

## Educational Technologies Focused on the Chronic Renal Patients Aiming to the Self-Care Promotion

Tecnologias Educacionais Direcionadas para Pacientes Renais Crônicos na Promoção do Autocuidado

La Tecnología Educativa Dirigida a los Pacientes Renales Crónicos en Promoción del Autocuidado

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### ABSTRACT

**Objective:** The study's purpose has been to identify the technologies focused on the health education of chronic renal patients aiming to promote the self-care. **Methods:** It is an integrative review that was performed in the databases LILACS, MEDLINE, SCOPUS, CINAHL and in the COCHRANE Library, where the final sample consisted of 16 articles. **Results:** The publications occurred between 2008 and 2016, prevailing studies with level III of evidence. The findings showed that the technologies used in health education for the promotion of chronic renal patient self-care used written materials (brochures, booklets and handouts), audiovisuals (videos, website, PowerPoint presentation, soap opera and interactive CD) and educational games as a communication vehicle. **Conclusion:** Among the articles that brought out these technologies, it was not verified their occurrence in the Brazilian scientific literature, then configuring a knowledge gap in that country.

**Descriptors:** Health Education, Self-Care, Chronic Renal Insufficiency.

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## RESUMO

**Objetivo:** C: Identificar as tecnologias direcionadas para a educação em saúde de pacientes renais crônicos para a promoção do autocuidado.

**Métodos:** Trata-se de uma revisão integrativa realizada nas bases de dados LILACS, MEDLINE, SCOPUS, CINAHL e na Biblioteca COCHRANE, sendo a amostra final composta por 16 artigos. **Resultados:** As publicações ocorreram entre 2008 e 2016, prevalecendo estudos com nível III de evidência. Os achados mostraram que as tecnologias utilizadas na educação em saúde para a promoção do autocuidado do paciente renal crônico utilizaram materiais escritos (folhetos, livretos e apostilas), audiovisuais (vídeos, website, apresentação de Power point, telenovela e CD interativo) e jogos educacionais como veículo de comunicação. **Conclusão:** Dentre os artigos que trouxeram essas tecnologias, não foram representantes na literatura científica brasileira, configurando-se uma lacuna de conhecimento nesse país.

**Descritores:** Educação em Saúde, Autocuidado, Insuficiência Renal Crônica.

## RESUMEN

**Objetivo:** Identificar las tecnologías dirigidas a la educación de la salud en pacientes renales crónicos para promover el autocuidado. **Método:** Se trata de una revisión integradora llevado a cabo en las bases de datos LILACS, MEDLINE, Scopus, CINAHL y Cochrane Library, y la muestra final de 16 artículos. **Resultados:** Publicaciones ocurrieron entre 2008 y 2016, los estudios ya existe con las pruebas de nivel III. Los resultados mostraron que las tecnologías utilizadas en la educación sanitaria para la promoción de los materiales renal crónica paciente autocuidado utilizados por escrito (folletos, prospectos y folletos), audiovisuales (videos, sitios web, presentaciones de Power Point, series de televisión y CD interactivo) y juegos educativos como vehículo de comunicación. **Conclusión:** Entre los artículos que trajeron estas tecnologías no eran representantes en la literatura científica brasileña, la creación de un vacío de conocimiento en este país.

**Descriptores:** Educación em Salud, Autocuidado, Insuficiencia Renal Crónica.

## INTRODUCTION

Chronic Kidney Disease (CKD) can be considered a worldwide public health problem, as there is an increase in the incidence and prevalence of patients requiring some type of treatment for pathology worldwide. This effect tends to be reinforced if the increased prevalence of hypertension and diabetes persists, as these are the major causes of CKD in the world.<sup>1</sup>

Because of its incurable and progressive nature, CKD and its treatments require the maintenance of habits that promote various changes in the physical, psychological, social and environmental spheres, which influence the quality of life of the patient.<sup>2</sup>

One of the changes resulting from the diagnosis of renal disease is the need to acquire skills that, among other objectives, seek to promote self-care activities. This self-care consists in accomplishing actions developed by the individuals, who will act in their benefit with the objective of maintaining life, health, and well-being. Thus, when this self-care is carried out effectively, it can help maintain the structural integrity and human functioning, contributing to its development.<sup>3</sup>

Accordingly, for the effectiveness of these self-care activities, a dialogic construction is necessary, so that professionals and patients understand that their success depends on shared negotiation. This interaction is important insofar as it allows the exchange of experiences in order to offer integral care, which values self-care as part of life, necessary for human well-being and development.<sup>4</sup>

In implementing these new demands for care, education can be a significant artifice, since it enables the socialization of knowledge, helping to promote health promotion and prevention of diseases, especially in the context of chronic diseases.<sup>5</sup>

Health education can also aid in the acceptance of the treatment of renal disease, promoting a greater effort of the patient to obtain social support and to develop the necessary self-care activities, which increases their motivation and safety, improving self-efficacy in relation to their Health treatment.<sup>6</sup>

Given the aforementioned context, the educational technology can represent an ally, and it is fundamental that the nurse, as a member of the multidisciplinary team, participates in its creation and evaluation, in order to contribute to the development of skills and favoring the patient's autonomy and confidence.<sup>5</sup>

Hence, the use of educational technologies can contribute to the acquisition of skills among renal patients, favoring the promotion of the individual's autonomy in self-care activities. So, it is important to investigate what technologies are being used in health education for chronic renal patients on self-care in order to make nursing interventions more effective in this clientele.

Therefore, this study meant to identify the technologies focused on the health education of chronic renal patients aiming to promote the self-care.

## METHODS

It is an integrative review, which consists of the accomplishment of a wide analysis of the literature, in order to subsidize discussions about methods and results of research in a systematic and organized way. This analysis of the literature results in the synthesis and general conclusions of the state of knowledge, making possible the identification of possible gaps that imply in the accomplishment of new studies in the thematic area studied.<sup>7</sup>

In order to elaborate the study, the following steps were taken: 1) identification of the theme or questioning of the integrative review; 2) sampling or searching in the literature; 3) categorization of studies; 4) evaluation of studies included in the integrative review; 5) interpretation of results; and 6) synthesis of the knowledge evidenced in the articles analyzed or presentation of the integrative review.<sup>7</sup>

Herein, the following guiding question was elaborated: what technologies have been used in the health education of chronic renal patients on their self-care? In order to

answer this question, the data collection was carried out from July to August 2016 through an online search of indexed articles in the following databases: *Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS)* [Latin-American and Caribbean Literature in Health Sciences], Medical Literature Analysis and Retrieval System Online (MEDLINE), SCOPUS, the COCHRANE Library and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). For the search of the articles, the Descriptors in Health Sciences - DeCS/MeSH and their respective translations were used as follows: *Educação em saúde/Health Education/Educación en Salud; Autocuidado/Self-care/Autocuidado* and *Insuficiência renal crônica/chronic renal insufficiency/Insuficiencia renal crónica*. Initially, the search was performed through the two pairs chronic renal failure and self-care and chronic renal failure and health education. In sequence, the search was performed using the cross-referencing with the three descriptors. In all searches, descriptors were used in Portuguese, English, and Spanish, as shown in **Table 1**.

**Table 1** - Publications from 2006 to 2016 on educational technologies aiming to promote the chronic renal patient self-care. Recife city, Pernambuco State, Brazil, 2016.

Matching	Database				
	MEDLINE	SCOPUS	CINAHL	COCHRANE	LILACS
Chronic renal insufficiency AND Self-care	486	2,573	16	16	14
Chronic renal insufficiency AND Health Education	1,129	3,625	3	18	7
Chronic renal insufficiency AND Self-care AND Health Education	170	866	1	5	1
<b>Total</b>	<b>1,785</b>	<b>7,064</b>	<b>20</b>	<b>39</b>	<b>22</b>

**Source:** Authors.

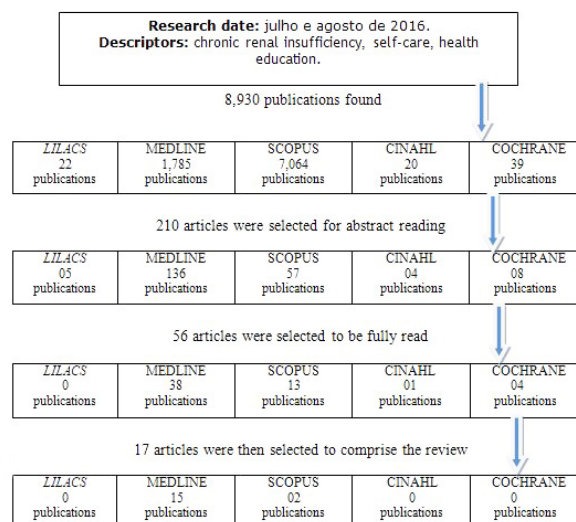
As inclusion criteria, articles written in Portuguese, English, and Spanish were present in full in the databases chosen and answer the question of research. In addition, articles published between the years 2006 and 2016 were selected. This temporal cut was used to search for the educational technologies that have been used in the education of renal patients. The exclusion criteria determined were: articles of reflection, theses, dissertations and editorials of non-scientific journals.

In order to guarantee the uniformity of the search in the databases, the sequence of use of the descriptors and the crossings were standardized and, later, two researchers carried out the search independently. A total of 8,930 studies were selected after the initial search, with a careful reading of all titles and abstracts, which resulted in the selection of 56 articles. Considering these, eight were duplicated, remaining 48 articles that were read in full in order to verify if they met the inclusion and exclusion criteria, then resulting in a final sample of 17 articles.

Aiming to assess the methodological rigor of the pre-selected articles, the instrument adapted from the Critical Appraise Skills Program (CASP) was applied.<sup>8</sup> According

to the obtained score, the studies were classified into two categories: level A (6 to 10 points) with good methodological quality and reduced bias or level B (up to 5 points) presenting satisfactory methodological quality, but with an increased risk of bias. With the application of the instrument, an article was classified as level B, being excluded from the final sample, according to the representation of the **Figure 1**.

**Figure 1:** Flowchart of the article selection process by databases and library. Recife city, Pernambuco State, Brazil, 2017.



For the extraction of the data, a validated instrument<sup>9</sup> was used, which included data regarding the authors of the studies, the location, year and country of their development, evidence level, objective, results and main conclusions of the studies.

In the evaluation of the level of evidence, the classification was classified into six categories, according to the methodological approach. These are as follows: Level I - Evidence from systematic reviews or meta-analysis of relevant clinical trials; Level II - Evidence derived from at least one well-delineated randomized controlled trial, moderate evidence; Level III - Well delineated clinical trials without randomization; Level IV - Well-delineated cohort and case-control studies; level V - Systematic review of descriptive and qualitative studies, weak evidence; Level VI - Evidence derived from a single descriptive or qualitative study; Level VII - Authorities' opinion or report of expert committees.<sup>10</sup>

## RESULTS AND DISCUSSION

Considering the 16 articles selected for the sample, 14 were available in the MEDLINE database and only two in the SCOPUS database. The LILACS, COCHRANE and CINAHL databases did not present articles selected for the final sample. According to the publications, nine surveys were published in nursing journals, while seven articles were in periodicals of other health areas. All selected studies were available in

English, with the United States of America (31.25%) followed by Iran (25%).

It was also observed that almost experimental studies (56.25%), classified as level III of evidence, followed the experimental studies with level II (37.5%) and only one research framed in the level of evidence VI.

According to the type of renal treatment, patients underwent, in most articles, patients received hemodialysis treatment (62.5%), while in 18.75% of the studies they underwent conservative treatment and, in one publication, treatment was performed by peritoneal dialysis.

Observing the topic of educational interventions, most of the research had as its main theme the controlling of hyperphosphatemia (31.25%), while 25% treated general care related to hemodialysis treatment and 12.5% addressed the dietary management of the patient renal and other 12.5%, general care related to the conservative treatment of CKD. Other topics that appeared less frequently were arteriovenous fistula care, general renal transplant care, and patient safety.

The characteristics of the scientific production represented by the authors, publication year, theme, and type of treatment are listed in Table 2.

**Table 2** - Distribution of articles according to author, publication year, theme and type of treatment addressed. Recife city, Pernambuco State, Brazil, 2017.

ID	Author/year	Country	Theme/ Treatment type
E1	Vann <i>et al.</i> , 2015	USA	General care/Conservative
E2	Baldwin, 2013	USA	Hyperphosphatemia controlling/Hemodialysis
E3	Karavefian; Ghaddar, 2012	Lebanon	Hyperphosphatemia controlling/Hemodialysis
E4	Aliasgharpour <i>et al.</i> , 2012	Iran	General care/Hemodialysis
E5	Lingerfelt; Thornton, 2011	Georgia	General care/Hemodialysis
E6	Ghadam <i>et al.</i> , 2016	Iran	General care/Hemodialysis
E7	Wang; Chiou, 2011	Taiwan	General care/Hemodialysis
E9	Forster; Allem; Mendez; Qazi; Unger, 2015.	USA	Kidney Transplant Care/Dialysis
E10	Shi <i>et al.</i> , 2013.	China	Hyperphosphatemia controlling/Hemodialysis
E11	Diamantidis; Zuckerman; Fink; Hu; Yang; Fink, 2012.	USA	Patient safety/Conservative
E12	Gardulf; Pålsson; Nicolay, 2011.	Sweden	Hyperphosphatemia controlling/Conservative and Hemodialysis
E13	Baraz; Parvardeh; Mohammadi; Broumand, 2009.	Iran	Dietary management/Hemodialysis
E14	Abercrombie; Greenbaum; Baxter; Hopkins, 2009.	USA	Hyperphosphatemia controlling/Peritoneal dialysis
E15	Mollaoğlu; Tuncay; Fertelli; Yürügen, 2012.	Turkey	Self-care with arteriovenous fistula/Hemodialysis
E16	Yen; Huan; Teng, 2008.	Taiwan	General care/Conservative

Source: Authors.

The information about the methodology type and the sample selected for the study are reported below (Table 3).

**Table 3** - Distribution of articles according to both methodology and sample used. Recife city, Pernambuco State, Brazil, 2017.

ID	Methodology	Sample
E1	Quasi-experimental	9 patients
E2	Quasi-experimental	150 patients
E3	Experimental	Group A (complete intervention = 41 patients), group B (partial intervention = 41 patients) and group C (Control = 40 patients).
E4	Quasi-experimental	Group A (intervention = 31 patients) and group B (control = 32 patients)
E5	Quasi-experimental	26 renal patients
E6	Quasi-experimental	Group A (intervention = 25 patients) and group B (control = 25 patients)
E7	Quasi-experimental	Group A (intervention = 30 patients) and group B (control = 30 patients)
E9	Experimental	Group A (intervention = 164 patients and 48 family members) and group B (control = 170 patients and 46 family members)
E10	Experimental	Group A (intervention = 40 patients) and group B (control = 40 patients)
E11	Descriptive - usability testing	10 renal patients and 2 family members
E12	Quasi-experimental	43 renal patients
E13	Experimental	Group A (intervention = 31 patients) and group B (control = 32 patients)
E14	Quasi-experimental	16 renal patients
E15	Quasi-experimental	32 renal patients
E16	Quasi-experimental	66 renal patients

Source: Authors.

Regarding the technologies discussed, the brochure was the most used in health education of the chronic renal patient, being present in seven studies. The educational video and the booklet were used in three articles and educational games in two surveys. Manual, handouts, PowerPoint presentation, website, CD with interactive multimedia and soap opera were educational technologies that appeared in only one article. Some research presented more than one technology as facilitators of the health education process, as shown in Table 4.

**Table 4** - Educational technologies. Recife city, Pernambuco State, Brazil, 2016.

Educational technology	Articles
<b>Written material</b>	E1; E4; E5; E6; E8; E10; E12; E13; E14; E15; E16
Brochures	E1; E6; E8; E12; E14; E15; E16
Booklets	E4; E10; E13
Handouts	E14
Manual	E5
<b>Audiovisual material</b>	E2; E12; E7; E9; E10; E11; E13
Video	E2; E12; E13
PowerPoint presentation	E10
Websites	E11
Interactive CD	E7
Soap opera	E9
<b>Educational games</b>	E3; E14

Source: Authors.

The articles selected were mostly published in nursing journals (56.25%). This fact may be based on the role of educator, inherent to the nurse's profession. Among the professionals who work in health education actions, the nurse is constantly provoked in the search for options that

will give them support in acting with the people, groups, and communities.<sup>5</sup>

Manuscripts from research conducted in the United States (USA) accounted for 31.25% of the sample. The interest in health education activities with the use of technologies in the USA can be justified by the prevalence of Terminal Chronic Renal Disease in the country of 636,905 cases in 2012, a figure that represented an increase of 3.7% in relation to the year 2011.<sup>11</sup>

The educational interventions were, primarily, directed to patients undergoing hemodialysis.<sup>6,12-21</sup> However, despite the importance of using educational technologies aimed at this public, the conservative treatment of renal disease, peritoneal dialysis, and transplantation also require complex demands for self-care, requiring attention by the nurse. Patient training for Peritoneal Dialysis (PD), for instance, requires a coordinated team and a multidisciplinary approach in order to promote health education that favors the maintenance of self-care in order to promote quality of life and prevent complications, such as peritonitis, which is considered one of the main causes of morbidity and treatment abandonment.<sup>22</sup> Despite the importance of the use of educational technologies in the patient in PD, only one study worked with this public.<sup>23</sup>

Concerning the patients who are conservative, health education has the additional role of delaying the deterioration of renal function, thus delaying the onset of renal replacement therapies.<sup>24</sup> Among the patients able to perform renal transplantation, the educational intervention can be useful in clarifying the potential donor alive, as well as increasing the self-efficacy and balance of decision in renal transplantation.<sup>25</sup>

Among the educational technologies used in the research, the written materials were the most representative in the sample.<sup>6,14,17-21,23,26,27</sup> The use of this type of educational material is advantageous because it is inexpensive and easy to handle, besides the possibility of later reading at the reader's choice. This technology still has the benefit of being often self-explanatory, not requiring a professional in charge to explain them. On the other hand, the use of this technology can be hampered by the need for reading, which may limit the understanding of the target audience, whether due to the inadequacy of the material or the reader's own incapacity.<sup>28</sup>

The studies that used the leaflet as an educational material were considered effective, promoting an increase of knowledge about the proposed theme<sup>17,18,20,23,26</sup> or even an increase in the quality of life score.<sup>6,17</sup> Only one study, using a longitudinal approach, identified an increase in knowledge and quality of life of conservative treatment of renal patients six months after the educational intervention with the subsequent decline of these indicators in the 12<sup>th</sup> month.<sup>27</sup> This fact suggests that educational intervention should not be carried out in a timely manner, but implemented continuously.

In addition to the written educational materials, audiovisual technologies were also highlighted among the selected studies, being found videos,<sup>12,18,19</sup> website,<sup>29</sup> soap opera,<sup>30</sup> PowerPoint presentation,<sup>21</sup> and interactive CD.<sup>16</sup> The use

of websites, software and videos represent a tool in health education, since it provides the acquisition of knowledge in a non-linear way by the patient, since it promotes interaction and simulation through images and sounds, which reflect daily reality, stimulate reflection and promote learning.<sup>31</sup>

Among these technologies, the use of the soap opera "*Fixando Paco*" deserves to be highlighted by the cultural appreciation of the target public. The soap opera covered renal transplant care and was designed to represent Hispanic cultural values, as well as being reproduced in the English and Spanish languages. In this study, patients who watched the soap opera had a significantly greater positive change in knowledge and in behavioral intention scores than those assigned to receive standard treatment.<sup>30</sup>

Still, among audio-visual technologies, one study reported on the steps used in the usability testing of a patient safety website targeted at kidney patients and their families. To do so, the research analyzed success rates of completion of tasks, adherence to dialogue scripts and error rates in measuring participant performance, with the main problem areas being related to site design and function. In the study, overall satisfaction with the website was considered high.<sup>29</sup>

The educational game appeared as a teaching strategy in two studies.<sup>13,23</sup> In one group, the participants were divided into three groups, in which group A received the intervention with dietary self-management advice and use of an interactive game, in group B there was the only use of the game and group C did not receive an intervention. The results of the research showed a significant improvement in the serum calcium phosphate levels in both groups A and B. The improvement in serum phosphorus levels and patient knowledge scores on dietary management were only significant in group A.<sup>13</sup>

It is important to remember that, despite the merit of educational technologies in renal patient education, it should not replace the health professional's follow-up. The professional, on the other hand, must participate in its production and validation in order to build adequate materials, which can function as a strategy in this process.

Likewise, the production of educational technologies focused on the needs of the client must respect their peculiarities and the construction of technologies must integrate the doing, the thinking and the being, mobilizing actions of human care.<sup>32</sup> Therefore, the choice of technology to be used must take account of the public to which it will be subjected, as some methods may be suitable for certain populations and unsuitable for others.

## CONCLUSIONS

The written materials (brochures, booklets and handouts), audiovisuals (videos, website, PowerPoint presentation, soap opera and interactive CD) were used in educational technologies with a focus on health education about the self-care of the chronic renal patient, and educational games as a vehicle for communication as well. The educational actions

that made use of these technologies had positive impacts on the knowledge of the target public on the topic addressed or on aspects related to health and quality of life. Nonetheless, the studies did not assess the effectiveness of educational technology in the practice of care.

Furthermore, it is not possible to state whether the benefits of educational intervention cited in the articles were related to the use of technology, since in most studies their use was done in a combined manner, and other health education interventions were used. Such facts may have represented limitations of this study.

It is necessary to carry out other studies on educational technologies aiming to educate the renal patient about the promotion of self-care, especially in Brazilian reality, since no research of this nature was found in the national scientific literature, then configuring a knowledge gap.

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