Original Article

Development and validation of a prototype multimedia application to enhance health education on the pelvic floor muscles among pregnant and puerperal women in Brazil

Ana Jéssica dos Santos Sousa^, Jessica Gabriela de Godoi Fernandes, Carolina Angélico, Patricia Driusso^

Women's Health Research Laboratory (LAMU), Department of Physical Therapy, Federal University of São Carlos, São Carlos, SP, Brazil

Contributions: (I) Conception and design: All authors; (II) Administrative support: All authors; (III) Provision of study materials or patients: All authors; (IV) Collection and assembly of data: All authors; (V) Data analysis and interpretation: AJDS Sousa, P Driusso; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Patricia Driusso. Federal University of São Carlos, Rodovia Washington Luís, km 235, CEP: 13565-905, São Carlos, SP, Brazil. Email: pdriusso@ufscar.br.

Background: Women are interested in and need to receive more information about pelvic floor muscles (PFMs), its functions, and dysfunctions. The aim of this study is to develop and validate a multimedia application (app) aimed to enhance health education on PFM among pregnant and postpartum women in Brazil.

Methods: This is a descriptive, transversal study in the modality of technological production, consisting of three stages, namely, bibliographic review, development of the multimedia app prototype, and validation of the multimedia app by specialists in the fields of health and technology as well as pregnant and postpartum women. The validation specialists answered an instrument that evaluated several skills including functioning, content, language, illustrations, general aspects, innovation and design, and level of satisfaction. The data obtained were tabulated and analyzed using Microsoft Excel for Windows® 2010. Analysis of the validation of the app prototype and its content was performed using the Content Validity Index (CVI) and by calculating the percentage of absolute agreement.

Results: The app presented a CVI of 0.89 by experts and 0.93 by the participating pregnant and postpartum women, with a global CVI of 0.91. The level of agreement between professionals and the participating pregnant and postpartum women was 93.7% and 95.8%, respectively, resulting in an overall level of agreement of 94.8%.

Conclusions: The educational material in the app format was evaluated based on its functionality, content, language, illustrations, design, and innovation. Furthermore, the content has been validated for pregnant and postpartum women. Thus, this content will contribute to the promotion of health education and dissemination of information regarding PFM, its functions, and dysfunctions.

Keywords: Pregnant women; pelvic floor; health education

Received: 13 October 2022; Accepted: 17 March 2023; Published online: 10 April 2023.

doi: 10.21037/mhealth-22-40

View this article at: https://dx.doi.org/10.21037/mhealth-22-40

^ ORCID: Ana Jéssica dos Santos Sousa, 0000-0003-1714-8709; Patricia Driusso, 0000-0001-8067-9786.

Introduction

Background

The pelvic floor muscles (PFMs) are responsible for supporting the pelvic organs, urinary and fecal continence, and sexual functions (1). Pregnancy and childbirth are major risk factors for PFM disorders such as urinary and fecal incontinence, pelvic organ prolapse, and sexual dysfunction (2-4). Thus, a highly accessible health education is needed about PFM anatomy (5), function (1), and potential for dysfunction (6) within the perinatal year (2,3), as drawn from the scientific literature (4).

Rationale and knowledge gap

There are known limits to pregnant women's education access about the pelvic floor and their functions via clinicians (7,8), hence direct to consumer health instruction has merit. A study indicate that women feel the need to receive more information about PFM and that acquiring knowledge in this regard can reduce anxiety related to the development of PFM dysfunctions (4). In addition, women who receive knowledge underlying the importance of PFM during pregnancy exhibit increased satisfaction with the childbirth experience (9).

Among the therapeutic treatments available to prevent PFM dysfunction, pelvic floor muscles training (PFMT) is a minimally invasive first-line treatment for PFM disorders that can be performed during pregnancy and after delivery (10). Evidence indicates that PFMT performed during pregnancy can reduce the risk of developing urinary incontinence (UI) pre- and postpartum by approximately 62% (11) and improve the quality of life of women with UI disorders (12).

Unfortunately, not all women have access to information on PFM, their functions and the benefits of PFMT (4). Therefore, there is a need to develop technological tools to expand women's knowledge in this context (13).

Objective

Thus, the general objective of the present project was to develop and validate an accessible and free multimedia application (app) that provides health education on PFM, primarily focusing on pregnant women as the target audience. This manuscript is written following STROBE reporting checklist (available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-22-40/rc) (14).

Highlight box

Key finding

- The educational material in the application was validated based on its functionality, content, language, illustrations, design, and innovation.

What is known and what is new?

- Women are interested to receive more information about pelvic floor muscles, its functions, and dysfunctions.
- The application content will contribute to the promotion of health education and dissemination of information regarding pelvic floor muscle, its functions, and dysfunctions.

What is the implication, and what should change now?

- The health education for pregnant and postpartum women can promote autonomy in decision-making and improve their quality of life.

Methods

This research is descriptive and transversal, in the modality of technological production, developed in the Laboratory of Research in Women's Health, Department of Physiotherapy. This study was approved by the Ethics Committee of the Federal University of São Carlos (CAAE:40121820.30000.5504) and was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All participants agreed to participate and provided their informed consent in electronic format.

The research was conducted from March 2021 to March 2022 across three stages, namely, bibliographic review and language adequacy; multimedia app prototype development methodology; and validation of the multimedia app by specialists in the fields of health and technology as well as by pregnant and postpartum women.

Bibliographic review and language adequacy

This first stage consists of conducting a theoretical-scientific survey that supports the selection of information contained in the app interface. To survey the relevance of health education promoted by the app, an electronic search strategy was performed using combinations of keywords with the Boolean operators AND, OR, and NOT. The search was performed in the PubMed database using the Medical Subject Headings (MeSH) tool, based on the following health descriptors: health education, pregnant

women, pregnancy, pelvic floor, and pelvic floor disorders.

The inclusion criteria comprised content on anatomy, function, and dysfunction of the pelvic floor in pregnant and postpartum women; physical therapy assessment and intervention in PFM disorders in pregnant and postpartum women; PFM preparation strategies for childbirth; health education aimed at pregnant women; and the benefits and barriers associated with this practice. In addition, the language used in the survey was adapted to make it accessible to the target audience, making it possible for the population to understand the content.

Multimedia application prototype development methodology

During the prototype development stage, this study used the contextualized instructional design (CID), which consists of the intentional and systematic action of planning, developing, and applying specific didactic situations, incorporating mechanisms that favor contextualization and human learning (15). Thus, based on the CID model, the Multimedia app includes the following steps.

Analysis phase

The educational objectives, content, and technological infrastructure were defined in the creation of a diagram to guide the construction of the tool (Appendix 1).

Design phase

Definitions of pedagogical concepts that promote learning, planning, and production of didactic content; definition of topics and writing of screens; selection of media; and the design of the interface (layout) were established.

Development phase

The Android® operating system (Google, United States) was selected for the development of the mobile platform based on its popularity and use in different types of devices (smartphones, tablets, cell phones, etc.). The app was developed and hosted on a Wix platform (https://pt.wix.com).

Implementation phase

In this phase, the configuration of educational technology tools and resources was carried out. Furthermore, an environment for downloading the app was configured on the Internet and installed on a mobile device.

Validation of the multimedia App

The app validation was performed in two stages. First, experts in the area of health and technology were consulted. Second, pregnant and postpartum women validated the data. Specialists of the health and technology, pregnant and puerperal women aged 18 years or older were included in this study. Pregnant and puerperal women were invited to participate in the research through the dissemination of the project on social media (i.e., facebook, and instagram). Experts interested were communicated electronically via e-mail by the researchers. There was the attempt to recruit a diverse population in terms of age, level of schooling and country region. Were excluded participants who refused to sign the Free and Informed Consent Term (FICT), which outlined the objectives and purpose of the project. The FICT was provided on Google Forms, and all participants were able to download a copy.

After demonstrating interest in participating in the validation, the professionals received an e-mail with the procedures for the validation process of the educational material: the link to access the app content, hosted on the Wix platform, and the instrument validation questionnaire, which included some objectives and essay questions to enhance the contribution of suggestions for improvement. Furthermore, the changes proposed by the specialists were analyzed and implemented. Thereafter, the prototype was validated by pregnant and postpartum women, as well as by future users of the material.

For the proper evaluation of the application, a specific instrument was adapted and used to assess competencies and assess the importance of the content in this educational material (16,17). Particularly, the following criteria were evaluated: functionality, content, language, illustrations, design, innovation, and satisfaction with the application. The validation form was composed of questions related to educational aspects, didactic resources of the app, and the environment's interface. The possible answers were based on the Likert (18) scale which includes: 1, strongly disapprove; 2, disapprove; 3, approve; 4, strongly approve (*Table 1*). Furthermore, additional comments and suggestions on each criterion to improve the educational material could be provided in a blank field at the end of each session.

Statistical analysis

The data obtained were tabulated and analyzed using

Table 1 Application evaluation questionnaire

Item	Strongly disapprove [1]	Disapprove [2]	Approve [3]	Strongly approve [4]
Functionality				
1.1 Fast and simple app?				
Content				
2.1 Do you think the information in the educational material is relevant for pregnant women and does it have the essential information needed to understand the pelvic floor musculature (its functions, dysfunctions, and training, among others)?				
2.2 Can the information in this educational material be used for prevention or search for treatment?				
2.3 Would you send this educational material to more people who might be interested in the topic?				
2.4 Does the content encourage pregnant women to continue to read, seek other information, and find professionals who help them and that can provide the services described in the application, among others?				
Language				
3.1 Did you have any difficulty understanding the words used in the educational material?				
Illustrations				
4.1 Are the app's illustrations attractive and organized?				
4.2 Is the mount of images adequate?				
4.3 Are the images easy to understand?				
General aspects				
5.1 Is the size of the educational material adequate?				
5.2 Is the presentation of the material adequate (i.e., colors, characters, and audio, among others)?				
Design and innovation				
6.1 Is the application well-designed and innovative?				
Satisfaction with the application				
7.1 I am well satisfied with the app.				

app., application.

Microsoft Excel for Windows® 2010. For the distribution of sociodemographic and clinical data, descriptive analysis was performed using frequency (absolute and relative), measures of central tendency (mean), and dispersion (standard deviation).

The analysis of the app validation and its content was conducted using the Content Validity Index (CVI) (19), which allows verification of the usability/acceptability of a prototype app evaluated for both technical ease and appropriateness of content selection. According to the literature, a cutoff score exceeding 0.80 is ideal for validating educational materials (20). Furthermore, the percentage of absolute agreement was calculated, which consisted of the sum of positive responses from the evaluators divided by the total number of evaluations performed. The minimum level of consensus required in the literature was 75% (21).

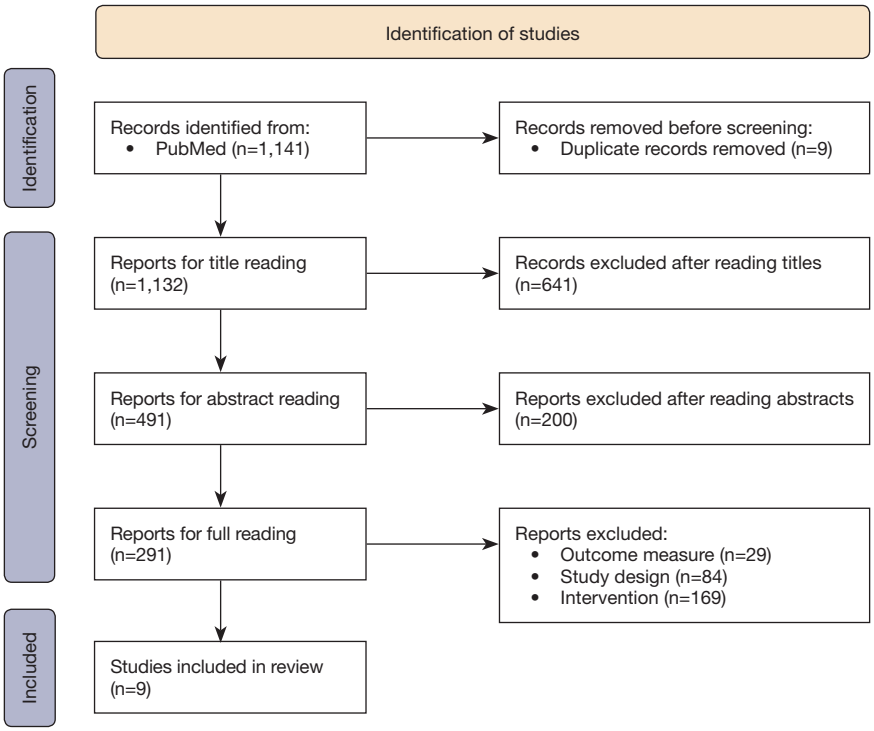

Figure 1 Flowchart of study selection.

Results

In the literature review, 1,141 studies were identified. Initially, duplicate studies were excluded. Then, the selection by titles was performed, followed by a selection of abstracts and, later, the full content of the articles. Nine articles were selected as a result of the literature review (*Figure 1*).

Review papers from this study were used to support the content included in the educational material. *Table 2* describes the selected articles.

From the choice and organization of the content, it was necessary to analyze the best strategies to display this information. Particularly, this project aimed to enhance the understanding of the educational material among the target audience (i.e., pregnant and puerperal women). Consequently, simple expressions were used to avoid jargon from the health area, to maintain an informative, clear, and accessible language. Furthermore, the process was conducted using illustrations and videos. Moreover, images with subtitles were used, highlighting the basics required for understanding and avoiding excessive information that could discourage further reading and understanding of the material. The videos were created to synthesize content using animations that facilitated understanding.

Upon completing the content, evaluation strategies were created to include different perspectives of the subject. In this context, health and technology professionals (TP) and pregnant and postpartum women were invited.

The application validation content was initially conducted by 13 health professionals (HP) (81.3%) and three technology experts (18.7%). The socio-demographic data, including academic background and areas of operation, are described in *Table 3*.

Table 4 presents the data underscoring the CVI for each item of the assessment instrument. The analysis was divided into HP and TP. In general, most of the evaluated criteria reached CVI values above the cutoff proposed by the literature of 0.80. Only Items 1.1 and 3.1, from the validation with TP, exhibited a lower CVI than expected. However, the average of the material was 0.89 among the experts, which was above the necessary cutoff.

The professionals who participated in the validation suggested several improvements such as adding a video that could explain navigation across the app. They also suggested using more didactic language in the illustrations.

All evaluations were considered and analyzed, resulting

Table 2 Descriptions of included studies

Author	Methods	Data
Miquelutti *et al.* [2013]	Qualitative study	Pregnant women with more information about PFM had greater control and self-confidence in labor and delivery
Miquelutti *et al.* [2013]	Randomized controlled trial	Women who underwent the systematic BPP had a lower occurrence of urinary incontinence. The BPP included PFMT and educational information about PFM
Miquelutti *et al.* [2015]	Randomized controlled trial	Details of the adopted conduct and the information were passed on to the women who participated in this research. Furthermore, it provides a basis for implementing birth preparation programs
Yikar *et al.* [2019]	Quasi-experimental research with a control group	Prenatal education reduces complaints during pregnancy and increases the quality of life of pregnant women
Daly *et al.* [2019]	Cross-sectional study	Many women do not receive any information about PFMT and its importance during prenatal care. This study presents statistical data on the lack of health education promotion, by healthcare providers, about PFM and PFMT
de Andrade *et al.* [2018]	Randomized controlled trial	A health education program on PFM improved women's knowledge about the pelvic floor. However, it did not increase muscle and sexual function nor reduce the occurrence of urinary incontinence
Martínez-Galiano *et al.* [2014]	Multicenter observational study	Prenatal education did not influence the type of delivery, but it favored the woman's active participation in childbirth and early skin-to-skin contact with the baby right after delivery. This study provides a basis for understanding the physiology of labor
Lawson *et al.* [2018]	Literature review	A theoretical foundation for PFM anatomy, functions, and dysfunctions. Furthermore, a framework for PFMT as a treatment and prevention option, among others
Castro-Pardiñas *et al.* [2017]	Descriptive cross-sectional study	Age and number of deliveries decrease PFM basal tone. Thus, healthy women had greater strength, endurance, and neuromuscular activity when compared to postpartum women and women with PFM dysfunctions

PFM, pelvic floor muscle; BPP, birth preparation program; PFMT, pelvic floor muscle training.

in new modifications to the material for validation with the target audience. *Table 5* presents the participants' suggestions.

In the content validation stage with the target audience, 13 pregnant women (86.7%) and 2 postpartum women (13.3%) were recruited, with a mean age of 31.4±6.23 years. The outstanding sociodemographic data are presented in *Table 6*.

Table 7 presents the CVI obtained from the app validation for pregnant and postpartum women. All evaluated criteria reached values above the 0.80 cutoffs. The average material was 0.93 among the target audience, indicating a high agreement.

After this validation process by specialist professionals and target audience, the app prototype was finalized for the health education of pregnant and postpartum women on PFM. The images of the application pages are illustrated in *Figure 2*.

Discussion

Pregnant women have a limited understanding of the functions and dysfunctions of the PFM (7), despite its extreme importance. In addition, practices such as intense medicalization, disrespect for the autonomy of the pregnant woman, and unnecessary interventions (i.e. episiotomy and instrumental birth), among others, contribute to increased risks for motherhood, childbirth, and puerperium (22).

Expanded access to this content will promote enhanced autonomy for pregnant women by ensuring that they have the necessary information to make important decisions about prenatal care and childbirth interventions that may impact PFM function. Gaining such knowledge increases the likelihood that these women will feel safe and satisfied with their choices. According to the guidelines established by the National Policy for Integral Attention to Women's Health, improving the women's quality of life through health

Table 3 Description of sociodemographic data of health and TP

Variables	N (%)
Sex	
Feminine	13 (81.3)
Masculine	3 (18.7)
Age group (years)	
18–25 years	3 (18.7)
26–30 years	4 (25.0)
>30 years	9 (56.3)
Healthcare professionals' data (N=13)	
Highest level of education completed	
University	1 (7.7)
Postgraduate	12 (92.3)
Current occupation	
Teaching practice	7 (53.8)
Clinical practice	2 (15.4)
Teaching and clinical practice	4 (30.8)
Years of area expertise	
<5 years	3 (23.1)
5–10 years	6 (46.1)
>10 years	4 (30.8)
Has experience with pregnant women	
Yes	12 (92.3)
No	1 (7.7)
TP' data (N=03)	
Highest level of education completed	
University	2 (66.7)
Postgraduate	1 (33.3)
Current occupation	
Teaching practice	0 (0.0)
App Developer	3 (100.0)
Years of area expertise	
≤5 years	3 (100.0)
>5 years	0 (0.0)
Has experience with app development	
Yes	3 (100.0)
No	0 (0.0)

TP, technology professionals; N, absolute sample frequency; %, sample frequency in percentage; app, application.

promotion, aiming at integrated healthcare, is necessary during this period of pregnancy and puerperium (22).

App creation is based on the growing use of technologies by the population (23) and seeks to build tools that act as facilitators in accessing new knowledge. Asklund *et al.* [2017] (24) created a mobile app for stress UI treatment in women and found a decrease in symptoms and an increase in quality of life. In addition, previously proposed educational materials were analyzed to have a basis on which contents should be addressed and an understanding of how to apply them and their possible results (25,26). In agreement with previous studies, our study showed a high level of agreement between experts and the target audience. Thus, the app may be an effective tool for education de mulheres with health issue similar.

The item "functionality" presented CVI among TP below the literature cutoff. This can be explained by the experience of higher-performance tools hosted in app stores. However, it is essential to note that other users of this material had a good experience. Furthermore, the "language" criterion was evaluated by TP below the cutoff. Therefore, the content was reviewed before being sent to pregnant women.

As the global average of educational materials reached a CVI value higher than that proposed in the literature, the content can be considered validated. Except for the two items already mentioned, the evaluations of professionals and the target audience showed a high level of agreement, demonstrating the effectiveness of the tool for pregnant and postpartum women. Therefore, the material will contribute to disseminating information about PFM and PFMT during pregnancy, providing a knowledge base for users who will benefit and make choices informed by scientific evidence.

This study had limitations concerning the sample size and diversity of pregnant and postpartum women. In addition, most participants exhibited a high level of education, which may have facilitated their understanding of the material. Evaluation by an ampler and a more diverse group of women could have contributed to different suggestions, resulting in further improvement. Moreover, the use of the app requires access to the Internet and mobile tools. However, many pregnant individuals do not have unlimited access to these technologies (27).

Conclusions

The application presented a CVI of 0.91, an agreement

Table 4 CVI of health and TP of each application evaluation item

Item	Strongly disapprove, n (%)		Disapprove, n (%)		Approve, n (%)		Strongly approve, n (%)		CVI	
	HP	TP	HP	TP	HP	TP	HP	TP	HP	TP
Functionality										
1.1 Fast and simple app?	0	0	0	2 (66.7)	4 (30.8)	0	9 (69.2)	1 (33.3)	0.92	0.5
Content										
2.1 Do you think the information in the educational material is relevant for pregnant women and does it have the essential information needed to understand the pelvic floor musculature (its functions, dysfunctions, and training, among others)?	0	0	0	0	2 (15.4)	0	11 (84.6)	3 (100.0)	0.96	1.0
2.2 Can the information in this educational material be used for prevention or search for treatment?	0	0	0	0	2 (15.4)	0	11 (84.6)	3 (100.0)	0.96	1.0
2.3 Would you send this educational material to more people who might be interested in the topic?	0	1 (33.3)	0	0	1 (7.7)	0	12 (92.3)	2 (66.7)	0.98	0.83
2.4 Does the content encourage pregnant women to continue to read, seek other information, and find professionals who help them and that can provide the services described in the application, among others?	0	0	0	0	3 (23.1)	0	10 (76.9)	3 (100.0)	0.94	1.0
Language										
3.1 Did you have any difficulty understanding the words used in the educational material?	0	1 (33.3)	10 (76.9)	1 (33.3)	1 (7.7)	0	2 (15.4)	1 (33.3)	0.85	0.67
Illustrations										
4.1 Are the app's illustrations attractive and organized?	1 (7.7)	0	0	0	3 (23.1)	1 (33.3)	9 (69.2)	2 (66.7)	0.90	0.92
4.2 Is the mount of images adequate?	0	0	0	0	4 (30.8)	1 (33.3)	9 (69.2)	2 (66.7)	0.92	0.92
4.3 Are the images easy to understand?	0	0	0	0	2 (15.4)	0	11 (84.6)	3 (100.0)	0.96	1.0
General aspects										
5.1 Is the size of the educational material adequate?	0	0	0	0	4 (30.8)	0	9 (69.2)	3 (100.0)	0.92	1.0
5.2 Is the presentation of the material adequate (i.e., colors, characters, and audio, among others)?	1 (7.7)	0	0	0	2 (15.4)	0	10 (76.9)	3 (100.0)	0.92	1.0
Design and innovation										
6.1 Is the application well-designed and innovative?	0	0	0	0	3 (23.1)	0	10 (76.9)	3 (100.0)	0.94	1.0
Satisfaction with the application										
7.1 I am well satisfied with the app.	0	0	0	0	4 (30.8)	1 (33.3)	9 (69.2)	2 (66.7)	0.92	0.92

N, absolute sample frequency; %, sample frequency in percentage; HP, healthcare professionals; TP, technology professionals; CVI, Content Validity Index; app., application.

Table 5 Suggestions made by specialist professionals during the validation process

Sections	Suggestions
Application function	• Put a brief orientation about how to navigate through the material on the first page
	• Decrease menu options to make it more straightforward and objective
	• Make the app run faster by turning it into a more compact material
Content	• Include a video that counts each set and repetition of the PFMT for the user to follow
	• Add a page with the references used in the preparation of the material
	• Point out that the pregnant woman can change her initial posture at the intervals of the exercises if she feels any discomfort
	• Change the description of bladder placement to "is positioned in front of and below the uterus"
	• Add that the perineal massage must be taught first by the physical therapist before the pregnant woman performs it alone or with the help of a partner
	• Emphasize the need for rest time between contractions and sets
Language	• Change the definition of episiotomy
	• Correct spelling mistake in one of the sentences
	• Change "there is" to "occurs" in "it is the channel where there is penetration during sexual intercourse..."
Illustrations	• Highlight subtitles so that they can be more evident
	• Add animation with pelvic organ prolapse
	• Increase the size of the arrows of the perineal massage animation
	• Emphasize the anteroposterior and elevation movement of the perineum in the animation of the PFM contraction
General aspects	• Complete material, but a little extensive. It would be interesting to try to reduce some of the content
	• Put colors with more contrast
Design and innovation	• Enhance the organization of the pages in the menu
Satisfaction with the application	• Add more illustrations
	• Emphasize that women can continue PFMT after the delivery

PFMT, pelvic floor muscle training; PFM, pelvic floor muscle.

Table 6 Description of sociodemographic and clinical data of pregnant and postpartum women

Variables	N (%)
Age group (years)	
18–25	3 (20.0)
26–30	3 (20.0)
>30	9 (60.0)
Level of schooling	
Elementary school	2 (13.3)
High school	4 (26.7)
University	4 (26.7)
Postgraduate	5 (33.3)
Marital status	
Married	11 (73.3)
Single	4 (26.7)
Country region	
Northeast	3 (20.0)
Southeast	9 (60.0)
South	3 (20.0)

N, absolute sample frequency; %, sample frequency in percentage.

Table 7 CVI of women of each application evaluation item

Item	Strongly disapprove, n (%)	Disapprove, n (%)	Approve, n (%)	Strongly approve, n (%)	CVI
Functionality					
1.1 Fast and simple app?	0	0	4 (26.7)	11 (73.3)	0.93
Content					
2.1 Do you think the information in the educational material is relevant for pregnant women and does it have the essential information needed to understand the pelvic floor musculature (its functions, dysfunctions, and training, among others)?	0	0	2 (13.3)	13 (86.7)	0.97
2.2 Can the information in this educational material be used for prevention or search for treatment?	0	0	1 (6.7)	14 (93.3)	0.98
2.3 Would you send this educational material to more people who might be interested in the topic?	0	0	1 (6.7)	14 (93.3)	0.98
2.4 Does the content encourage pregnant women to continue to read, seek other information, and find professionals who help them and that can provide the services described in the application, among others?	0	0	2 (13.3)	13 (86.7)	0.97
Language					
3.1 Did you have any difficulty understanding the words used in the educational material?	2 (13.3)	11 (73.3)	1 (6.7)	1 (6.7)	0.88
Illustrations					
4.1 Are the app's illustrations attractive and organized?	2 (13.3)	0	1 (6.7)	12 (80.0)	0.92
4.2 Is the mount of images adequate?	1 (6.7)	0	3 (20.0)	11 (73.3)	0.92
4.3 Are the images easy to understand?	0	1 (6.7)	3 (20.0)	11 (73.3)	0.90
General aspects					
5.1 Is the size of the educational material adequate?	1 (6.7)	0	3 (20.0)	11 (73.3)	0.92
5.2 Is the presentation of the material adequate (i.e., colors, characters, and audio, among others)?	0	1 (6.7)	3 (20.0)	11 (73.3)	0.90
Design and innovation					
6.1 Is the application well-designed and innovative?	0	0	4 (26.7)	11 (73.3)	0.93
Satisfaction with the application					
7.1 I am well satisfied with the app.	0	0	2 (13.3)	13 (86.7)	0.97

N, absolute sample frequency; %, sample frequency in percentage; CVI, Content Validity Index; app., application.

level between professionals of 93.7%, and between pregnant and postpartum women of 95.8%. The overall agreement was 94.8%, which was considered validated. Thus, the educational material on this app is expected to contribute to the dissemination of information on PFM and its importance, functions, and dysfunctions. Making this knowledge widely accessible can promote health education for pregnant and postpartum women, enhance their autonomy to make decisions with a scientific basis underscoring prenatal care and childbirth, and improve their quality of life. This application was developed and validated with the intention that pregnant and puerperal women have direct access to this information, however, we believe that this educational resource can also be used by HP.

Figure 2 The layout of the developed multimedia app prototype.

In the future, we intend to insert the application in operating system stores and carry out new tests to identify performance, compatibility, and errors related to the operating system. In addition, we also intend to analyze the adherence and self-efficacy of using this application in pregnant and puerperal women.

Acknowledgments

Funding: This study was financed in part by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior-(CAPES)-Finance Code 001 and São Paulo Research Foundation (FAPESP) (Project No. 2018/26718-9).

Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-22-40/rc

Data Sharing Statement: Available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-22-40/dss

Peer Review File: Available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-22-40/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://mhealth.

amegroups.com/article/view/10.21037/mhealth-22-40/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was approved by the Ethics Committee of the Federal University of São Carlos (CAAE:40121820.30000.5504) and was conducted in accordance with the Declaration of Helsinki (as revised in 2013). All participants agreed to participate and provided their informed consent in electronic format.

References

1. Eickmeyer SM. Anatomy and Physiology of the Pelvic Floor. Phys Med Rehabil Clin N Am 2017;28:455-60.
2. Mørkved S, Bø K. Effect of pelvic floor muscle training during pregnancy and after childbirth on prevention and treatment of urinary incontinence: a systematic review. Br J Sports Med 2014;48:299-310.
3. Bø K, Hilde G, Tennfjord MK, et al. Pelvic floor muscle function, pelvic floor dysfunction and diastasis recti abdominis: Prospective cohort study. Neurourol Urodyn 2017;36:716-21.
4. Neels H, Tjalma WA, Wyndaele JJ, et al. Knowledge of the pelvic floor in menopausal women and in peripartum women. J Phys Ther Sci 2016;28:3020-9.
5. Peschers U, DeLancey J. Anatomy. In: Therapeutic Management of Incontinence and Pelvic Pain [Internet]. London: Springer, 2019:9-20. Available online: http://link.springer.com/10.1007/978-1-84628-756-5_2
6. D'Ancona C, Haylen B, Oelke M, et al. The International Continence Society (ICS) report on the terminology for adult male lower urinary tract and pelvic floor symptoms and dysfunction. Neurourol Urodyn 2019;38:433-77.
7. Hill AM, McPhail SM, Wilson JM, et al. Pregnant women's awareness, knowledge and beliefs about pelvic floor muscles: a cross-sectional survey. Int Urogynecol J 2017;28:1557-65.
8. O'Neill AT, Hockey J, O'Brien P, et al. Knowledge of pelvic floor problems: a study of third trimester, primiparous women. Int Urogynecol J 2017;28:125-9.
9. Miquelutti MA, Cecatti JG, Makuch MY. Antenatal education and the birthing experience of Brazilian women: a qualitative study. BMC Pregnancy Childbirth 2013;13:171.
10. Lawson S, Sacks A. Pelvic Floor Physical Therapy and Women's Health Promotion. J Midwifery Womens Health 2018;63:410-7.
11. Woodley SJ, Boyle R, Cody JD, et al. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev 2017;12:CD007471.
12. Rogers RG, Ninivaggio C, Gallagher K, et al. Pelvic floor symptoms and quality of life changes during first pregnancy: a prospective cohort study. Int Urogynecol J 2017;28:1701-7.
13. Dumoulin C, Hay-Smith J, Frawley H, et al. 2014 consensus statement on improving pelvic floor muscle training adherence: International Continence Society 2011 State-of-the-Science Seminar. Neurourol Urodyn 2015;34:600-5.
14. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. Int J Surg 2014;12:1495-9.
15. Filatro AC. Learning design como fundamentação teórico-prática para o design instrucional contextualizado. [São Paulo]: Universidade de São Paulo, 2008;35-369. Available online: https://www.teses.usp.br/teses/disponiveis/48/48134/tde-12062008-142556/en.php
16. Duarte P, Canelas R, Soares R, et al. Avaliação para a aprendizagem em educação a distância: uma revisão integrativa de estudos sobre a utilização de e-rubricas. II Congresso Intencional TIC e Educação Em Direção à Educação 2012;2:3127-43. Available online: https://www.researchgate.net/profile/Rui-Soares-12/publication/256090419_II_Congresso_Internacional_TIC_e_Educacao_3127_AVALIACAO_PARA_A_APRENDIZAGEM_EM_EDUCACAO_A_DISTANCIA_UMA_REVISAO_INTEGRATIVA_DE_ESTUDOS_SOBRE_A_UTILIZACAO_DE_E-_RUBRICAS/links/00b7d521a2c17bc31e000000/II-Congresso-Internacional-TIC-e-Educacao-3127-

AVALIACAO-PARA-A-APRENDIZAGEM-EM-EDUCACAO-A-DISTANCIA-UMA-REVISAO-INTEGRATIVA-DE-ESTUDOS-SOBRE-A-UTILIZACAO-DE-E-RUBRICAS.pdf
17. Hernández Martín A, Casillas Martín S, Mena Marcos JJ. Elaboración de una rúbrica para la evaluación de la asignatura" Las TIC como instrumentos de innovación educativa" perteneciente al Máster: las TIC en educación. Análisis y diseño de procesos, recursos y prácticas formativas. Universidad Salamanca. 2016:1-30. Available online: https://gredos.usal.es/bitstream/handle/10366/130653/MID_15_72.pdf?sequence=1
18. Likert R. A technique for the measurement of attitudes. Archives of Psychology 1932;55:22-140.
19. Polit DF, Beck CT. The Content Validity Index: Are You Sure You Know What's Being Reported? Critique and Recommendations. Researchin Nursing & Health 2006:489-97.
20. Lynn MR. Determination and quantification of content validity. Nursing Research 1986;35:382-5.
21. Lima AC, Bezerra KC, Sousa DM, et al. Development and validation of a booklet for prevention of vertical HIV transmission. Acta Paul Enferm 201730:181-9.
22. Brasil. Política nacional de atenção integral à saúde da mulher: princípios e diretrizes. Brasília Ministério da Saúde, 2004:1-82.
23. UNESCO B. O Futuro da aprendizagem móvel: implicações para planejadores e gestores de políticas. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000228074, consultado a. 2014;10.
24. Asklund I, Nyström E, Sjöström M, et al. Mobile app for treatment of stress urinary incontinence: A randomized controlled trial. Neurourol Urodyn 2017;36:1369-76.
25. Hyakutake MT, Han V, Cundiff GW, et al. Pelvic Floor Health Education: Can a Workshop Enhance Patient Counseling During Pregnancy? Female Pelvic Med Reconstr Surg 2016;22:336-9.
26. Hyakutake MT, Han V, Baerg L, et al. Pregnancy-Associated Pelvic Floor Health Knowledge and Reduction of Symptoms: The PREPARED Randomized Controlled Trial. J Obstet Gynaecol Can 2018;40:418-25.
27. FÓRUM DE REFLEXÃO UNIVERSITÁRIA – UNICAMP. Desafios da pesquisa no Brasil: uma contribuição ao debate. São Paulo em Perspectiva 2002;16:15-23. Available online: https://www.scielo.br/j/spp/a/vCVKwBN3NC6Xk7yMX44QGDJ/?lang=pt&format=pdf

doi: 10.21037/mhealth-22-40
Cite this article as: Sousa AJDS, Fernandes JGG, Angélico C, Driusso P. Development and validation of a prototype multimedia application to enhance health education on the pelvic floor muscles among pregnant and puerperal women in Brazil. mHealth 2023;9:14.

Appendix 1 Script of the app contents

Page 1 (About the application)

Preparation of Pelvic Floor Muscles (PFM) in pregnancy
This app was developed by the Women's Health Research Laboratory (LAMU) of the Physical Therapy Department of the Federal University of São Carlos (UFSCar).
Its purpose is to present information about the pelvic floor muscles (which we will call in this app PFM) and how to train these muscles on a regular basis during pregnancy.
(video tutorial on how to navigate through the application)
(Logo of the Department of Physical Therapy, Laboratório de Pesquisa em Saúde da Mulher and the Universidade Federal de São Carlos)

Hello, future mom!
Training PFM during pregnancy is crucial. Just as you train other muscle groups at the gym, these muscles can also be trained and strengthened. When it is not working properly it can result in pelvic floor muscle dysfunction.

In this application, we will explain more about this subject!
(Button: Let's Start!)

All the illustrations and animations used are own or public domain (flaticon).

FOLLOW OUR SOCIAL NETWORKS
(Link to all social networks)

Page 2
Anatomy of the pelvic region

The anatomy of the pelvic region is composed of the pelvic organs (uterus, bladder, vagina, urethra, and rectum) and the PFM.
(Subpages buttons: Uterus, Bladder, PFM, Vagina, Urethra and Rectum)
(Illustration of a pelvis viewed from the side with the pelvic organs in evidence)
Ref: (1)

Subpage 2.1 (Uterus)
UTERUS
(Illustration uterus)
It's the organ responsible for **housing your baby during pregnancy.** In it we also find the endometrium, which is a layer that is prepared to receive the embryo and flakes off during menstruation if this does not happen.
Ref: (1)

Subpage 2.2 (Bladder)
BEXIGA
(Illustration bladder)
The bladder has the function of **temporarily storing our urine.** It is positioned in **front and below** the uterus, so as your baby grows and moves around, he puts a little pressure on the bladder and increases the urge to pee.
Ref: (1)

https://dx.doi.org/10.21037/mhealth-22-40

Subpage 2.3 (PFM)
PFM
(PFM Illustration)
It's a **set of muscles** and, together with ligaments and fascia, make up the pelvic floor.
(Eickmeyer, 2017)

Subpage 2.4 (Vagina)
VAGINA
(Vagina Illustration)
It's the **canal** where **penetration** occurs **during sexual intercourse**, where the **blood comes out during menstruation**, and **where the baby will pass during vaginal delivery** (also known as natural childbirth).
Ref: (1)

Subpage 2.5 (Urethra)
URETRA
(Urethra illustration)
It's the duct **responsible for carrying urine from the bladder to the outside of the body.** The urethra is located in the middle of our PMF, so changes in this musculature end up affecting it as well.
Ref: (1)

Subpage 2.6 (Rectum)
RECTUM
(Rectum Illustration)
It's the final straight portion of the large intestine in humans. It accumulates your feces, reabsorbing water and nutrients, until the moment of defecation.
Ref: (1)

Page 3
Pelvic Floor Muscle Function

Did you know that PFM is responsible for:

(Subpages buttons: Support of pelvic organs and baby, Urinary and fecal continence, Female sexual function and Labor e delivery)
Ref: (28)

Subpage 3.1
Support of the pelvic organs and the baby

PFM, along with ligaments and fascia, supports the pelvic organs. It **closes the opening** below the pelvic bones, forming **a hammock that holds the bladder, urethra, uterus (when pregnant, it holds the baby's weight as well), and rectum.**
(Illustration of a pelvis viewed from the side with the pelvic organs in evidence)
Ref: (28)

https://dx.doi.org/10.21037/mhealth-22-40

Subpage 3.2
Urinary and Fecal Continence

PFM is also **able to hold pee and feces, preventing the unintentional loss of these fluids.**
Ref: (28)
Below you will find a video about urinary continence:
(LAMU's own youtube video: **Do you know what Urinary Incontinence is?**)

Subpage 3.3
Female Sexual Function

Did you know that when PFM function is not adequate, problems can arise in a woman's sex life?
(Illustration of pregnant woman on the couch thinking)
Among the main problems that a woman may have, in case of impaired PFM function, we highlight:

- Pain during sexual activity
- Difficulty or impossibility of penetration
- Difficulty reaching orgasm

Ref: (28)

Subpage 3.4
Labor and delivery

The baby's head can be up to 4 times larger than the diameter of the vaginal canal (which the baby passes through).
(Illustration of the moment when the baby's head comes off)
Therefore, it is important that the PFM has sufficient stretch to allow the baby to pass through.
Ref: (29)

Page 4

Pelvic floor muscle dysfunctions
(PFMD)

In cases where PFM is not functioning well, the woman may present some dysfunctions:

(Subpages buttons: Pelvic Organ Prolapse (POP), Urinary Incontinence (UI), Anorectal incontinence and Female Sexual Dysfunctions)
Ref: (28)

Subpage 4.1
Pelvic Organ Prolapse (POP)

Pelvic organ prolapse is characterized by the falling or lowering of the pelvic organs that are above the PFM.
Ref: (28)
(Button to page 1: Pelvic organs)
(Gif of a pelvis viewed from the side with the pelvic organs falling out)

https://dx.doi.org/10.21037/mhealth-22-40

Subpage 4.2
Urinary Incontinence (UI)

Did you know that it's not normal to lose urine? Even just a tiny drop? Urinary incontinence is any loss of urine. There are three types of urinary incontinence: Stress Urinary Incontinence (SUI), Urge Urinary Incontinence (UUI) and Mixed Urinary Incontinence (MUI).
Ref: (28)

(Subpage buttons: SUI, UUI and MUI)

Urinary incontinence is one of the most common PFM dysfunctions in pregnant women, and if left untreated, it tends to worsen, diminishing their quality of life.
Ref: (Sangsawang e Sangsawang , 2013)

Subpage 4.2.1
Stress Urinary Incontinence (SUI)
Stress incontinence happens when physical movement or activity promotes increased pressure inside the belly. This pressure creates a force on the bladder, causing a leak urine.
(Illustration of a woman lifting weights with urine loss)
Usually this pressure happens when you **cough, sneeze, exercise, jump, and climb stairs,** for example.
Ref: (D'Ancona C et al, 2019)

Subpage 4.2.2
Urge Urinary Incontinence (UUI)

A UTI occurs in episodes **when there is a very strong urge to go to the bathroom, but the woman cannot hold it in until she gets there.** This happens because the bladder muscle contracts repeatedly and without "warning" to the woman.
(Illustration woman loses urine beside the toilet)
Ref: (D'Ancona C et al, 2019)

Subpage 4.2.3
Mixed Urinary Incontinence (MUI)

And MUI is when urine loss occurs in situations of both stress and urgency.
Ref: (D'Ancona C et al, 2019)

Subpage 4.3
Anorectal incontinence

It's related to involuntary loss of flatus or feces.
(Illustration of a woman with loose stool)
Ref: (28)

Subpage 4.4
Female Sexual dysfunctions

The most common sexual dysfunctions in women are:

https://dx.doi.org/10.21037/mhealth-22-40

Sub-page buttons: **Orgasmic dysfunction**, Dyspareunia, and Vaginismus.
If you identify any of these symptoms **ask a health professional for help**, because there is treatment! The ideal is an **integrated treatment** between a physical therapist, gynecologist, and a psychologist or sex therapist.
(Illustration of a pregnant woman receiving orientation from the physiotherapist)
Ref: (28)

Subpage 4.4.1
Orgasmic dysfunction

It is the difficulty or inability to reach orgasm during sexual intercourse with or by yourself. It is not normal not to feel pleasure!
Ref: (28)

Subpage 4.4.2
DYSPAREUNIA

It is the pain during the introduction of some object in the vaginal canal or during penetration during sexual intercourse. It is important to emphasize that it is not normal to feel pain and/or discomfort (burning or stinging) during the introduction of any object (for example the pap smear) or during intercourse itself.
Ref: (28)

Subpage 4.4.3
VAGINISM
Vaginismus generates the closing of the vaginal canal opening due to an excessive contraction of the PFM, which does not allow the introduction of objects into the vaginal canal or penile penetration.
Ref: (28)

Page 5

Pelvic floor muscle training
(PFMT)

PFMT is an exercise program consisting of voluntary, repeated contractions of the pelvic floor muscles.
This training helps **prevent the aforementioned dysfunctions** and assists in **reducing the risk of urinary incontinence both in late pregnancy** (over 34 weeks) **and postpartum** - how great is that!
(Gif pelvic floor muscles contracting)
In addition, studies show that PFMT reduces the time of labor, because the pregnant woman becomes more aware of these muscles and can better relax the pelvic floor muscles - faster labor is the wish of every pregnant woman, isn't it?
Come **learn how to contract** your pelvic floor muscles.
(Subpages buttons: How to contract PFM, PFMT program)
Ref: (2)

Subpage 5.1

How to contract PFM
Imagine that your vaginal canal can function like a straw. During contraction, this straw should perform a suction, moving in and up.
(PFM Illustration)

https://dx.doi.org/10.21037/mhealth-22-40

- Concentrate and try to contract only the pelvic floor muscles, avoiding contracting the glutes and the abdominal muscles.
- Avoid performing an expulsion force (movement contrary to contraction)
- Hey, don't hold your breath during the contraction, okay? Contract while you breathe out.
- In any case, it's ideal to check with a physiotherapist who is specialized in women's health, so that he or she can help you with the proper way to do the PFM contraction.

(Illustration of a pregnant woman being assisted by a physical therapist)
Ref: (2)

Subpage 5.2
PFMT program

Now you know the importance of PFM, its functions and dysfunctions, and how to contract the muscles.
So, let's train?
(Video that teaches how to contract the PFM, with sustained contraction timing the sustained time, counting the rest time and with fast contraction)

To help you train these muscles, we have created a daily program of PFMT, lasting 16 weeks (from the 20th week of pregnancy to the 36th week), which you can perform at the most comfortable and convenient time for you, for example: at home, at work, in the transportation, wherever is best for you!
(Button with a video with the 3 sets of the PFMT program so that the pregnant woman can follow along while she trains)

In the button above you will find a video of the entire PFMT program to accompany you during your daily training.

(Subpages buttons: Positions, Series and Repetitions, reminders)

The important thing is to train! You don't need any tools, just your own body.
Ref: (2,30,31)

Subpage 5.2.1
Positions

During the training you can adopt different positions according to your comfort. You can start training in the easiest position (lying down) and progress to the most difficult position (standing up):

(Subpages buttons: Lying down, Four point kneeling, Sitting and Standing)
Ref: (2,30,31)

Subpage 5.2.1.1
Lying

Lie down on the bed, if you want to place a back or head support, and let your legs bend slightly apart.

This is the easiest position to perform PFMT.
(Illustration of a pregnant woman lying with her back resting on a pillow)
Ref: (2,30,31)

https://dx.doi.org/10.21037/mhealth-22-40

Subpage 5.2.1.2
Four point kneeling

For this position, the ideal is to use a mat or mattress on the floor to support your knees and hands. Your hands should be spread apart, in the same direction as your shoulders, your knees should be in line with the positioning of your hips, and your spine straight.
(Illustration of a pregnant woman in the four-legged position on a yoga mat)
This position can be a little more uncomfortable in late pregnancy, because the weight of the belly is down. So remember to always adopt a position that is comfortable for you.
Ref: (2,30,31)

Subpage 5.2.1.3
Sitting

Sit in a chair, with your back straight and well supported by the backrest, and your hips fully supported by the seat. Also leave your legs slightly apart and your feet flat on the floor.
(Illustration of a pregnant woman sitting on a chair)
Ref: (2,30,31)

Subpage 5.2.1.4
Standing

Stand upright, keeping your back and shoulders straight, leaving your legs slightly apart.
(Illustration of a pregnant woman standing with her legs slightly apart)
This is one of the most difficult positions to perform PFMT.
Ref: (2,30,31)

Subpage 5.2.2
Series and Repetitions

You should perform 3 sets of exercises with sustained and fast contractions. In each series, 6 to 12 sustained contractions will be performed with a 12-second rest in between.
Ref: (2,30,31)

Subpage 5.2.3
Reminders

- Contract your PFM before making any effort, such as coughing, sneezing, or jumping.
- Do these exercises every day so that your PFM remains strengthened and functioning normally.
- Don't hold your breath while doing the exercises.
- If you feel pain in the pelvic floor muscles, avoid performing the exercises and check a professional.

Ref: (2,30,31)

Page 6
Prevention of Perineal Laceration

During childbirth, laceration of the PFM can occur-stretching and tearing of the muscles, ligaments, and nerves.

https://dx.doi.org/10.21037/mhealth-22-40

(Illustration with the different levels of laceration)

The most common consequences of a perineal tear are perineal pain and dyspareunia, symptoms that can directly interfere with a woman's sexual function but also create discomfort during basic daily activities such as sitting and going to the bathroom. You may be thinking "Is there any possibility of decreasing the chance of something like this happening to me?" And the answer is yes! As a way to prevent tearing, there are some techniques that are recommended for preparing the PFM for delivery.

(Buttons for subpages: Perineal Massage, EPI-NO)

It is important to talk to your doctor, nurse, and physiotherapist about it! Episiotomy (a cut in that region to increase the space for the baby's passage) is considered a caused laceration. Remember, episiotomy is a procedure in disuse and without indication.

(Illustration showing the episiotomy region)
Ref: (32)

Page 7
Find a physiotherapist!

Prenatal care is generally conducted by the obstetrician and nurse, but it is very important to follow up with other professionals, if possible. The **physiotherapist specialized in women's health** enters the team with an eye toward assisting pregnant women:
(Buttons: Prevention of Dysfunctions, Preparation for Labor, Labor and Puerperium)
(33)

Subpage 7.1
Prevention of dysfunctions

A **physiotherapist** specialized in women's health can **assess PFM function and advise if you are not contracting in the right way, also ensuring effective training (PFMT)**, so that the risks of possible PFM dysfunction are lower!

Subpage 7.2
Preparation for labor

- **PFM**

Physiotherapeutic assistance **helps in the preparation of labor,** making it more efficient, whether vaginal or cesarean. **One of the most important conducts in this phase is PFMT.** Through this training, you strengthen the muscles of this region and gain body awareness, being able to contract and relax PFM at the right moments.
(Button returns to the PFMT page)

- **Perineal massage**

It can be performed by the physiotherapist , both to **stretch the perineum and to prevent perineal trauma** - for example, the laceration we mentioned earlier.
(Button: Perineal Massage)

https://dx.doi.org/10.21037/mhealth-22-40

Subpage 7.2.1
Perineal massage

Perineal massage helps to **lengthen the muscles and increase their flexibility,** reducing the risk of laceration. It is the procedure with the **greatest scientific basis**, and is performed from the **34th week of pregnancy**. This technique is performed in the vaginal region and can be done by the pregnant woman herself or by someone she trusts. It combines the use of **specific movements** with the fingers and **application of pressure** in the area.
Ref: (34)
(Gif illustrating perineal massage)
Remembering, massage must be explained and taught by a physical therapist before being performed by yourself or your partner.

- **Health Education**

One of the most important attitudes is to **educate** the pregnant woman and her partner about the **changes that will occur in the** mother's body in relation to the baby, and information about the **stages of labor** so that the pregnant woman can know what to expect during this time.
(Illustration of a pregnant woman receiving orientation from the physiotherapist)

Subpage 7.3
Labor and Delivery

In addition to acting in preparation for childbirth, the physical therapist can also act during labor. An example of this is the **use of non-pharmacological analgesic resources** (electrotherapy, massage in the lumbar region, use of water, among others), i.e. resources that can relieve the pain that the woman is feeling at this very important moment and the p**ositioning that can be adopted at the moment of delivery.**
(Illustration demonstrating electrotherapy, massage of the lumbar region, use of water and positioning)
Ref: (35)

Subpage 7.4
Puerperium (postpartum)

You may also experience some pain, swelling, and may need **guidance on what are the proper postures for breastfeeding.** Also, it's important to remember that you can (and should!) continue PFMT after delivery, to prevent and/or treat PFM dysfunction.
(Illustration mother holding newborn baby)
Ref: (30)
We know that it is a very dedicated time **for the** baby, but try, whenever possible, to **set aside a little time for you and your PFM.**

References

28. Haylen BT, de Ridder D, Freeman RM, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. Int Urogynecol J 2010;21:5-26.
29. Ashton-Miller JA, Delancey JO. On the biomechanics of vaginal birth and common sequelae. Annu Rev Biomed Eng 2009;11:163-76.
30. Woodley SJ, Lawrenson P, Boyle R, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev 2020;5:CD007471.

https://dx.doi.org/10.21037/mhealth-22-40

31. Reilly ETC, Freeman RM, Waterfield MR, et al. Prevention of postpartum stress incontinence in primigravidae with increased bladder neck mobility: a randomised controlled trial of antenatal pelvic floor exercises. Available online: www.bjog-elsevier.com
32. Gomes Lopes L, Maia Dutra Balsells M, Teixeira Moreira Vasconcelos C, et al. Can pelvic floor muscle training prevent perineal laceration? A systematic review and meta-analysis. Int J Gynaecol Obstet 2022;157:248-54.
33. COFFITO. Resolução Coffito no 372, de 6 de novembro de 2009. Reconhece a Saúde da Mulher como especialidade do profissional Fisioterapeuta e dá outras providências. Diário Oficial da União Brasília. 2009;(228):101.
34. Mei-dan E, Walfisch A, Raz I, et al. Perineal massage during pregnancy: a prospective controlled trial. Isr Med Assoc J 2008;10:499-502.
35. Simkin PP, O'hara M. Nonpharmacologic relief of pain during labor: systematic reviews of five methods. Am J Obstet Gynecol 2002;186:S131-S159.

https://dx.doi.org/10.21037/mhealth-22-40