ORIGINAL ARTICLE
MULTIMEDIA APPLICATION IN A MOBILE PLATFORM FOR WOUND TREATMENT USING HERBAL AND MEDICINAL PLANTS
APLICATIVO MULTIMEDIA EN PLATAFORMA MÓVIL PARA TRATAMIENTO DE FERIDAS UTILIZANDO FITOTERÁPICOS E PLANTAS MEDICINAIS
APLICATIVO MULTIMEDIA EN PLATAFORMA MÓVIL PARA TRATAMIENTO DE HERIDAS UTILIZANDO FITOTERÁPICOS Y PLANTAS MEDICINALES
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ABSTRACT
Objective: to develop a mobile platform multimedia application for wound treatment using herbal and medicinal plants. Method: technological production research containing application development for mobile technology. Results: the application was constructed after literature review with LILACS, MEDLINE, INI, CINAHL, Cochrane, ScIELO, manuals, and dissertations. It will be available online after authorization of registration with the National Institute of Industrial Property (protocol number BR: 5120160007117). Conclusion: this study enabled to describe the steps of the planning and development of the multimedia application in a mobile platform for treatment for wound treatment using herbal and medicinal plants. The steps covered open perspectives to believe that the use of this application is very effective in clinical practice in cleaning and wound treatment using herbal and medicinal plants and for teaching Nursing with regard to technology. This research has as perspective the validation of this application by nurses. Descriptors: Wound Healing; Herbal Medicine; Mobile Applications; Education, Nursing.

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RESUMO
Objetivo: desenvolver um aplicativo multimídia em plataforma móvel para tratamento de feridas utilizando fitoterápicos e plantas medicinais. Método: pesquisa de produção tecnológica contendo o desenvolvimento de aplicativo para tecnologia móvel. Resultados: o aplicativo foi construído após revisão da literatura em LILACS, MEDLINE, INI, CINAHL, Cochrane, ScIELO, manuais e dissertações. O mesmo estará disponível online após autorização do registro no Instituto Nacional da Propriedade Industrial (protocolo número BR:5120160007117). Conclusão: este estudo possibilitou descrever as etapas do planejamento e desenvolvimento do aplicativo multimídia em plataforma móvel para tratamento de ferida utilizando fitoterápicos e plantas medicinais. As etapas percorridas abrem perspectivas para acreditar que o uso desse aplicativo é de grande eficácia na prática clínica na limpeza e no tratamento de ferida utilizando fitoterápicos e plantas medicinais e para o ensino de Enfermagem no que se refere à tecnologia. Esta pesquisa tem como perspectiva a validação deste aplicativo por enfermeiros. Descriptores: Cicatrização; Medicina Herbária; Aplicativos Móveis; Educação em Enfermagem.

RESULTES
Objective: desarrollar un aplicativo multimedia en una plataforma móvil para tratamiento de heridas utilizando fitoterápicos y plantas medicinales. Método: investigación de producción tecnológica conteniendo el desarrollo del aplicativo para tecnología móvil. Resultados: el aplicativo fue construido después de la revisión de la literatura junto a LILACS, MEDLINE, INI, CINAHL, Cochrane, ScIELO, manuales y dissertaciones. El mismo estará disponible online después de la autorización del registro en el Instituto Nacional de la Propiedad Industrial (protocolo número BR:5120160007117). Conclusión: este estudio posibilitó desarrollar las etapas del planeamiento y desarrollo del aplicativo multimedia en plataforma móvil para tratamiento de herida utilizando fitoterápicos y plantas medicinales. Las etapas recorridas abren perspectivas para acreditar que el uso de ese aplicativo es de gran eficacia en la práctica clínica en la limpieza y en el tratamiento de herida utilizando fitoterápicos y plantas medicinales y para la enseñanza de Enfermería en lo que se refiere a la tecnología. Esta investigación tiene como perspectiva la validación de este aplicativo por enfermeros. Descritores: Cicatrización de Heridas; Medicina de Hierbas; Aplicaciones Móviles; Educación en Enfermería.

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INTRODUCTION

Wounds are a public health problem since millions of people are carrying some kind of injury. Estimates indicate that 8 to 10 million people are carriers of lower limb ulcers; 7 to 8 million, pressure injury and 40 to 50 million surgical wounds, every year. These data indicate the magnitude of the problem with significant socioeconomic repercussions.¹

Assistance to wounded patients has been one of the greatest challenges in nurses’ clinical practice, as they result in high rates of morbidity, relapses and significant impairment of quality of life, which are reflected in high financial costs for the health institution and for the patient.²–⁴ Wound treatment requires a multidisciplinary therapeutic approach and involves pharmacological, phytotherapeutic actions with the use of medicinal and educational plants, as it aims to correct the underlying cause of the ulceration and to solve the factors that exacerbate it to promote healing and prevention of recurrence.⁵

The herbal treatment of wounds can represent an economical and effective way of minimizing the issues related to wound healing. The World Health Organization believes that the practice of the use of medicinal plants is considered the main therapeutic option for approximately 80% of the world population.⁶ The world market for this group of drugs reaches several billion dollars annually and about 25% of medicines marketed today were developed from plants.⁷ Medicine therapy is a universe to be explored, where there are many possibilities of cure and allows the reduction of costs with conventional therapies. But this must be applied by qualified professionals and knowledgeable of the principles that guide it. Although medicinal plants have been part of the popular universe for thousands of years, several authors point out the lack of standardization of medicinal plants according to scientific criteria as one of the main bottlenecks for the implementation of medicine therapy in official organs and of public service.⁸

For a long time, the use of medicinal plants and herbal medicine was the main therapeutic resource to treat the health of people and their families. However, with advances in the technical-scientific environment, especially in the health sciences area, new ways of treating and curing diseases have emerged. One of these ways is the use of industrialized drugs, gradually introduced into the daily lives of modern people, through advertising campaigns that promised to cure the most diverse diseases. Since then, the use of medicinal plants has been replaced by allopathic medicines.⁹

Thus, the relevance of developing a mobile application that offers the professional a means of quick consultation is highlighted, so he can prescribe the treatment, cleaning, and an ideal food supplement to promote wound healing using medicine therapy and medicinal plants. Also, the mobile application is easily transported anywhere (urban and rural areas).

OBJECTIVE

- To develop a mobile platform multimedia application for wound treatment using herbal and medicinal plants

METHOD

This is a descriptive study applied in the mode of technological production. The study was approved by the Research Ethics Committee of the Medical Sciences School Dr. José Antônio Garcia Coutinho of the University of Vale do Sapucaí, under Consistentiated Opinion 1,133,797.

As a methodology for the development of the multimedia application, a Contextualized Instructional Design (DIC) was chosen that involves a constructivist proposal and consists of the intentional action of planning, developing and applying specific didactic situations, incorporating mechanisms that favor contextualization.¹⁰ The multimedia application in the Mobile platform for wound treatment using herbal and medicinal plants followed four steps.

- Step 1 - Analysis

From the perspective of the DIC, this step consisted of understanding the educational problem and elaborating a related solution. For this purpose, a review of the literature was carried out with the Health Sciences databases, including the Cochrane Library, Scientific Electronic Library Online (Scielo), Latin American and Caribbean Health Science Literature (Lilacs), the National Library of Medicine (Cinahl), and bibliographies, books and theses in the area of the last 10 years, using as descriptors: wounds, dressings, healing, herbal medicine, nutritional supplements and medicine therapy.

Only primary studies that had a direct link to the subject matter, available in full, and without the proposed temporal delimitation were adopted as inclusion criteria to select the publications to be included in the review since the intention was to compile all the studies that met the established criteria. Chapters of books, theses, dissertations,
monographs, technical reports, reference works and articles that, after reading the abstract, did not converge with the proposed study object, besides the publications that were repeated in the databases and in the virtual library were excluded.

During the literature review, all the articles describing acute and chronic wounds, dressings, coverages, wound healing, nutritional supplement, medicinal plants, and medicines were included for construction of the multimedia application in a mobile platform for wound treatment using herbal medicines and medicine therapy. Also in this step, the technological infrastructure and the creation of a diagram in guide the construction of the tool were defined (Figure 1).

♦ Step 2 - Design

This step involved the planning and production of didactic content, definition of topics and writing of subjects, selection of media and layout design. It was decided to use texts, structured in topics, and connected by hypertexts (links).

♦ Step 3 - Development

There was the selection of the multimedia application tools, the definition of the navigation structure and the planning of the configuration of the environment.

Figure 1. Schematic drawing of the application database

♦ Step 4 - Implementation

The multimedia application in a mobile platform for wound treatment using herbal medicines and medicinal plants was registered in the National Institute of Industrial Property (Ministry of Development, Industry and Foreign Trade) under the protocol number: BR: 5120160007117. It will be available on the link to the University of Vale do Sapucaí website after authorization of the computer registry at the National Institute of Industrial Property.

RESULTS

Literature review

Figure 2 shows how the selection of the articles for the basis for the construction of the app was carried out, being 18 articles and two books and a master’s thesis.
Figure 2. Flowchart of identification, selection, and inclusion of the studies found during the literature review for the construction of the app.
Mobile app multimedia presentations

The splash screen is composed of the app name and a drop-down menu that will open the first screens. The menu consists of the “Patients Registration” items that will open the screen for the inclusion of a new patient, “All Patients” and “Search Patients”, which allows locating a patient record already registered (Figure 3).

Figure 3. App for wound treatment. (Left) Home screen and (Right) Patient Registration screen.

To start the evaluation of the registered patient, the patient registration screen with the basic data, such as CPF, gender, address, and name is opened, and the name is the only one required. The patient record is a free number field, where the patient can enter the patient record number if any (Figure 3).

After registering the patient, the data is displayed in the “View patient” screen and, from this screen, it is possible to register one or more wounds or to list those that have already been registered through specific buttons. In the drop-down menu, the edition or delete screen can be opened (Figure 4).
The screen registering wound allows one or more wounds per patient to be registered. The requested data are the location of the body in which it appears and the date on which the wound treatment was started. The most important screen of the app is the evaluation of the wound, because it is through this work that the professional will obtain information about the evolution of the treatment, and it is also through this evaluation that the software will make the suggestions of herbal treatment (Figure 4). It is composed of check fields, considering the ease of handling of the mobile devices for this purpose. It also has two drop-down fields, where values are selected in a list for the field “Quantity of Exudate” and for the “Type of fabric” field.

After evaluation of the wound, a screen with the proposed medicine therapy is displayed. Based on the data obtained by the wound evaluation, the indication is made considering the type of exudate, and the amount and types of tissue in the wound bed. The data is then stored in the device, leaving the user responsible for keeping and maintaining the data (Figure 5).
In the food supplement options preview screen, “Green Juice with Medicinal Plant”, the information slides on the screen so all proposals are visible without the need to change screens. A juice is suggested for each day of the week and, at the end, it is possible to exchange the ingredients between them, as long as they maintain the proportion of a vegetable, a herbal remedy and a fruit (Figure 5).

The use of computational technologies in education and health has been innovating the teaching-learning relationship and theory-practice in care as they are adapted to the needs of patient care and contemporary educational models. Health professionals follow this innovation and they have shown that interactivity favors the learning process and improves safe care without harm to the patient through experiences with the use of virtual learning environments.11-13

The current trend towards the use of smartphones is due to its ease of use, aesthetics, and ability to access the Internet, and add multiple functions through their applications. This equipment has already become almost unanimous in the appliance consumer market in Brazil. An app is a software that has a specific function, being able to assist us in a certain task. Smartphones are important tools since most of the population own them and almost always are available, considering their portability.

The use of applications as a tool for therapeutic, preventive, diagnostic and teaching in the health area is quite innovative, and it is a method capable of generating interest and motivation in wanting to learn more and more, since the devices mobile that host these applications are used by health professionals in a proportion of 45% to 85%, being consulted more than books and magazines.14

Considering these characteristics, a mobile application for wound treatment using medicine therapy and medicinal plants was developed on Android® platform through the Android Studio® application made available by Google®. The developed application has an easy-to-use graphical user interface that makes your day to day faster.

The main advantage of developing educational objects is their reuse, available on websites, allowing access and use of these materials by any individual in the content.15 In the case of the application developed with this research, it is believed that its use will be on a large scale, since it offers the possibility of being consulted in the urban and rural regions, on mobile devices and in the off-line mode.

The app interface built in this study to treat wounds with herbal medicine or medicinal plant consists of a database composed of three registrations. The first or
main one is the patient record that contains his personal data, as well as the evaluation of the professional in relation to the clinical aspects of the patient. The second, linked to the first one, is the registration of the evaluation of the wound, where the evaluation is recorded (wound type, measurement of wound area in cm², type and amount of exudate, type of tissue, and anatomical location where the lesion lies.

When assessing wounds, professionals need to make decisions based on knowledge of the skin anatomy, principles of tissue repair physiology, and factors that interfere with it. These professionals must know the types of wounds and the various forms of treatment existing, being able to develop the ability to observe the tissue loss, the clinical aspect of the lesion, its location and size, presence of exudate, skin characteristics surrounding the wound, pain, and signs of infection.16-17

The app provides the therapeutic conduct, that is the type of herbal or medicinal plant indicated for cleaning the lesion and primary dressing, with the purpose of promoting the healing of the lesion, and the food supplement carried out with herbal and medicinal plants. The application is called Herbal Healing, which translates to its form of use and its purpose.

Mobile apps, when directed to the health area, can be a tool for interactivity and information exchange among users, which is a limitation of other applications.13 It is important that interactivity be taken into account when developing this type technology, as it allows users to exchange experiences and get real-time questions when connected to the Internet.18,19

Choosing a medicinal plant has the capacity to prevent infection, to maintain the lesion in a physiological environment (humid environment), favoring the migration of the cells to the wound bed, resulting in the formation of repair tissue and the reepithelialization of the wound. The purpose of this app is to use albumin, propolis, and papain 6% or 10% in the devitalized tissue and, in the granulation tissue, 2% or 4% papain, barbatimão and propolis, supplemented with medicine therapy foods and medicinal plants.20

A herbal food supplement is rich in essential nutrients for skin healing, as the leaf of green juice is rich in vitamins, protein, minerals, arginine, and micronutrients such as zinc, vitamins A, E, C and carotenoids. It also improves the immune response of the individual, important for wound healing. Besides being moisturizing and refreshing, it provides the hydroelectrolytic balance necessary for the healing process.20

The use of 6% to 10% papain in the lesion promotes enzymatic debridement by making proteolysis, providing rapid non-traumatic removal of undesirably proteinaceous material in the lesions, without posing risks to the patient. When papain in the 1% to 4% concentration is used in the wound, an alignment of the fibers that make up the collagen occurs, favoring uniform tissue growth and slatter healing.21

Tissue repair of venous ulcers was analyzed through a study comparing papain gels at 2% and 4%. This study included 16 patients with 30 venous ulcers. As for ulcers, there was an average reduction of 7.9 cm² (50% of the size) in 90 days and 20% healed completely in 57 days. There was an increase in epithelialization, a significant reduction in sphincter and edema, improvement in depth, type and quantity of exudate. 2% and 4% papain gels were effective in the healing of venous ulcers.22

In an integrative review of the literature, researchers have analyzed studies that address the therapeutic use of propolis in cutaneous lesions.22 Data were obtained by searching the LILACS, MEDLINE and BDENF databases, covering the period from 1980 to 2007. It was identified 1,127 articles, of which 38 met the inclusion criteria of the study. Of them, 7 (18.4%) were clinical and 31 (81.6%) experimental studies in vitro and in animals. The analysis of the work highlighted the efficacy of propolis in the treatment of wounds, acting as a healing agent and natural antimicrobial, whose properties depend directly on the form, place of extraction and concentration of the product.23

CONCLUSION

The results of this study enabled to describe the steps of planning and development of the multimedia application in a mobile platform for the treatment of injury (cleaning, therapeutic conduct, and dietary supplement) with herbal medicine and medicinal plant. The steps covered open perspectives to believe that the use of this app is highly effective in clinical practice in the treatment of injuries and for Nursing teaching about technology. This research has as perspective the validation of this application by nurses.

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