Application to help physiotherapists in the evaluation of pelvic dysfunctions after cervical cancer

Aplicativo para auxiliar fisioterapeutas na avaliação de disfunções pélvicas após câncer de colo do útero

Bianca Silva da Cruz [1*]
Givago da Silva Souza [1]
Érica Feio Carneiro Nunes [2]
Felipe André da Costa Brito [1]

[1] Universidade Federal do Pará (UFPA), Belém, PA, Brazil
[2] Universidade do Estado do Pará (UEPA), Belém, PA, Brazil

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***Correspondence:** biancasilva_cruz@yahoo.com.br

Abstract

Introduction: Cervical cancer is caused by a persistent infection with some types of human papillomavirus (HPV), and its treatment entails chemotherapy, radiotherapy and surgery. This may cause different kinds of dysfunction in the pelvic floor. Hence, physiotherapy plays an important role in the evaluation and treatment of urogynecological dysfunctions occasioned by the oncological treatment. **Objective:** To develop a digital technology in application format to help physiotherapists in the assessment of pelvic dysfunctions after cervical cancer. **Methods:** A digital technology in application format was developed after approval from the Ethics in Research Committee of the Tropical Medical Center. The instrument was developed by a physiotherapist with expertise and experience in the area. The researchers held meetings to finalize the creation of the checklist, and the application was programmed using the Android Studio Environment. In the end, the application was evaluated by two physiotherapist experts in the field. **Results:** The application created displays five sections addressing the symptoms of urinary dysfunction, sexual function, anal function, pain and alterations such as: lymphedema, vaginal stenosis and vaginal fibrosis. **Conclusion:** The use of the application may help physiotherapists in the assessment of pelvic dysfunctions after cervical cancer.

Keywords: Oncology. Physiotherapy. Uterine cervical cancer.

Resumo

Introdução: *O câncer de colo do útero é causado pela infecção persistente por alguns tipos de papilomavírus humano e o seu tratamento envolve quimioterapia, radioterapia e cirurgia, podendo ocasionar diferentes disfunções no assoalho pélvico. Desta forma, a fisioterapia tem papel importante na avaliação e tratamento das disfunções pélvicas decorrentes do tratamento oncológico.* ***Objetivo:*** *Desenvolver uma tecnologia digital em formato de aplicativo para auxiliar fisioterapeutas na avaliação de disfunções pélvicas após câncer de colo do útero.* ***Métodos:*** *Trata-se do desenvolvimento de uma tecnologia digital em formato de aplicativo, que foi realizado após aprovação do Comitê de Ética em Pesquisa do Núcleo de Medicina Tropical. O instrumento foi elaborado por fisioterapeutas com expertise e experiência na área. Os pesquisadores realizaram reuniões para finalizar o processo de criação do checklist, e o aplicativo foi programado em ambiente Androide Studio. Ao final, o aplicativo foi avaliado por duas fisioterapeutas especialistas na área.* ***Resultados:*** *O aplicativo criado apresenta cinco capítulos abordando sintomas de disfunção urinária, função sexual, função anal, dor e alterações como linfedema, estenose vaginal e fibrose vaginal.* ***Conclusão:*** *A utilização do aplicativo poderá auxiliar os profissionais fisioterapeutas na avaliação de disfunções pélvicas após câncer de colo do útero.*

Palavras-chave: *Oncologia. Fisioterapia. Neoplasia do colo do útero.*

Introduction

Cervical cancer (CC) is caused by persistent infection by some types of human papillomavirus (HPV).[1] Genital infection by this virus is frequent, but most of the time the disease does not develop; still, cellular alterations may occur in some cases and progress to cancer.[1,2] OA pap smear verifies the cellular alterations caused by HPV, which, if diagnosed early, there is a high cure rate.[1,2]

In Brazil, except for non-melanoma skin tumors, CC is the third most common type of cancer among women. According to the 2022 estimate, 16,710 new cases were calculated, which is considered a risk of 15.38 cases per 100,000 women.[3] Regarding the treatment of CC, this may involve surgery, radiotherapy and chemotherapy, according to the stage of the disease. These therapies can cause damage to vascularization and pelvic innervation, to the functionality of the pelvic floor muscles, resulting in dysfunctions of the urogynecological system such as urinary incontinence, fecal incontinence, sexual dysfunction and vaginal stenosis, which impair the quality of life of women after completing cancer treatment.[4] Physiotherapy plays an important role in the conservative treatment of urogynecological disorders.[5-7] Among the resources used by physiotherapy are guidance on pelvic anatomy and on disorders caused by cancer treatment, vaginal desensitization, perineal massage, use of vaginal dilators, electrostimulation and others.[5-7] The benefits range from gain in perineal sensation, marked improvement in urinary loss, reduction of nocturia, and increased strength and endurance of the pelvic floor muscles, as well as improved sexual function and quality of life.[5-7]

In this context, it is worth mentioning that technologies have been helping health area professionals, mainly through the use of a mobile application that can contribute to the diagnosis, clinical decisions and therapeutic approach.[8] Thus, instruments that help physiotherapists in the evaluation and treatment of these patients are of great importance in the field of oncology, since few studies are carried out with this specific population.

Thus, the importance of physiotherapy in helping women after CC treatment is evident, so it is important to create instruments that help professionals in this process. Accordingly, the aim of this study was to develop a screening checklist for urogynecological physiotherapy after treatment for CC in the form of a mobile application, with the purpose of guaranteeing patients (who have an indication and real need) adequate physiotherapy assistance, since cancer cannot be treated underestimating the impacts of the disease and its treatment on urological, proctological and sexual functions.

Methods

This was an applied research study with an exploratory character, for the development of a digital technology in the form of an application to help determine an indication for pelvic physiotherapeutic care after CC treatment. The research was approved by the Research Ethics Committee of the Tropical Medicine Center of the Federal University of Pará (CAAEE: 29018720.2.0000.5172).

The instrument was developed by physiotherapists with expertise and experience in the area, based on bibliographical references in the area of women's health and oncology. The researchers held meetings to finalize the checklist creation process, and the application was programmed in an Android Studio environment. In the end, the application was evaluated by two physiotherapist specialists in the area. The programmed application was divided into five sections: 1 - symptoms of urinary dysfunction; 2 - sexual function; 3 - anal function; 4 - pain; 5 - body structure according to physiotherapeutic assessment. The application was evaluated by two specialists in the field, who were instructed to explore the application and report their opinion, as well as proposing changes and suggestions in a qualitative way. The instrument created was called CheckIn and comprises five sections and 31 questions (Figures 1 - 4).

Section 1 (symptoms of urinary dysfunction) is subdivided into obstructive, irritative and stress urinary incontinence symptoms (Figure 2). Section 2 (sexual function) addresses questions related to sexual interest, sexual pleasure, vaginal stenosis and vaginal lubrication (Figure 3). Section 3 (anal function) refers to fecal and anal incontinence (Figure 3), and section 4 (pain) is related to the pelvic, vaginal, anal and surgical region and to dyspareunia (Figure 3). Finally, section 5, which evaluates body structure according to physiotherapeutic assessment, inquires about the presence of vaginal stenosis (vaginal canal length less than 8 cm), lower-limb lymphedema (lower-limb perimetry with difference between limbs greater than 2 cm) and presence of fibrosis in the vaginal canal.

The questions in sections 1 to 4 should be marked according to the patients' responses, answered using a Likert 1-5 scale, where 1 (never) means absence of symptoms and 5 (always) means very severe symptoms. The final outcome can be classified as: no symptoms (response 1 on the Likert scale), mild symptom (response 2), moderate (response 3), severe (response 4) or very severe (response 5). Section 5, on the other hand, requires physiotherapeutic evaluation through lower limb perimetry, palpation of the vaginal canal and measurement of the vaginal canal, and must be answered by means of a dichotomous answer: yes (presence of dysfunction) or no (absence of dysfunction). Therefore, the application will be able to help physiotherapists in the assessment of post-CCU pelvic dysfunctions, addressing various aspects related to women's health.

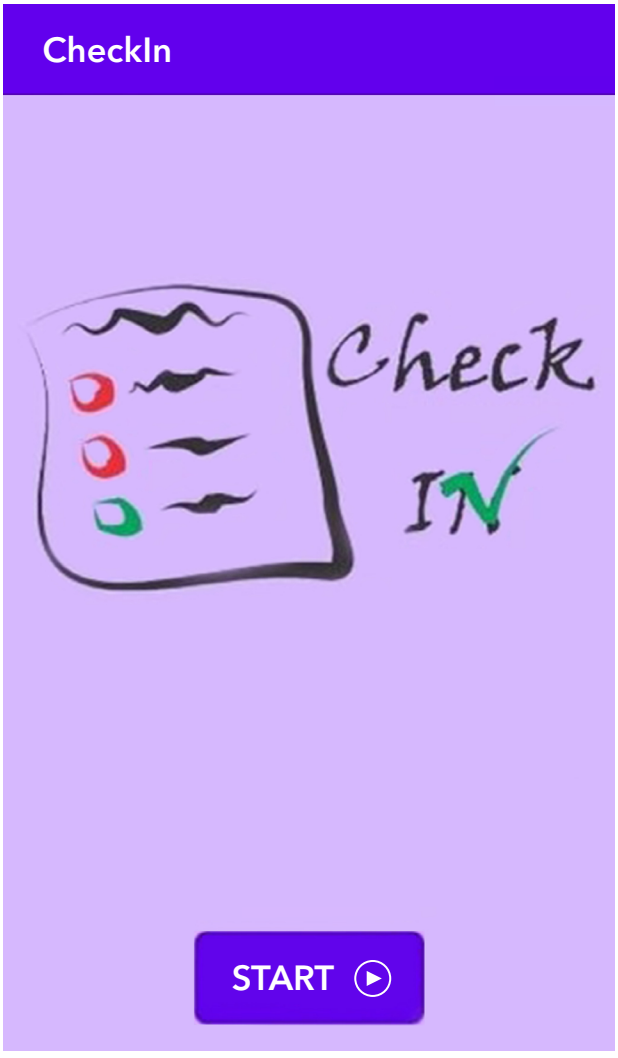

Figure 1 - Home screen of the developed app.

Results

Regarding the professionals' answers about the application, the following points were observed:

"I see that the application brings practicality to the evaluation and is an alternative to reach the therapeutic purpose by physiotherapists. However, I advise modifying it in some way so that the answer alternatives are shown and do not appear only after clicking on the question, to

give agility to use and, in addition, generate an interface (in PDF, for example) with the patient's responses so that it can be used to guide the treatment depending on the complaints collected in the application" (Physiotherapist 1).

"The application is very practical and easy. I believe that initially I need to show directions and explanations about how the application works. Questions related to surgery should have one more term in the answer (e.g., not applicable), as not all patients undergo surgery. Regarding the check-in, it was not clear that you should click on the question first in order for the response scale to appear. And when you finish the questions, you could have somewhere to click and rotate a page with the answer to all the questions and access to the final result" (Physiotherapist 2).

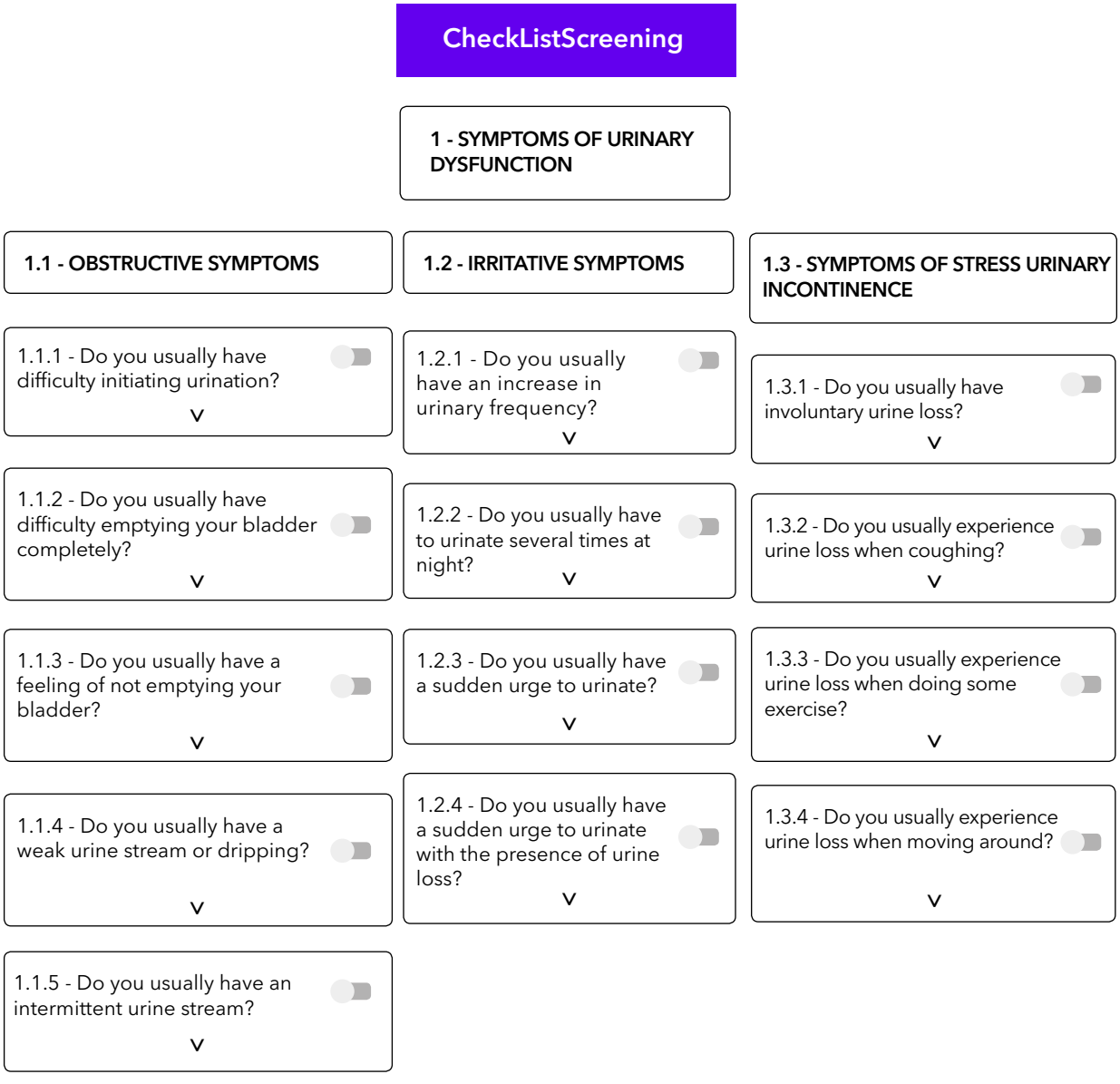

Figure 2 - Section 1 of the developed app: Symptoms of urinary dysfunction.

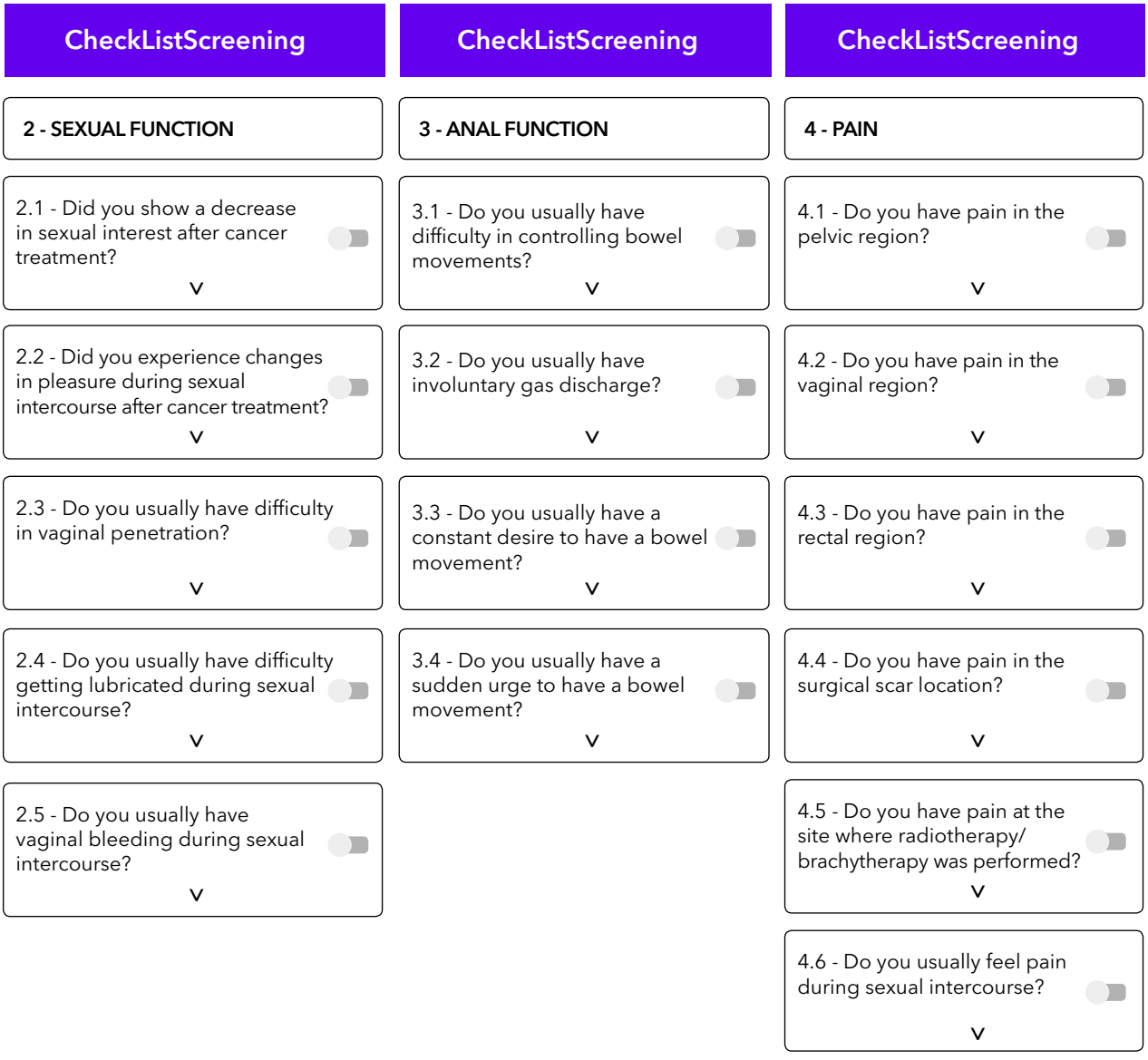

Figure 3 - Sections 2 (sexual function), 3 (anal function) and 4 (pain) of the developed app.

Discussion

The use of an application as a helpful tool in the health area is innovative and has been developing according to technological and scientific advances, which can contribute to greater precision in patient care in several aspects, including with regard to care. physiotherapeutic.[8] Technologies have been acting in a modern and resolutive way, culminating in beneficial outcomes for problems that were mostly complicated to be solved in the health area. This advance in the use of applications by health professionals, with the aim of solving problems quickly and efficiently, occurs in all areas and contributes to early diagnosis, effective treatment and choice of treatment.[8]

Regarding physiotherapy, some applications are already available related to the orthopedic area, virtual reality and storage of patient data, among others.[9,10] Thus, mobile applications are suitable for simulating or even replacing some activities of physiotherapists, optimizing the professional's time, improving the consultation, diagnosis and follow-up of patients. Regarding the

oncology area, specifically focused on CC, the creation of this application will help in the evaluation of patients and advise on choosing the type of treatment.[9,10]

The application addresses the most obvious post-treatment dysfunctions for CC, which are vaginal stenosis, sexual dysfunction, lymphedema and urinary incontinence or problems related to bladder function. Studies have determined the presence of urinary symptoms after treatment for CC, such as stress and mixed urinary incontinence, symptoms related to bladder overactivity, urge incontinence, increased urinary frequency, nocturia and urinary urgency.[11] Noronha et al.[12] carried out a study with 60 post-CC patients divided into three groups (radical hysterectomy, exclusive radiotherapy and chemoradiation), which had similar measures of urinary incontinence, urinary urgency, urge incontinence and stress and urge bowel evacuation Thus, it is evident that urinary incontinence and problems related to bladder function are a consequence of cancer treatment and therefore need to be addressed in this population. Thus, in the checklist prepared, there is a section related to the symptoms of urinary dysfunction, which were divided into obstructive, irritative and stress urinary incontinence.

The instrument also addresses vaginal stenosis, which is frequently reported by patients after cancer treatment, especially by those undergoing brachytherapy, as described by several scientific studies.[12-14] The assessment used in the instrument is based on the National Cancer Institute, which describes that the vaginal length should be greater than eight centimeters;[3] therefore, values smaller than eight centimeters are indicative of vaginal stenosis. In addition, patients undergoing brachytherapy may also have vaginal fibrosis caused by inflammation, which can stress the epithelial tissue, leading to pelvic pain and impaired sexual function.[3]

Regarding sexual function, the dysfunctions addressed in the instrument were those related to sexual interest and pleasure, lubrication, dyspareunia and the presence of bleeding during vaginal penetration. A study carried out with 85 patients after CC treatment 32.9% reported dyspareunia, 25.95% changes in sex life, 22.3% reduced sexual interest, and 16.4% lower frequency of sexual intercourse.[14] According to Ramalho et al.,[15] sexual dysfunction is prevalent among gynecological cancer survivors, negatively impacting quality of life.

Sexual function is directly associated with the quality of life in patients treated for CC and involves physical and psychological factors. Regarding cancer patients, this is something that should be evaluated due to the traumas of the treatment that affect sexual function and the type of treatment, since chemotherapy can affect ovarian function and induce an early menopause, leading to dyspareunia, vaginal atrophy and reduced lubrication.[16] Surgeries, on the other hand, can cause nerve damage and reduced blood circulation to the pelvic organs, affecting physiological response and sexual stimulation.[16] Radiotherapy, in turn, also affects ovarian function and causes tissue damage, leading to tissue hypoxemia, fibrosis and vaginal stenosis.[16]

Another problem that occurs due to the removal of the inguinal lymph nodes or radiotherapy in the region of the lymph nodes is the possibility of the appearance of lymphedema in the lower limbs, which is also addressed in the instrument developed.[17] Lymphedema is mainly associated with the surgical treatment of lymphadenectomy, radiotherapy and progression disease.[17] In the study by Rebegea et al.,[17] the incidence of lymphedema in post-CC patients was 15%. Bona et al.[18] concluded from their study that the frequency of lymphedema after CC treatment is variable and that it is mainly associated with the extent of lymphadenectomy, number of lymph nodes removed and adjuvant radiotherapy. The assessment of lymphedema addressed in the instrument is the perimetry of the lower limbs, which determines the difference between limbs, with results greater than two centimeters indicating the presence of lymphedema.[19] In this way, the instrument contemplates several dysfunctions that may be present in women after CC treatment, emphasizing that with advances in early detection and oncological treatment, there has been a significant increase in patient survival. Thus, this advance must be accompanied by therapeutic developments that improve the quality of life of patients, addressing changes caused by treatment.[3,15]

Therefore, the evaluation of pelvic floor dysfunctions is a necessary tool in patients who have completed such treatment, as it allows the identification of patients who show some alteration and an indication for appropriate physical therapy. It is worth noting that pelvic floor dysfunctions have physical, economic, psychological, emotional and social consequences.[20] Accordingly, treatment through physiotherapy is important, as studies show positive results in the treatment, follow-up and guidance provided by physiotherapists in the field of oncology and women's health.[21]

Conclusion

The use of the application can help physiotherapists in the evaluation of patients after treatment for CC, and also includes the main dysfunctions that can be addressed during an evaluation of patients in the area of women's health. This type of monitoring through a checklist in the form of an application proves to be a promising resource in the care of cancer patients.

Authors' contribution

BSC, GSS and EFCN were responsible for the conception and design of the study, preparation of the checklist and critical review of the manuscript in terms of content. BSC wrote the manuscript, and GSS and FACB wrote the mobile app. All authors approved the final version.

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