

Educational technology for disease prevention in preschoolers and schoolchildren

Tecnologia educacional para a prevenção de doenças em crianças pré-escolares e escolares

Tecnología educativa para la prevención de enfermedades en preescolares y escolares

ABSTRACT

Objective: To report the experience about the creation and application of an educational nursing technology focused on hand washing as a way of preventing diseases among preschoolers and schoolchildren. **Method:** A descriptive study of the type of experience report, carried out by students of the Nursing course, during the supervised internship. **Results:** The experience provided the opportunity to learn about the development of an educational technology aimed at children using attractive tools for their age. The application of a planned educational activity was essential to the training process as nurses, and this experience was positive, to assist in planning future educational interventions, using educational tools according to the target audience. **Conclusion:** This experience was positive, to assist in planning future educational interventions, using educational tools according to the target audience.

Descriptors: Child health; Health education; Educational technology; School health services; Nursing.

RESUMO

Objetivo: Relatar a experiência acerca da criação e aplicação de uma tecnologia educacional de enfermagem voltada para a lavagem das mãos como forma de prevenção de doenças entre pré-escolares e escolares. **Método:** Estudo descritivo do tipo relato de experiência, realizado por acadêmicos do curso de Enfermagem, durante o estágio supervisionado. **Resultados:** A experiência oportunizou o aprendizado sobre a elaboração de uma tecnologia educacional voltada para o público infantil utilizando ferramentas atrativas para a idade. A aplicação de uma atividade educativa planejada foi essencial ao processo de formação como enfermeiros, sendo essa experiência positiva, para auxiliar no planejamento de futuras intervenções educacionais, utilizando ferramentas educativas de acordo com o público-alvo. **Conclusão:** Essa experiência foi positiva, para auxiliar no planejamento de futuras intervenções educacionais, utilizando ferramentas educativas de acordo com o público-alvo.

Descriptores: Saúde da criança; Educação em saúde; Tecnologia educacional; Serviços de saúde escolar; Enfermagem.

RESUMEN

Objetivo: Relatar la experiencia sobre la creación y aplicación de una tecnología educativa de enfermería orientada al lavado de manos como forma de prevención de enfermedades entre preescolares y escolares. **Método:** Estudio descriptivo del tipo relato de experiencia realizado por académicos del curso de Enfermería durante la etapa supervisada. **Resultados:** La experiencia dio oportunidad al aprendizaje sobre la elaboración de una tecnología educativa orientada al público infantil utilizando herramientas atractivas para la edad. La aplicación de una actividad educativa planificada fue esencial en el proceso de formación de enfermeros, siendo esa experiencia positiva para auxiliar en la organización de futuras intervenciones educativas utilizando herramientas didácticas de acuerdo con el público al que van destinadas. **Conclusión:** Esta experiencia fue positiva para ayudar en la planificación de futuras intervenciones educativas utilizando herramientas didácticas de acuerdo con el público objetivo.

Descriptores: Salud del Niño; Educación en Salud; Tecnología Educacional; Servicios de Salud Escolar; Enfermería.

Emanuel Adenilton Teixeira

Barbosa¹

 0000-0002-3628-4039

Vanderlene Mota Andrade¹

 0000-0003-3032-2417

Talita Almeida de Oliveira¹

 0000-0001-5284-5927

Maria Corina Amaral Viana²

 0000-0002-6890-9400

Edna Maria Camelo Chaves³

 0000-0001-9658-0377

Aliniana da Silva Santos³

 0000-0002-1742-2758

¹ Centro Universitário UniFanor,

Fortaleza, CE, Brasil.

² Universidade Regional do Cariri,
Fortaleza, CE, Brasil.

³ Universidade Estadual do Ceará,
Fortaleza, CE, Brasil.

Corresponding author:

Aliniana da Silva Santos

E-mail: enfa.aliniana@gmail.com

How to cite this article:

Barbosa EAT, Andrade VM, Oliveira, TA, et al. Educational technology for disease prevention in preschoolers and schoolchildren. Revista de Enfermagem do Centro-Oeste Mineiro. 2021;11:e3094. [Access ____]; Available in: _____. DOI: <http://dx.doi.org/10.19175/recom.v11i0.3094>

INTRODUCTION

The most common diseases in childhood are respiratory and enteroparasitic infections, which are the most prevalent among preschoolers and schoolchildren⁽¹⁾. One third of the world population, mainly in developing countries, is infected with helminths transmitted by the soil, which are parasitic intestinal nematode worms, among them, roundworms (*Ascaris lumbricoides*) stand out, being the largest and most prevalent helminths transmitted, responsible for 1 billion infections and almost half of the global disease burden is borne by children aged 5 to 14 years⁽²⁾.

Children between 4 and 7 years of age still do not have formed notions of hygiene, considerably increasing the risk of infection, in this age group, added to the deficient immune system⁽¹⁻⁴⁾. It appears that the main form of prevention against these infections occurs, above all, by washing hands, so simple preventive measures need to be adopted. The literature highlights the importance of educational interventions, aimed at preschoolers and schoolchildren, to encourage hand washing in order to reduce gastrointestinal infections⁽⁵⁾.

On the international scenario, an educational intervention study in India, carried out from a randomized trial on hand washing directed at 5-year-old schoolchildren and their families, promoted awareness about germs, how they spread and its role in the disease, obtaining as an outcome the reduction of episodes of diarrhea, Respiratory Infections, among others, as well as a drop in school absenteeism, thus bringing important evidence on hand washing for the prevention of diseases prevalent in childhood⁽⁶⁾.

Childhood is considered a crucial period for acquiring new knowledge and habits, with early childhood schools being privileged spaces for educational interventions aimed at promoting health with a view to adopting healthy behaviors since childhood⁽⁷⁾. Basic body care, such as bathing, brushing teeth and washing hands, helps prevent disease, and hygiene habits at school should be strengthened⁽⁸⁾.

Health education stands out as a necessary tool for the promotion of health in childhood. Among the educational processes, educational technologies (ET) stand out, which are defined as the systematization of knowledge from the planning and monitoring of the educational process⁽⁹⁾. The use of these technologies is based

on the planned elaboration of one or more educational strategies, which, in the case of children, must have a playful character. Educational interventions should take place in a relaxed and participatory manner, thus highlighting playful practices with preschool children as effective for improving health-oriented behaviors⁽⁷⁾. It is believed that, through ET, it is possible to streamline the teaching-learning process, with the use of materials aimed at the socio-educational development of children.

Commonly, children do not perform hand hygiene, often due to lack of family guidance, or at the school itself, therefore, the importance of scheduling educational actions aimed at children, with the school as the intervention scenario.

Thus, the work aimed to report the experience about the creation and application of an Educational Nursing Technology, focused on hand washing, as a way of preventing diseases among preschoolers and schoolchildren.

METHOD

This is a descriptive study of the type of experience report, carried out by students of the Nursing course, during the supervised internship I, in the period of May 2018, in a children's school, located in Regional II, in the neighborhood of Papicu, in the city of Fortaleza, Ceará.

The action was carried out in an early childhood education institution as it is considered a privileged space for the promotion of children's health⁽⁸⁾ in the age group 4 to 7 years. Health education was authorized by the institution's coordination. Children from the integral education of children degree I to III participated in the educational intervention. The action took place on the school court as it is a strategic location close to several washbasins.

Some researchers in this work have expertise in the field of child health with a focus on educational actions using ET, with several publications in national and international journals in the area. Nursing students were encouraged to develop an educational action, through planning in a creative and playful way, directed to the real needs of the target audience. To choose the subject that would be worked with the children, the nursing students carried out a survey with the direction of the chosen school, for convenience, about the subjects that could be worked with the children, among them, the washing of hands appeared.

The Educational Nursing Technology was composed of visual resources divided into 3 stages:

1) In a wheel, the problem was exposed in a playful way on the theme (moments when one should wash the hands), using a conversation wheel and, as a didactic resource, small plates containing germ drawings were used. These figures were found on the Google image, printed on a colored A4 sheet and nailed to wooden sticks, as shown in Figure 1 presented in results.

Still in this stage, the step by step of hand hygiene recommended by ANVISA⁽¹⁰⁾ p.30-36 was simulated when quoting: "1st) Open the tap and wet your hands; 2nd) Apply a sufficient amount of liquid soap to the palm of the hand; 3rd) lather the palms of the hands, rubbing them together; 4th) Rub the palm of the right hand against the back of the left hand, interlacing the fingers and vice versa; 5th) Interlace your fingers and rub the interdigital spaces; 6th) Rub the right thumb with the help of the palm of the left hand, making a circular movement and vice versa; 7th) Rub the digital pulps (fingertips) and the nails of the left hand against the palm of the right hand, cupped closed, making a circular movement and vice versa; 8th) Rub the left wrist with the help of the palm of the right hand, making a circular movement and vice versa; 9th) Rinse hands, removing soap residues; 10th) Dry your hands with disposable paper towels, starting with your hands and following with your wrists".

2) Dynamics explaining how microorganisms are passed through the hands, using as teaching tools: gloves, balloons and gouache paint and properly described in the result of this research.

3) Educational workshop for proper hand hygiene, using liquid soap and washbasins. At this stage, each child was invited to wash his hands, using the knowledge he acquired during the educational action.

The strategy of balloons and paints was seen by the students, in an educational program at the college, and the research proposal was adapted, using the illustrative figures. Thus, the educational technology of this study was produced with visual resources, such as illustrations and existing materials, adapted to a new approach, aimed at encouraging hand hygiene by children.

RESULTS AND DISCUSSION

The experience provided the opportunity to learn about the development of an educational technology, aimed at children, using simple language and visual resources attractive for their age. The steps performed are described below:

The first stage had as an educational strategy an expository-participative conversation circle with the children sitting on the floor, in the shape of a circle, in which the students demonstrated the correct hand hygiene technique, following the step by step according to Anvisa⁽¹⁰⁾. Alcohol gel was used to demonstrate the steps. Illustrative drawings were used, representing the microorganisms (worms), as shown in Figure 1. The figures were passed among the children in the circle in order to explain to them how disease transmission occurred and what preventive measures were intended to interact with them, using these figures in the form of cartoons, as a way to facilitate their process of understanding about microorganisms that are invisible to the eyes, but that are present in the hands when not sanitized.

Figure 1 - Representation of microorganisms used in educational nursing technology, Fortaleza, CE, Brazil, 2018.



Source: Google images with adaptations.

In the second stage, a dynamic was used as educational strategy with the children still sitting and arranged in a circle; size P procedure gloves were put on their hands, using the tools illustrated in Figure 2.

Figure 2 - Educational tools used in the dynamics of hand contamination by microorganisms, Fortaleza, Ceará, Brazil, 2018.



Source: From the authors.

After putting on the gloves in the children's hands, it was used gouache paint of different colors (each color symbolized a microorganism) that was passed on the gloves. After this application, a balloon filled with air was passed between the children with their gloved hands and with paint. At the end of the dynamic, the balloon was filled with ink marks of different colors. Thus, it was possible to demonstrate to children how microorganisms are passed from one person to another or from food to our organism through the hands, thus being able to demonstrate in a playful way that, when the hands are not washed, the microorganisms pass from one person to another, causing various diseases, such as belly pain (diarrhea), cold, flu, among others.

Finally, the third stage was held, the hand hygiene workshop, in which the children were taken to the washers to implement the washing and drying techniques correctly, as shown in the first stage of the educational activity. It was possible to notice that the majority managed to learn the steps demonstrated.

Educational nursing technology proved to be positive and appropriate for the age group, since educational tools used frequently by children (gouache paint and balloons) were used, which could show the importance of hand hygiene.

The school is an ideal environment for meeting education and health, as it is a conducive space for building favorable relationships for health promotion. The task, still incomplete, is to integrate knowledge from the educational curriculum across the board, as a pedagogical strategy so that health education in the school environment is critical and promotes health awareness⁽¹¹⁾. Thus, the Health at School Program (HSP) is a strategy to complement the need to strengthen the integration between the education and health sectors, promoting the intersectorality promulgated by SUS and the co-responsibility

between these sectors, accustomed to working in isolation⁽¹²⁾.

In a systematic review study, it was possible to identify which educational intervention, aimed at hand hygiene is able to reduce the incidence of diarrhea and respiratory diseases, thus reducing school absenteeism, especially in developing countries⁽¹³⁾. Educational actions about the advantage of washing hands aim to alleviate the number of intestinal infections caused by helminths that commonly infect children⁽¹⁴⁾.

Children, especially preschoolers and schoolchildren, have neurological capacity to capture information, and it is essential, in this period of development, to stimulate their learning, using the language of the children's world, through the use of playful strategies, to favor a link between knowledge and its application in the practice of daily life. The implementation of an educational package can result in the prevention of infection by helminths transmitted by the soil, since the increase in knowledge can lead to better hygiene practices, adopting a new behavior that results in fewer infections by these parasites⁽¹⁾.

During childhood, the world of learning is permeated by relaxation, play, playfulness, allowing the child to learn while playing and make this teaching-learning process pleasurable. Playful activities, as a form of learning, are important to promote knowledge in a dynamic way, being considered favorable for a motivating and pleasant environment, enabling learning, in addition to reinforcing pre-established ideas^(15,16). Through play, the child develops his senses and achieves innumerable skills⁽¹⁶⁾.

Health education with a preventive approach can promote the control of many diseases transmitted by the lack of hand hygiene. One of the ways to successfully overcome the expansion of microorganisms is the mobilization of the school community, because this public is in the process of forming knowledge⁽¹⁷⁾.

In this context, it is necessary to involve educators who are willing to implement actions for the healthy development of the children, acting mainly within the scope of health promotion. Nurses are important actors in the educational process, being able to act in a complementary way for the integral development of the children in school environments⁽¹⁸⁾.

The literature highlights the need for integration between health, education and society

professionals, in order to favor the construction of conducts aimed at promoting the health of children in the school phase, indicating the school as a prominent space to occur changes of risk behaviors⁽¹⁹⁾.

Nurses, among health professionals, play a fundamental role in the development of the teaching-learning process, as they are directly involved with the management and systematization of care, in different scenarios, especially with regard to primary health care⁽²⁰⁾. Caring and educating are inseparable attributions, in the nursing work process, being nurses essentials with the team in the construction and restructuring of the health care model⁽²¹⁾.

Thus, the development of educational technologies by nursing students serves both for their training, for future elaboration of educational interventions, as well as to reinforce the individual and collective capacity of children who are considered important and necessary so that there is a reduction in diseases caused by poor hand hygiene.

FINAL CONSIDERATIONS

The application of a planned educational activity was essential in the academic training process, and it is a positive experience to assist in planning future educational interventions using playful tools among children.

It is hoped that the use of educational technology, composed of different educational strategies, can favor the change of behavior aimed at hand washing among children who participated in the educational action, in order to promote the prevention and reduction of intestinal and respiratory infections.

It is observed that nursing is one of the professions that most work with health education and, therefore, this experience was rich and fundamental so that, as nurses, we can plan health education actions directed to the needs of the target audience, using didactic resources that can be adapted, thus using creativity.

The limitation of this research is related to the fact of using pre-existing visual resources and adapted to the educational proposal; in addition, the experience of the students was in a private environment, during a short period within the supervised internship in primary health care.

REFERENCES

- 1 - Soares AL, Neves EAO, SOUSA IFAC. A importância da educação sanitária no controle e prevenção ao ascaris lumbricoides na infância. Ciênc Biol Saúde Unit 2018 [citado em 11 abr 2021]; 3(3):23-32. Acesso em: <https://periodicos.set.edu.br/facipesaudade/article/view/5980>
- 2 - Bieri FA, Gray DJ, Williams GM, Raso G, Li YS, Yuan L, et al. Health-education package to prevent worm infections in Chinese schoolchildren. N Engl J Med. 2013;368(17):1603-12. DOI: [10.1056/NEJMoa1204885](https://doi.org/10.1056/NEJMoa1204885)
- 3 - Almeida NRB, Carvalho AS, Moreno CA. Análise parasitológica de contaminantes de origem fecal encontrados em uma Creche do interior da Bahia. Id on Line Rev Mult Psic. 2017; 11(38):642-51. DOI: [10.14295/ideonline.v11i38.930](https://doi.org/10.14295/ideonline.v11i38.930)
- 4 - Faria KF, Mota KCP, Silva CO, Oliveira MM, Araújo IAC, Mendes GG, et al. Ensino em parasitologia: Ação extensionista com crianças em idade escolar. Revista Conexão UEPG 2019;15(3): 294-300. DOI: [10.5212/Rev.Conexao.v.15.i3.0009](https://doi.org/10.5212/Rev.Conexao.v.15.i3.0009)
- 5 - Chittleborough CR, Nicholson AL, Young E, Bel S, Campbell R. Implementation of an educational intervention to improve hand washing in primary schools: Process evaluation within a randomised controlled trial. BMC Public Health 2013;13:757. DOI: [10.1186/1471-2458-13-757](https://doi.org/10.1186/1471-2458-13-757)
- 6 - Nicholson JA, Naeeni M, Hoptroff M, Matheson JR, Roberts AJ, Taylor D, et al. An investigation of the effects of a hand washing intervention on health outcomes and school absence using a randomised trial in Indian urban communities. Trop Med Int Health 2014; 19(3):284–92. DOI: [10.1111/tmi.12254](https://doi.org/10.1111/tmi.12254)
- 7 - Sigaud CHS, Santos BR, Costa P, Toriyama ATM. Promoção da higiene bucal de pré-escolares: Efeitos de uma intervenção educativa lúdica. Rev Bras Enferm. 2017;70(3):519-25. DOI: [10.1590/0034-7167-2016-0237](https://doi.org/10.1590/0034-7167-2016-0237)
- 8 - Ramos LS, Gomes HALF, Aguiar TCG, Soares RMS, Corrêa MX, Morgan LTF, et al. Instruções de higiene na escola e na sociedade como ação de saúde e prevenção de doenças: Uma revisão

bibliográfica. Revista Eletrônica Acervo Saúde 2020;12(10):1-7. DOI: [10.25248/reas.e4558.2020](https://doi.org/10.25248/reas.e4558.2020)

9 - Nietzsche EA, Backes VMS, Colomé CLM, Ceratti RN, Ferraz F. Tecnologias educacionais, assistenciais e gerenciais: Uma reflexão a partir da concepção dos docentes de enfermagem. Rev Latino-Am Enfermagem 2005;13(3):344-53. DOI: [10.1590/S0104-11692005000300009](https://doi.org/10.1590/S0104-11692005000300009)

10 - Brasil. Agência Nacional de Vigilância Sanitária. Higienização das mãos em serviços de saúde. Brasília: Anvisa; 2007.

11 - Miranda DN, March C, Koifman L. Educação e saúde na escola e a contrarreforma do ensino médio: Resistir para não retroceder. Trab Educ Saúde 2019; 17(2):1-22. DOI: [10.1590/1981-7746-sol00207](https://doi.org/10.1590/1981-7746-sol00207)

12 - Santiago L, Rodrigues MTP, Oliveira Junior AD, Moreira TMM. Implantação do Programa Saúde na escola em Fortaleza-CE: Atuação de equipe da Estratégia Saúde da Família. Rev Bras Enferm. 2012;65(6):1026-9. DOI: [10.1590/S0034-71672012000600020](https://doi.org/10.1590/S0034-71672012000600020)

13 - Mbakaya BC, Lee PH, Lee RLT. Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among schoolchildren in developing countries: A systematic review. Int J Environ Res Public Health 2017;14(4):371. DOI: [10.3390/ijerph14040371](https://doi.org/10.3390/ijerph14040371)

14 - Tefera E, Belay T, Mekonnen SK, Zeynudin A, Belachew T. Prevalence and intensity of soil transmitted helminths among school children of Mendera Elementary School, Jimma, Southwest Ethiopia. Pan Afr Com J. 2017;27:88. DOI: [10.11604/pamj.2017.27.88.8817](https://doi.org/10.11604/pamj.2017.27.88.8817)

15 - Ribeiro FDO, Souza MA, Paula AO, Silva AG, Oliveira AC. Estratégia lúdica para a melhoria de práticas de higienização das mãos entre os profissionais de saúde. Rev Enferm UFPE on Line 2017;11(10):3971-9. DOI: [10.5205/1981-8963-v11i10a25207p3971-3979-2017](https://doi.org/10.5205/1981-8963-v11i10a25207p3971-3979-2017)

16 - Rodrigues EN, Alves MSJ, Sobral MSC. O brincar e o aprender na educação infantil. Rev Mult Psic. 2019;13(43):187-96. DOI: [10.14295/ideonline.v13i43.1520](https://doi.org/10.14295/ideonline.v13i43.1520)

17 - Nicácio LA, Davim RMB, Oliveira MB, Camboim JCF, Medeiros HRL, Oliveira SX. Intervenção educativa sobre o mosquito *Aedes*

Aegypti em escolares: Possibilidade para a enfermagem no contexto escolar. Rev Enferm UFPE on Line 2017;11(10):3771-7. DOI: [10.5205/reuol.12834-30982-1-SM.1110201710](https://doi.org/10.5205/reuol.12834-30982-1-SM.1110201710)

18 - Silva MFA, Santos PFBB, Wesp LHS, Silva LLI, Bispo WF. A enfermagem nas instituições de educação infantil: Refletindo sobre essa parceria. Rev Enferm UFPE on Line 2017;11(supl 8):3310-6. DOI: [10.5205/reuol.11135-99435-1-ED.1108sup201716](https://doi.org/10.5205/reuol.11135-99435-1-ED.1108sup201716)

19 - Sales CCF, Meschial WC, Oliveira MLF. Construção de oficinas pedagógicas para prevenção das intoxicações infantis. Arq Cienc Saúde UNIPAR 2018 [citado em 11 abr 2021]; 22(1):17-22. Acesso em: <http://www.revistas.unipar.br/index.php/saude/article/download/6221/3556>

20 - Rangel RF, Backes DS, Ilha S, Siqueira HCH, Martins FDP, Zamberlan C. Cuidado integral: Significados para docentes e discentes de enfermagem. Rev Rene 2017;18(1):43-50. DOI: [10.15253/2175-6783.2017000100007](https://doi.org/10.15253/2175-6783.2017000100007)

21 - Vieira FS, Portela NLC, Sousa GC, Costa ES, Oliveira DEP, Neiva MJLM. Inter-relação das ações de educação em saúde no contexto da Estratégia Saúde da Família: Percepções do enfermeiro. Rev Pesqui. 2017;9(4):1139-44. DOI: [10.9789/2175-5361.2017.v9i4.1139-1144](https://doi.org/10.9789/2175-5361.2017.v9i4.1139-1144)

Editores Responsáveis:

Juliana Dias Reis Pessalacia
Kellen Rosa Coelho Sbampato

Note: This work is part of an Undergraduate Experience Report related to Supervised Internship I, being one of the items used for evaluation of the student at the end of the semester.

Received: 13/09/2019

Approved: 13/04/2021