MHealth technology in the prevention and control of obesity from the perspective of health literacy: Lisa Obesidade

Tecnologia mHealth na prevenção e no controle de obesidade na perspectiva do letramento em saúde: Lisa Obesidade

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ABSTRACT This study aimed to describe a mHealth technology, used to assist in the prevention and control of obesity in adults in the light of health literacy. The technology was developed by the method of participatory design by an interdisciplinary team that involved nurse, nutritionist, a designer and a systems analyst. The authors developed a low and high fidelity design, based on user-centered interactive design, in the light of health literacy. The study provided to develop knowledge of the use of literacy for the development of mobile technology, aiming at greater accessibility of individuals to the prevention and control of obesity. The perception of an interdisciplinary team on issues related to health, the development and application of mHealth technology to address the problem was considered. A technology called Lisa Obesidade was obtained, with the purpose of empowering the user. It is expected to be a tool to help health professionals carry out actions promoting health.

KEYWORDS Mobile applications. Obesity. Health promotion.

RESUMO *O estudo objetivou descrever a tecnologia mHealth, utilizada para auxiliar na prevenção e no controle da obesidade em adultos à luz do letramento em saúde. A tecnologia foi desenvolvida pelo método do design participativo por uma equipe interdisciplinar que envolveu enfermeira, nutricionista, um designer e um analista de sistemas. Os autores desenvolveram um design de baixa e alta fidelidade, baseado no design interativo centrado no usuário, à luz do letramento em saúde. O estudo proporcionou desenvolver conhecimento do uso do letramento para desenvolvimento de tecnologia móvel, visando a uma maior acessibilidade dos indivíduos à prevenção e ao controle da obesidade. Foi considerada a percepção de equipe interdisciplinar sobre as questões relacionadas à saúde, o desenvolvimento e a aplicação da tecnologia mHealth para o enfrentamento do problema. Obteve-se tecnologia denominada Lisa Obesidade, com objetivo de empoderamento do usuário. Espera-se ser uma ferramenta para auxiliar profissionais da saúde a realizar ações promotoras de saúde.*

PALAVRAS-CHAVE *Aplicativos móveis. Obesidade. Promoção da saúde.*

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Introduction

Brazil has about 18 million people considered obese, according to the Brazilian Society of Endocrinology and Metabology. Summing up the total of overweight individuals, the amount reaches 70 million, double that of three decades ago. Obesity is characterized by excessive accumulation of body fat in the individual. Its causes may be related to the genetic heritage of the individual, poor eating habits, endocrine dysfunctions, sedentary lifestyle. It is a risk factor for a number of diseases, such as systemic arterial hypertension, cardiovascular diseases, type 2 diabetes, among others[1,2].

Obesity is, today, recognized as a pandemic and, for some decades, it has been pointed out as a priority in the public policy agenda at the national and international levels. Some punctual progress can be observed. However, no country has managed to control this epidemic. Correlated to this fact are the lobby of the private commercial sector; the lack of specific policy priority of governments to implement effective measures in the face of the lack of understanding of the population of the real dimension of the problems correlated with this pathology, which results in insufficient civil society pressure for political action; and the scarce empirical evaluation of measures implemented[3].

MHealths can be defined as the use of information and communication technologies to offer and improve health services. Mobile health creates conditions for the continuous evaluation of health parameters, configures a new scenario to encourage healthy behaviors and assists self-management of chronic conditions, among other aspects of application[4].

The reach of this technology, although facilitated by the greater access of the population, needs not only to be accessible, but to aggregate the factor of the real understanding of the linked content to sensitize its use. In this perspective, health literacy is a tool that allows users of these technologies to understand and interact with content that must be validated and, if possible, fed back.

Health literacy can be defined as the level to which individuals have the ability to obtain, process, understand basic information and services necessary for making appropriate health decisions[5]. Based on the belief of the authors in this conception, there was a proposal for the development, in an interdisciplinary way, of a mHealth technological tool called Lisa Obesity, whose objective is to describe a technology to aid in the prevention and control of obesity in adults in the light of health literacy. The perspective is that it may contribute to reduce the indexes of obesity that have brought so much suffering to the population due to associated comorbidities.

Methodological procedures

In the process of conception of the mHealth Lisa Obesity technology, the methodology of the user-centered participatory interaction design process was adopted[6], whose main objective is the conception and construction of interactive products that improve and increase the range of possibilities of communication, interaction and work between people. This methodology stands out by considering the needs and the continuous participation of the users (researchers) in all the phases of conception and development of the project. The objective of this process is to make user interaction with the tool as simple and efficient as possible.

This technology was elaborated by a design professional, with the guidance of a nurse master in collective health, doctored professors in nutrition and a professor of computer science.

The interaction design process contemplates four stages: The first stage provides for the identification of the needs of the customer(s) and/or user(s) and, based on

them, the establishment of the system requirements. The next stage is the design of possible 'solutions' for the needs identified based on requirements. A design proposal is selected, the construction phase of a functional prototype, an interactive version, begins. With the functional prototype ready, the last evaluation stage is carried out. It is possible that during the execution of an activity, it is identified that it is necessary to resume an earlier step for correction or improvement, that's why, it is interactive. The fourth and last stage involves the compilation and analysis of the results obtained.

In this study, to meet the first stage, brainstorming meetings were held, identifying the technical requirements/functions that the system should contemplate, with a view to mitigating the problem presented.

Next, the main requirements identified are presented:

Identification of the clinical profile – clinical register of the user. It allows the user to fulfill health characteristics in order to be associated with the type of clinical profile. Through this item, it is possible to know if the user has comorbidities, such as diabetes or systemic arterial hypertension.

Calculation of the Body Mass Index (BMI), allowing the user, by putting his/her weight (Kg) and height (m), to know his/her classification, according to the weight classification *table 1*. The result of the IMC calculation allows the visualization, through color signals (green, yellow and red). The user will know if he/she is at risk for obesity or if he/she is obese, as well as his/her classification, and, from there, he/she will receive information for possible conducts.

Information about obesity in the light of health literacy, based on Guide[7] and the methodology of the process of design of participatory interaction centered on the user[6].

Control and alert of dangerous foods to certain pathologies through the photo of his/her plate with the participation of health professionals.

Nearest obesity treatment centers – the user will receive possible locations for obesity treatment centers.

After this preliminary survey, the functional requirements of the tool were established and a requirements document was elaborated:

1. Access the system: place of inclusion of the user (login and logoff);

2. Record register data: an option on the home screen to enter user data: password, e-mail, age, gender and level of education;

3. Perform a BMI calculation by means of the formula: when entering your weight and height, the user will be 'classified' or will have information about his/her risk for obesity. According to the classification: Low weight (<18.5), normal weight (18.5 – 24.9), overweight (≥ 25), pre-obese (25.0 to 29.9), obese I (30.0 to 34.9), obese II (35.0 to 39.9), obese III (≥40). This way, he/she can set his/her weight loss goal and follow his/her progress;

4. Evaluation of the meal: the user takes a photo and post it on the application, and his/her plate will be evaluated by a network of collaborators (users, nutritionist and students of nutrition);

5. News and events: tool for the visualization of the main health promotion events that are occurring.

The second step consists of the processes of design and redesign. This step was the time to define how the product would be. In the case of technological artifacts, the design

contemplates the prototypes of the interfaces (screens) of the application system. These prototypes address the identified requirements that were met on the screens through the elements of interface and layout.

A prototype is a representation of the interface with which the user can interact and offer information to propose changes and improvements. It is a semi-functional model of the final product[8]. Using a partially completed version of the site/application is a common way to perform usability test in the early stages of the life cycle of the project[9].

The following prototyping levels are considered: low fidelity, medium fidelity and high fidelity. Each of these three levels of prototype fidelity presents significant unique benefits to be included in the interface design process[9].

In the design phase, the conception of low-fidelity prototypes is adopted. A low-fidelity prototype has a low degree of detailing. It only visually displays functionality, it does not have interaction capabilities[9]. The objective was to provide an overview of the screen layout and interface elements, allowing for a clearer discussion of the proposal.

In this phase, the creation of the tool design was started, with the participation of the team members in the discussions, based on the steps of the creation of material according to the health literacy, in order to approach the functionalities of the system, the language and the understanding of the user. It was also discussed at this stage what motivations lead a nutrition professional to enter the application.

The design process of low-fidelity prototypes produced by the designer used the Photoshop tool.

The high fidelity prototype was built using the interactive version, contemplating the characteristics of low fidelity prototype, typography, iconography and color palette.

Discussions among team members continued throughout the process, generating adaptations and changes, such as changing the name of the technology, interactivity and formats that aroused greater interest of the user.

In the elaboration of the high-fidelity screens, it was used, also, the Photoshop tool.

The study described in the article was finalized in this stage, in which the elaboration of the interactive design was obtained.

Results and discussion

In the context of software engineering, prototyping is a process that enables the developer to create a final product model that will be further developed[10].

Prototyping models can be low and high fidelity. The high prototype is very similar to the final version, because it is a program that executes part or all of the characteristics that will be improved in the final product[6,10].

Systematic reviews have shown that traditional approaches to overweight, in particular, clinical and pharmacological treatments, have been unsuccessful in disease control and that there is a consensus on the need to adopt ecological models in public health actions for prevention and control of overweight and obesity. Such models recognize the existence of multiple factors associated with weight gain. In addition, support for currently available technologies may be another important point in driving strategies to address increases in disease prevalence. The development of a technology for the prevention and treatment of obesity, in the light of health literacy, with the objective of assisting users and professionals as a tool for health promotion, was achieved through the Lisa Obesidade design, which is willing to be a tool for learning and interaction with the user, in addition to providing interfaces that enable healthy habits[11].

And this approach is reinforced when it emphasizes the importance of concern with the user in the development of an interface, which is only effective when the user

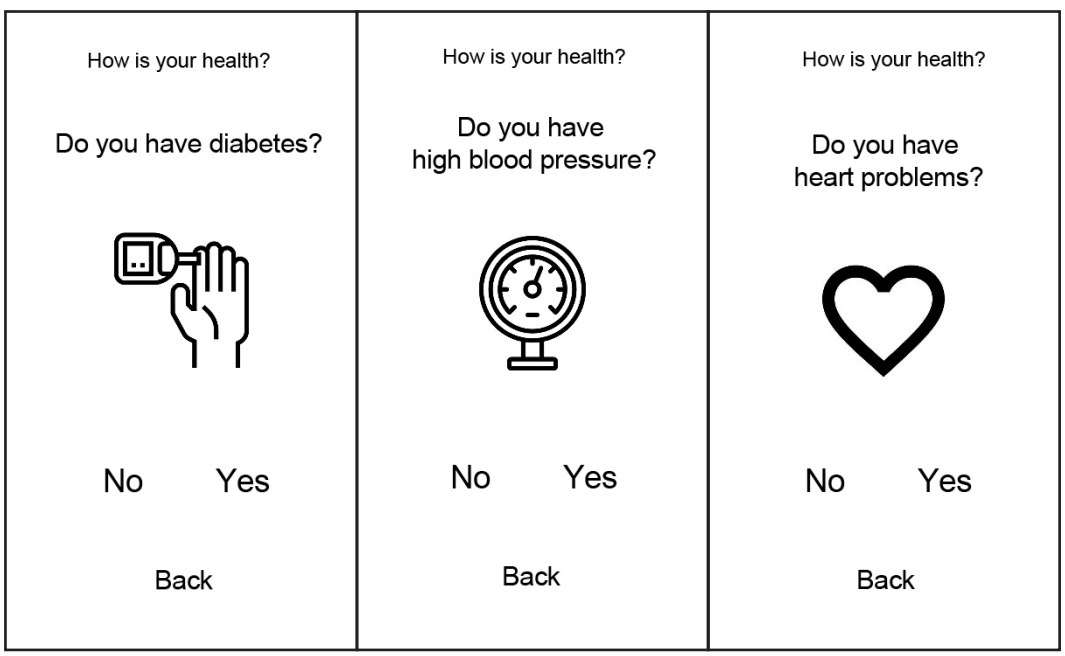
is able to perform the action through the tool. From this thought, design processes emerged that put the user as a central figure and started from his/her characteristics to define the final result of the artifact created. This set of methods is encompassed by the concept of the design centered on the user, whose main characteristic is the effective involvement of end users in the design process and in the way they influence the design of the design[12].

The research favored deepening the knowledge of the context presented, considering the perception of the interdisciplinary team (nutrition, nursing, designer and technology) on issues related to health, development and application of mHealth technology to address the problem.

In the first moment, the conception and development of 23 screens were carried out in the low fidelity prototype (*figure 1*). In this stage, prior evaluation was provided, by the interdisciplinary team, of the screens and interfaces, with a special concern for its structure, content and comprehension.

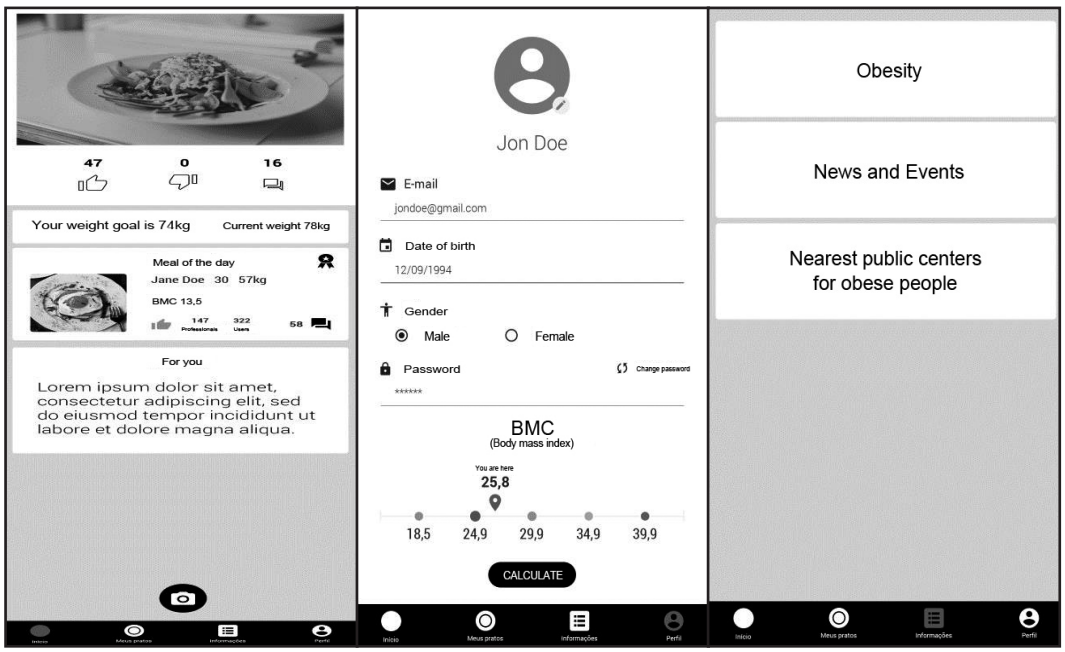
In the second moment, the prototype of high fidelity was elaborated, with development of 14 screens that, after discussions between the interdisciplinary team (*figures 2* to *5*), allowed the perception of the needs of adjustments related to the interactivity and the images. Thus, subsequently, 34 high fidelity screens were produced, which provided cleaner screens, with more accessible content, some of which were transformed into two.

Figure 1. Screens of profile of the user of the low-fidelity prototype



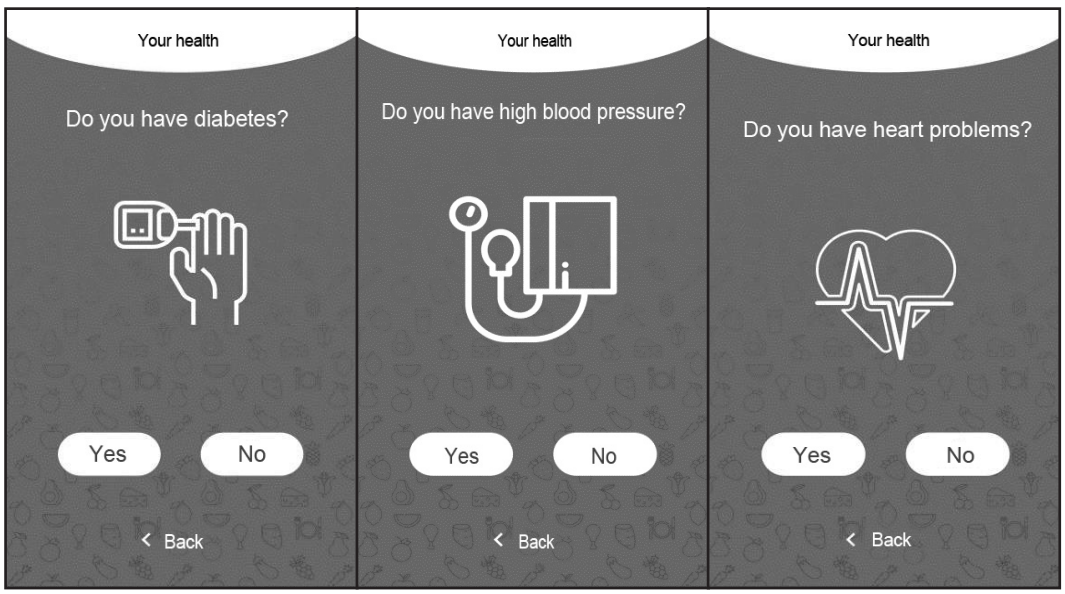
Source: Own elaboration, 2017.

Figure 2. Goal and weight chart screens, plate evaluation, BMI calculation and general low-fidelity prototype information



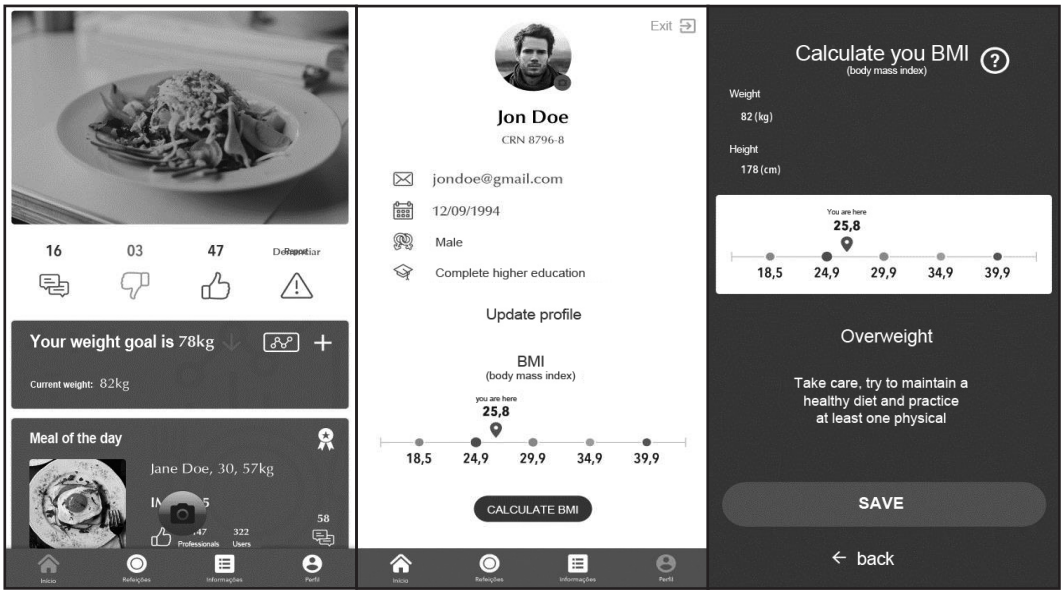
Source: Own elaboration, 2017.

Figure 3. Screens of profile of the user of the high-fidelity prototype



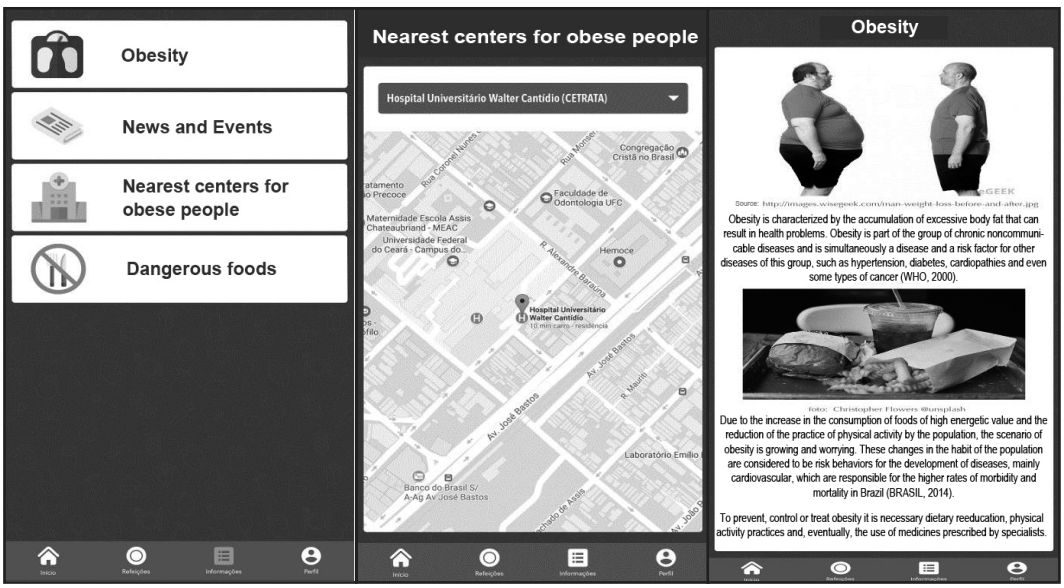
Source: Own elaboration, 2017.

Figure 4. Goal and weight chart screens, plate evaluation, BMI calculation and general information of the high fidelity prototype



Source: Own elaboration, 2017.

Figure 5. General and custom information screens of the high-fidelity prototype



Source: Own elaboration, 2017.

The technology developed to prevent obesity allows a better control on the part of the professionals of the care provided by the users. Care through the multidisciplinary team should be rethought, because much of what each professional can offer, or effectively offers patients, is lost in hermetic actions and dissociated from the care built by the group. On the other hand, this reality does not seem to be a phenomenon related solely to Brazil, where the experience here reported is developed. The material developed by the Advisory Board Company[13] demonstrates that it has been a concern of different countries the effort to encourage the interested parties to work together, in an approach centered on the person, to effectively treat patients in the appropriate setting. The greatest expression of such an effort results in the understanding that a new definition of work must be thought in favor of the transformation of care.

The bond between the health professional and the user is fundamental for the control and prevention of obesity. Group work allows better stimulation of accession and generates better quality of life for patients. The World Health Organization (WHO) defines accession to the treatment of chronic diseases as a multidimensional phenomenon determined by the combination of five sets of factors, called dimensions: health system, disease, treatment, patient and factors related to the caregiver. This classification makes it clear that the belief that patients are solely responsible for treatment is misleading[14].

The methodology proposed for the development of the technology proved to be quite efficient, both in the initial phases and in the activity of elaboration of the requirements for the understanding of the needs of the users. The importance of the participation of an interdisciplinary team during the whole process is due to the fact that it provides a better definition of the stages, parameters and evaluations of alternatives that better meet the objective of this study, as well as the product generated. The use of low and high fidelity prototypes, throughout the design process, contributed to identify and select the most accurate forms, the best alternatives that allow better interaction and learning of the user.

It is believed that the principles underlying the methodology based on prototypes have made the design process more interactive, extending the use of prototypes for all phases of the design process; creating a greater number of interactive cycles; adapting the prototype in each phase and considering the characteristics of the phases, design area, aims, purposes and level of fidelity to each cycle.

The vision of the prototypes has been expanded to something beyond a project presentation tool, understanding that they can contribute both to the understanding of the problem and what should be designed in the early stages of design as well as to the parameters survey with users, performance of evaluations with the alternatives and approval of the final product.

It is believed that these principles can contribute to make the design process and the products developed from it more efficient. At that time, the association of the user-centered design and the application of health literacy principles were important. For the information and the content addressed, the use of a clear and easy to understand language was attempted. The screens with information/images were contextualized and accessible. In the development of health technologies, the user-centered design cannot be dissociated from health literacy.

With the expressive number of users of mobile applications, the health team should take advantage of this interest and make this tool an ally in the guidelines for the prevention and treatment of obesity, as well as maintaining healthy habits. The selection of applications in a judicious way can promote

a greater approximation of the professional and improve the understanding of the user about their health status, as well as sharpen their interest in taking care of their own health.

Mobile technologies are already part of our daily lives and, for the reasons stated, have the potential to impact health promotion in a positive way, especially in the prevention and treatment of overweight and obesity, which are currently major challenges to public health in the world[11].

Final considerations

After all the steps taken and constant discussions of the interdisciplinary development team of the Lisa Obesidade design, a technological resource was obtained which is expected to offer users the adoption of comprehensive measures of health care, favoring its empowerment and configuring itself as an additional tool to help health professionals carry out health promotion actions.

The technology developed in this study is available for the evaluation stage of judges and the public.

In view of the above, it is clear that the tool developed here is part of a strategy for empowering users, which does not exempt periodic monitoring with health professionals.

Collaborators

Oliveira LMR participated in the conception, planning, analysis, interpretation and writing of the work; Vergara CMAC participated in the interpretation of data and analysis of the writing of this article; Sampaio HAC brought contributions in the critical review of the article; Vasconcelos JE participated in the conception, planning, analysis, interpretation of data. ■

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