest occurred in up to three months, were the ones who presented more satisfactory results when compared to longer periods. The printed materials that stood out were the manuals, flyers, wallet cards, comics and poster. Among the electronic resources, are the teleconference, electronic games and videos.

There was a prevalence of publications aimed to the general population, that is, directed to the primary prevention of stroke, in order to teach them to prevent the disease and to identify early characteristic neurological symptoms. It was identified studies that target specific populations at increased risk of stroke, such as black women and the elderly. Other studies were aimed to children and teenagers.

It was noted application of technologies in many places, such as churches and beauty salons, which aimed to improve the knowledge of the population about stroke and control of modifiable risk factors. With the same approach, it was observed the use of phone calls and educational campaigns in televised media.

It should be emphasized that the studies reported the importance of dealing with the stroke as a clinic emergency, for which there is available treatment based on thrombolytics, in case of for acute ischemic stroke. Another aspect emphasized was that to identify early the symptoms and to call emergency immediately is highly recommended because it gives agility in service and enables the patient to make use of thrombolytic therapy in proper time. It is known that this treatment is recommended only in the first 4.5 hours of onset of symptoms of ischemic stroke.

Articles for stroke patients, caregivers and health professionals were in lower number. Among the patients, the main goal was to control modifiable risk factors and preventive measures. Some studies have cited the use of behavioral theories such as Social Cognitive Theory and the Health Belief Model, to support the implementation of educational technologies, with a view to changing behavior in face of the control of risk factors for stroke and adoption of healthy habits.

The studies directed to caregivers and family members reported the use of educational technologies in the preparation of the hospital discharge and home care, especially those related to daily life activities.

The process of health education for patients with stroke and their family members is essential in the fight against the illness situation imposed by the disease. In addition to the supply of materials, commonly printed, instrumental support for the development of knowledge and skill is part of the preparation of patients and family caregivers to live with chronic condition[39].

With regard to health professionals, the topic discussed was the application of teleconference for training on the treatment of the acute stage of stroke, through the use of thrombolytics.

The importance of addressing the health education about stroke lies in the fact that this is one of the key features aimed to reduce new cases of the disease and recurring events. It is recommend at least five components that must be included in the educational plan about stroke: risk factors, alert signs and symptoms, triggering emergency medical service on suspicion of stroke, long-term post-stroke care and drug treatment adherence[40]. Such contents were referred to in articles of the integrative review; However, the mentioned themes were the definition of stroke and the affected organ, the recognition of signs and symptoms, the risk factors and the emergency action on suspicion of stroke.

Few publications have cited the source of theoretical basis used in technology. Only a few studies have reported the use of international guidelines on stroke proposed by the American Heart Association, American Stroke Association, National Stroke Foundation and Japan Stoke Association. Only one study reported, on the methodology, the validation process of the material with target audience. Other studies have highlighted the FAST method (Face, Arm, Speech, Time) to make the recognition of stroke faster, by the lay audience, where: F means asymmetry on the face; A means weakness or loss of movement in the arms; S means speech defects; T means time to trigger emergency service if any of the signs are abnormal, based on the Cincinnati Prehospital Stroke Scale.

Educational technologies about stroke need to contain reliable information, as well as to present content in ways that people can understand what is transmitted and use this knowledge over time, according to their educational needs[39]. To that end, a fundamental element is the quality of the educational material, which requires the use of language and illustrations compatible with the culture and schooling of the target audience, in order to seek an easy understanding of the subject[40-41].

In addition, it is essential to consider the educational intervention for stroke patients with neurological deficits. In this case, the material to be used needs to be adapted and the nurses' practice must be qualified to meet the educational demands of the patients in this condition. In order to achieve good results, family members and caregivers should be involved in the process[42].

Hence, the educational technologies have to be developed and validated[43], since an educational material produced effectively can change the reality of a population[44]. In studies of the integrative review, only one study mentioned the technology validation process; the others just cited the use.

Another aspect noted is that studies that used oral ways to guide, such as lectures, had unfavorable outcomes specially in the change of behavior in relation to risk factors, in the difficulty in retaining information and in the behavior change itself.

So for successful educational experiences it is necessary to identify the educational needs of individuals and select educational resources with features that fulfills the expectations of the target audience[45].

In this context, to disseminate information about stroke is not enough to solve the problem. It is necessary that these be in accordance with the educational needs of the population. Thus, it is essential that the educational activities be planned and implemented according to the needs of each situation of illness, through clear objectives that lead to goals established[46-48]. The educational technologies are indispensable in the practices of health education, because they insert the individuals in the educational process, help empower those involved in and facilitate the development of personal skills that will maintain and improve health[49].

The studies were carried out with different populations, using many educational technologies to effectively send messages that allow the public to recognize alert signs of stroke and trigger the emergency mobile service. On the issue about the health education in stroke, it is necessary to compose messages for different audiences through multiple media. So it becomes necessary to identify the educational needs of the individuals and select educational resources with features that meet the expectations of the target audience, and be culturally and linguistically compatible with the target group[50].

Study limitations

Much of the scientific knowledge produced about the use of educational technologies aimed to the stroke comes from other countries, especially the developed ones. These are studies made with people of different cultures and races, and using a different healthcare system from the Unified Health System (SUS), which presents some obstacles in the care of people with stroke.

Another point that must be emphasized is that the technologies used in the health education of stroke were mostly printed materials that require reading skills and text comprehension, which might have difficulties to be implemented, due to in limited health literacy evidenced in the Brazilian population. Therefore, in the preparation of such materials, it is necessary to adapt the scientific knowledge in messages easy to understand, so that they can be widely used by the target audience.

In recent years, advances have been made to improve health assistance to the stroke. So the use of educational interventions mediated by technologies became urgent, and these must be adapted and applied to the Brazilian context, to facilitate health education on the subject.

Contributions to nursing area, health and public policy

It is pointed out that the results of this investigation may improve research that make use of educational technologies in the process of health education in the context of stroke, especially in nursing, contributing to practice based on evidence. And yet, subsidize the nurses' practice in the health education process of people, related to the disease.

FINAL CONSIDERATIONS

There were many educational technologies used in the health education process for stroke, identified in this study. The printed material for general public stood out, aiming to the recognition of alert signs of the disease and the emergency decision-making. The studies with patients used educational interventions in order to change the behavior related to stroke, focusing on controlling risk factors and adopting healthier lifestyle to prevent other cerebrovascular events from happening. Regarding the caregivers, the focus was on the training for the hospital discharge.

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