

Development of a digital technology for adolescents with urinary incontinence: “Segura aí”

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ABSTRACT

Objective: To describe the development of a digital technology prototype in the nurse navigator patient navigation modality, aimed at adolescents with urinary incontinence. **Method:** An experience report on the development of a digital health technology in urological care called “Segura aí”. The development of “Segura aí” was based on the intervention mapping approach, following the stages: 1) needs assessment; 2) preparation of matrices of change objectives; 3) definition of practical applications and theory-based methods to be used; and 4) development of intervention program components and materials. **Results:** “Segura aí” was created as a digital navigation tool to support the development of self-management skills for urinary incontinence symptoms, recognizing their impact on adolescents’ lives and assisting with symptom management in different social settings. **Conclusion:** “Segura aí” was developed to manage urinary incontinence symptoms in adolescents, with the aim of improving treatment adherence and becoming a tool for adolescent empowerment, supporting the development of self-care skills needed during the transition from pediatric to adult care.

DESCRIPTORS: Urinary incontinence. Adolescent health. Internet-based intervention. Self management. Patient navigation.

Desenvolvimento de tecnologia digital para adolescentes com incontinência urinária: “Segura aí”

RESUMO

Objetivo: Descrever o desenvolvimento de protótipo de tecnologia digital na modalidade de navegação de pacientes do tipo enfermeiro navegador, voltada para adolescentes com incontinência urinária. **Método:** Relato de experiência sobre o desenvolvimento de tecnologia digital em saúde urológica denominada de “Segura aí”. A construção do “Segura aí” se baseou na abordagem de mapeamento de intervenção (*intervention mapping approach*) baseada nas etapas: 1) avaliação de necessidades; 2) preparação das matrizes dos objetivos da mudança; 3) definição das aplicações práticas e métodos baseados em teoria a serem utilizados; 4) desenvolvimento de componentes e materiais do programa de intervenção. **Resultados:** O “Segura aí” foi criado para ser uma ferramenta digital de navegação, a fim de apoiar o desenvolvimento de habilidades de autogerenciamento dos sintomas de incontinência urinária, reconhecendo os impactos na vida do adolescente e auxiliando no manejo de sintomas nos diversos ambientes sociais. **Conclusão:** O “Segura aí” foi desenvolvido para manejo dos sintomas de

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incontinência urinária em adolescentes, com a finalidade de melhorar a adesão terapêutica, bem como se tornar uma ferramenta de empoderamento do adolescente, apoiando-o no desenvolvimento de habilidades de autocuidado, que são necessárias na transição do cuidado pediátrico para o adulto.

DESCRITORES: Incontinência urinária. Saúde do adolescente. Intervenção baseada em internet. Autogestão. Navegação de pacientes.

Desarrollo de tecnología digital para adolescentes con incontinencia urinaria: “Segura a!”

RESUMEN

Objetivo: Describir el desarrollo de un prototipo de tecnología digital en la modalidad de navegación de pacientes del tipo enfermero navegador, dirigida a adolescentes con incontinencia urinaria. **Método:** Informe de experiencia sobre el desarrollo de una tecnología digital en salud urológica denominada “Segura a!”. La construcción de “Segura a!” se basó en el enfoque de mapeo de intervención (*intervention mapping approach*), basado en las siguientes etapas: 1) evaluación de necesidades; 2) preparación de las matrices de los objetivos del cambio; 3) definición de las aplicaciones prácticas y los métodos basados en teorías que se utilizarán; 4) desarrollo de los componentes y materiales del programa de intervención. **Resultados:** “Segura a!” fue creado como una herramienta digital de navegación, con el fin de apoyar el desarrollo de habilidades de autogestión de los síntomas de incontinencia urinaria, reconociendo los impactos en la vida del adolescente y ayudando en el manejo de los síntomas en los diversos entornos sociales. **Conclusión:** “Segura a!” fue desarrollado para el manejo de los síntomas de incontinencia urinaria en adolescentes, con el propósito de mejorar la adherencia terapéutica, así como convertirse en una herramienta de empoderamiento del adolescente, apoyándolo en el desarrollo de habilidades de autocuidado necesarias para la transición de la atención pediátrica a la atención de adultos.

DESCRIPTORES: Incontinencia urinaria. Salud del adolescente. Intervención basada en internet. Autogestión. Navegación de pacientes.

INTRODUCTION

Lower urinary tract symptoms (LUTS) encompass a set of causes ranging from neurological, anatomical, and functional disorders. This group of symptoms includes urinary incontinence (UI), enuresis, dysuria, urgency, increased or decreased urinary frequency, hesitancy, dribbling, straining, postponement of urination, and urinary retention¹. However, the most prevalent LUTS among children and adolescents are daytime UI and enuresis^{1,2}.

These symptoms have a substantial impact on adolescents' quality of life, predisposing them to emotional disorders that intensify when they need to manage UI, and when they begin living with and attempting to manage UI symptoms, this situation becomes even more challenging¹⁻⁴. LUTS may progress to incontinence-associated dermatitis, which causes pain, burning, and discomfort, affecting well-being⁵. Furthermore, adolescents experience low self-esteem, insecurity, anxiety, and social isolation, affecting their parents and family life^{2,4}.

Considering the psychosocial and biological repercussions of these symptoms on adolescents' lives, management and treatment are crucial for reorganizing their daily activities and improving their quality of life^{1,4}. The search for technologies that facilitate symptom management and promote well-being is strategic for minimizing the impacts of this urological condition on adolescents' daily routines⁶.

The use of standard urotherapy (SU) is recommended as a first-line treatment, as it is a nonpharmacological approach based on changing elimination behaviors and promoting healthy lifestyle habits¹⁻³. The control and management of urinary symptoms generally occur over the long term, and attending numerous follow-up and monitoring appointments can be

challenging for families and adolescents⁷. Considering the needs of adolescents with UI, an alternative was developed to facilitate the dynamics of frequent follow-up appointments and health applications that facilitate patient adherence to treatment and healthcare, in the form of patient navigation, in which clients independently follow a care guide while being accompanied by healthcare professionals throughout the process of managing their symptoms^{3,5}.

Conceptually, the patient navigation program consists of a patient- and family-centered model of care aimed at providing support and promoting autonomy in the self-care process⁸. In this context, digital technologies have emerged as tools capable of promoting the adoption of healthy habits. Evidence from randomized controlled studies^{3,9,10} indicates that the use of these technologies in patients with cystic fibrosis can encourage physical activity and increase engagement in treatment, contributing to improved treatment adherence.

Furthermore, various types of technologies can be incorporated into the health field^{3,5,11}, which, regardless of their format, are viewed as allies in implementing individualized and personalized actions for patients³⁻⁵. These tools enable the development of preventive measures, such as an interactive game aimed at the assessment, prevention, and treatment of incontinence-associated dermatitis⁵.

It is important to highlight that nursing professionals can be trained to provide integrated care within a patient navigation model, with their primary role being case management with a humanized approach, recognizing the care trajectory and empowering patients and their families⁹. Few models have been identified in Brazil, the pioneers in implementing this navigation service are oncology units, where nursing professionals coordinate care and provide the support needed to overcome the impact of diagnosis and treatment⁸.

When digital technology is integrated into care, nursing becomes a mediator of this care, strengthening patients and their families and making them leaders in this process, thereby enabling them to understand their health condition more proactively and promoting treatment adherence^{3,12}.

Thus, better health outcomes are achieved because patients feel more engaged, promoting leadership in following the therapeutic plan^{4,11,13}, given the difficulties faced by adolescents with urinary symptoms, ranging from frequent appointments for symptom assessment and monitoring to the shortage of professionals specializing in pediatric urology, particularly in the Brazilian context.

Considering the potential of digital health technologies to support care and promote better outcomes in symptom self-management, this study aimed to develop a digital technology in the form of nursing navigation related to urological care, targeting adolescents with UI¹³.

OBJECTIVES

To describe the development of a digital technology prototype in the nurse navigator patient navigation modality, aimed at adolescents with UI.

METHODS

This is an experience report on the development of a digital health technology in urological care aimed at adolescents with UI, called “Segura at”. It was structured based on the Symptom Management Theory (SMT) and the five components of SU, and developed by a nursing undergraduate student and a nursing faculty member from a federal university in the Central-West Region of Brazil during the second semester of 2024.

The production of the “Segura at” prototype consists of developing an innovation within the context of health technologies. The definition, development, configuration, layout, and theoretical model of this digital patient navigation intervention in the form of a website were structured based on the theoretical framework of SMT, together with the first-line therapy known as SU, based on the intervention mapping approach, which aims to structure decision-making in the first four stages of a health program, from planning to intervention assessment¹⁴⁻¹⁶.

The stages are:

1. Needs assessment;
2. Preparation of matrices of change objectives;
3. Definition of practical applications and theory-based methods to be used;
4. Development of intervention program components and materials¹⁷.

Definition of the “*Segura ai*” prototype: needs assessment and preparation of matrices of change objectives

The starting point for creating the prototype of the digital intervention in urological health was the result of a series of discussions and creative thinking based on scientific evidence, SMT, and the design thinking approach. This is a human-centered innovation methodology that has gained popularity in the health sector because it increases reach in response to patients’ actual needs, assisting them more effectively and in a personalized manner¹⁵.

Development of the “*Segura ai*” layout: definition of practical applications

The layout was developed based on contextualized instructional design, creating a visual identity for the website^{17,18}.

Development of the “*Segura ai*” prototype and theoretical framework: theory-based methods

The construction and configuration of “*Segura ai*” were based on the initial stages of the intervention mapping approach, which provides a protocol for planning health promotion, prevention, and care programs based on theory and evidence¹⁷.

The digital technology model was developed based on SMT, which consists of a multidimensional process of symptom management, grounded in the premise that effective management of any symptom or group of symptoms should consider three components: symptom experience, symptom management strategies, and outcome^{13,14}.

In conjunction with SMT, the five components of SU were incorporated because it is considered a first-line treatment for UI and consists of a nonsurgical and nonpharmacological approach. SU is based on five components¹:

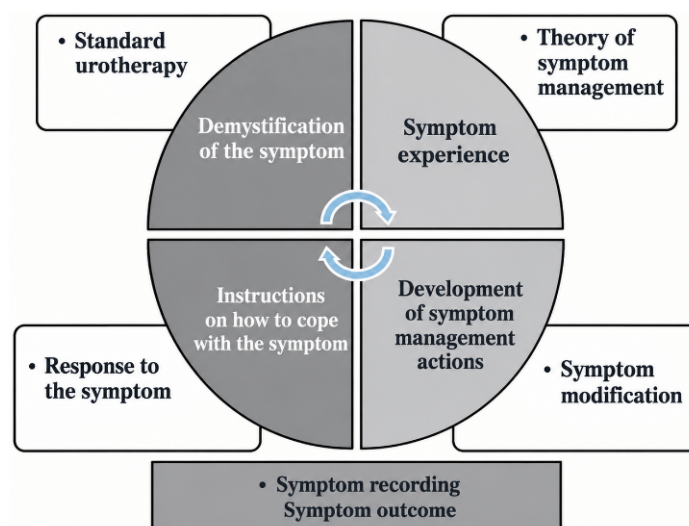
1. Information and demystification regarding lower urinary tract (LUT) function;
2. Instructions on how to address specific LUTS in each case;
3. Behavioral modification (regular bowel and urinary habits and appropriate posture on the toilet for elimination, among others), with guidance on a healthy lifestyle (adequate fluid intake, reduced caffeine intake, a fiber-rich diet, among others) and regular scheduling of urination intervals;
4. Recording of symptoms and elimination habits and identification of the pelvic floor musculature;
5. Systematic clinical follow-up.

“*Segura ai*”: development of intervention program components and materials and establishment of forms of adoption, implementation, and sustainability

The website modality was chosen to personalize treatment for the adolescent population and increase treatment adherence. To illustrate this integration, Figure 1 presents a schematic representation of the theoretical structure of “*Segura ai*”.

RESULTS

“*Segura ai*” was designed to disseminate relevant information for the practice of symptom self-management throughout the supported self-care journey, helping adolescents understand their symptoms and, consequently, better understand their urological condition and learn how to manage these symptoms through the application of SU practices in their daily routines.



Source: <https://sites.google.com/view/segura>.

Figure 1. Integration of the Symptom Management Theory with standard urotherapy. Brasília (DF), 2024.

Stage 1: Logical model of the problem and needs assessment¹⁷: to identify the problems, in accordance with the method of choice that the first stage establishes for needs assessment, a scoping review was conducted to map digital technologies and their applicability in the context of pediatric urology¹⁹. Searches were conducted in the Coordination for the Improvement of Higher Education Personnel (CAPES – *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*) Journal Portal, in the PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Scopus, Excerpta Medica dataBASE (EMBASE), Ovid Medline, Medical Literature Analysis and Retrieval System Online (MEDLINE Complete), and Latin American and Caribbean Health Sciences Literature (LILACS – *Literatura Latino-Americana e do Caribe em Ciências da Saúde*) databases. Eighteen eligible articles were selected to compose the final sample of the scoping review¹⁹. Internet-based technologies used in the context of pediatric urology included telehealth and telemedicine, which stood out as the most frequently used technologies by pediatric urologists to communicate with their patients/parents (38.89%), followed by mobile applications (22.22%), online intervention programs (16.6%), and, at a lower rate (5.55%), serious games, telephone calls, social media, and the voiding video. The applicability of these technologies improved self-management and self-efficacy, personalized care, health education, monitoring, and follow-up¹⁹.

In a second stage, a mixed-methods systematic review was conducted to investigate the perceptions of pediatric patients and their family members regarding the use of digital interventions in the context of pediatric urology, with the aim of identifying facilitating factors and barriers to the use of these tools. Eleven articles were selected to compose the final sample of this mixed-methods systematic review. The studies demonstrated that digital health interventions support patients and their family members in the process of self-management and self-efficacy in managing urinary and/or bowel symptoms, as well as in the follow-up and monitoring of these symptoms. In 45% of the studies, digital interventions were capable of improving healthcare, particularly in remote areas, contributing to reduced expenses and travel and promoting a more comfortable environment, safety, and privacy for patients and families¹⁸.

Stage 2: Program objectives (Logic Model of Change)^{3,12-17,20,21}: based on the second stage of the methodology, preparation of the matrices of change objectives, the development of "Segura a" was conceived as a type of digital technology in website format, organized into four main domains: symptom experience, symptom management strategies, and symptom outcomes, articulated with the five components of SU. The first phase is based on information and demystification regarding LUT function; the second is grounded in the process of behavioral modification (regular bowel and urinary habits, appropriate sitting posture on the toilet, etc.); the third consists of guidance on a healthy lifestyle (adequate fluid intake, reduced caffeine intake [and potential bladder irritants], a fiber-rich diet, with regular scheduling of urination intervals; the fourth is structured around recording symptoms and elimination habits; and the fifth concludes with measures for encouragement and symptom support/follow-up^{3,6,11}.

Stages 3 and 4: Program design and production¹⁷: “*Segura aí*” was developed on the Google Sites platform, integrated with Google Analytics, which is easy to understand and free of charge and can be accessed at <https://sites.google.com/view/segura-ai/apresenta%C3%A7%C3%A3o>.

The layout, artwork, and videos were developed using Canva, employing the contextualized instructional design methodology. The “*Segura aí*” layout features its own logo, with colors aligned with those of the university with which this project is affiliated.

Regarding the settings, there is a brief description of the purpose of this online intervention on the homepage. The four main axes of “*Segura aí*”, based on TMS¹⁴ and SU¹, were inserted into the main menu. Designed as an interactive and attractive website for adolescents, “*Segura aí*” is structured into gamified phases, as presented in Figure 2.



Source: <https://sites.google.com/view/segura>.

Figure 2. “*Segura aí*” phases. Brasília (DF), 2024.

Phase I: “Knowing my territory, demystifying the symptom”. This phase aims to help adolescents become familiar with their bodies and their condition. Such self-knowledge is the first stage in assisting with the management and control of urinary symptoms. The topics addressed were getting to know the urinary system and its anatomy, what incontinence is, and its classifications.

Phase II: “Duel with the symptom”. This is the stage in which adolescents have already gained a better understanding of their condition and begin to realize that there is no need to fight the symptoms every day; they simply need to manage them. Thus, topics related to self-management of urinary symptoms are addressed (Figure 3).

Phase III: “In search of control”. This is the most important phase of “*Segura aí*”, because it is the point at which adolescents are engaged in trying to incorporate into their routines the habit changes that are important for managing UI symptoms (Figure 4).

“*Segura aí*” may last from four to six weeks so that adolescents can gradually incorporate each activity into their routines. There are also additional pages containing text-based activities, games, videos, and spaces for adolescent interaction, with the aim of promoting playful and lighthearted moments to balance the symptom self-management interventions provided by the program.

DISCUSSION

This study described the systematic process of developing a digital technology in the patient navigation modality, aimed at adolescents with UI. This study is significant because it presents the unique feature of a digital intervention that provides self-knowledge about the symptom and teaches in detail its management and implications for the daily routine of adolescents with UI.

However, it is worth remembering that you need to be committed to following the guidelines, as they are the key to achieving positive outcomes.

1

SCHEDULED VOIDING

Establish a scheduled voiding program is important for managing urinary incontinence symptoms. It allows you to set a schedule and regularize bladder emptying, thereby reducing frequent leakage. Practice scheduled voiding every 2 to 3 hours, emptying your bladder even if you do not feel the urge.

2

ADEQUATE FLUID INTAKE THROUGHOUT THE DAY

Scheduled urination should be combined with adequate fluid intake, prioritizing water. Therefore, you should drink about 250 ml of fluid each time you go to the restroom to urinate, as well as after every meal.

Source: <https://sites.google.com/view/segura>.

Figure 3. Guidelines for changing habits with standard urotherapy. Brasília (DF), 2024.

On the path of progress

Once you realize that you no longer need to battle incontinence, and that it is actually a process of self-management, I can say without a doubt that significant progress has been made.

Because the first step toward self-managing symptoms is knowing what is happening; the second step is understanding why those symptoms should be managed; and the third step... I'll tell you that right now!

HOW I CAN MANAGE INCONTINENCE SYMPTOMS

Now that you understand what constitutes these symptoms, and what doesn't, let's refer to managing Incontinence as **"Segurar A!"** (Hold it in), get the reference?

So, to successfully **"Segurar A!"** (Hold it in), there are a number of behavioral changes and tools that will assist you in the process.

That is why, at the end of this section, we have prepared a treasure trove of tips + instruments + tools to help you manage these symptoms.

MY TREASURE TROVE

UROTERAPIA

Source: <https://sites.google.com/view/segura>.

Figure 4. Guidelines for phase IV of "Segura a!". Brasília (DF), 2024.

The literature presents various types of technologies as digital interventions for adolescent health^{3,22}. A meta-analysis study highlighted that some interventions, including applications, telemedicine, and websites aimed at behavior change, demonstrated that application-based interventions have a positive effect on patients' lives²². MyHealthPA²² is an application aimed at adolescents, with the purpose of promoting the development of healthy habits from an early age and thus preventing diseases in adulthood¹⁵. Although "Segura a!" has a website format, the tool aims to promote change and encourage healthy elimination behaviors, resulting in positive outcomes related to UI symptoms.

Digital technologies are being widely used by patients diagnosed with chronic diseases^{3,10}. The use of mobile technologies, such as cell phones and tablets with applications and games, has been observed as a strategy to promote acceptability among adolescents because of their playful format, which generates engagement and safety¹⁵. This was one of the essential aspects in the development of “*Segura ai*”, in terms of an attractive design to increase engagement, so that adolescents would be interested while also feeling safe when applying the intervention to their routine.

Evidence highlights that internet-based technologies may have a positive effect on psychological well-being, regardless of the patient’s condition or diagnosis^{10,12,22}. The use of games and activities based on a positive psychology approach promotes positive effects and equivalent improvements in well-being^{4,18}. “*Segura ai*” was based on game and interaction sessions designed to provide adolescents with playful moments and communication with other users in the same age group, promoting an environment of well-being.

Study limitations

First, in the national context, no digital technology aimed at the health of adolescents with UI was identified. The main limitations of this study concern the need for content validation by experts and appearance validation by the target population, since future research on the acceptability and usability of “*Segura ai*” needs to be conducted.

Recommendations

Multicenter studies are recommended to expand knowledge about the use of digital health technologies in the context of urology, include professionals from different fields to enrich its content, conduct testing in clinical settings to assess its effectiveness, and disseminate it through training in clinical practice and in relation to the quality of care provided to patients with UI.

CONCLUSION

“*Segura ai*” is intended to be a personalized digital technology that meets adolescents’ needs and can be implemented into their routines, with the aim of improving adherence to SU-related recommendations and, consequently, the management of UI symptoms. It is an innovative program developed in the patient navigation modality, or even as a nurse navigator, in which nurses act as coaches, assisting with empowerment, support, and clarification regarding the health condition and promoting patients’ supported self-care.

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