UFSM

REUFSM
REVISTA DE ENFERMAGEM DA UFSM

ISSN 2179-7692
OPEN ACCESS

Rev. Enferm. UFSM, v.15, e9, p.1-20, 2025 •
Submission: 11/01/2024 • Acceptance: 03/14/2025 • Publication: 05/07/2025

Original article

# Digital game on best childbirth practices: validation of text and image content*

Jogo digital sobre boas práticas no parto: validação do conteúdo textual e imagético

*Juego digital sobre buenas prácticas en el parto: validación de contenido textual y visual*

**Fernanda Honnef[I], Stela Maris de Mello Padoin[II], Marcelo Simão de Vasconcellos[III], Tassiane Ferreira Langendorf[II]**

[I] Universidade Federal do Pampa, Uruguaiana, Rio Grande do Sul, Brazil
[II] Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil
[III] Fundação Oswaldo Cruz (Fiocruz), Rio de Janeiro, Rio de Janeiro, Brazil

***** Extracted from the thesis "Knowledge translation in a digital game for promotion of female autonomy in labor and childbirth", Nursing Graduate Program, Federal University of Santa Maria, 2023.

## Abstract

**Objective**: to validate the textual and visual content of a care-educational technology on best practices in labor and delivery aimed at pregnant women and their companions. **Method**: Development and innovation research. **Stages**: content selection, creation of the game's narrative consisting of the synthesis of evidence and obstetric recommendations, production of the images and the game. Content validation was carried out by 15 experts selected through the snowball sampling technique, using an online survey. The analysis was carried out according to the Content Validity Index. **Results**: the digital interactive story game "Our Choices, Our Childbirth" was made up of 24 illustrations and texts on prenatal care, birth plans, non-pharmacological pain relief methods, freedom of movement, and non-recommended practices. The Content Validity Index was 0,93, and the experts' suggestions were met. **Conclusion**: the game fosters female empowerment, promotes best practices and enables the reconsideration of the obstetrical model of care.
**Descriptors:** Parturition; Women's Health; Health Education; Translational Science, Biomedical; Educational Technology

## Resumo

**Objetivo**: validar conteúdo textual e imagético sobre boas práticas no parto e no nascimento para criação de jogo destinado a gestantes e acompanhantes. **Método**: Pesquisa de desenvolvimento e inovação. Etapas: seleção do conteúdo, criação da narrativa do jogo composta pela síntese de evidências e recomendações obstétricas, criação das imagens e do jogo. A validação do conteúdo deu-se por 15 especialistas selecionados pela técnica bola de neve, utilizando questionário on-line. Análise realizada pelo Índice da Validade de Conteúdo. **Resultados**: o jogo digital de narrativa interativa "Nossas Escolhas, Nosso Parto" foi composto

por 24 ilustrações e textos sobre pré-natal, plano de parto, métodos não farmacológicos de alívio da dor, liberdade de posições e ações não recomendadas. O Índice da Validade de Conteúdo foi 0,93, sendo atendidas as sugestões dos especialistas. **Conclusão**: a criação do jogo estimula o protagonismo feminino, promove boas práticas e possibilita o repensar do modelo obstétrico.
**Descritores:** Parto; Saúde da Mulher; Educação em Saúde; Ciência Translacional Biomédica; Tecnologia Educacional

## Resumen

**Objetivo:** Validar el contenido textual y visual sobre buenas prácticas en el parto y nacimiento para la creación de un juego dirigido a mujeres embarazadas y sus acompañantes. **Método:** Estudio de desarrollo e innovación. Pasos**:** Selección de contenido, creación de la narrativa del juego compuesta por la síntesis de evidencias y recomendaciones obstétricas, creación de las imágenes y del juego. La validación del contenido fue realizada por 15 expertos seleccionados mediante la técnica de bola de nieve, en la cual se utilizó un cuestionario online. Análisis realizado por el Índice de Validade de Contenido. **Resultados:** El juego digital de la narrativa interactiva "Nuestras Elecciones, Nuestro Parto" fue compuesto por 24 ilustraciones y textos sobre cuidados prenatales, plan de parto, métodos no farmacológicos de alivio del dolor, libertad de posiciones y acciones no recomendadas. El Índice de Validez de Contenido fue de 0,93, teniendo en cuenta las sugerencias de los expertos. **Conclusión:** La creación del juego incentiva el protagonismo femenino, promueve buenas prácticas y posibilita repensar el modelo obstétrico.
**Descriptores**: Parto; Salud de la Mujer; Educación en Salud; Ciencia Traslacional Biomédica; Tecnología Educacional

## Introduction

The current labor and childbirth context reflects the institutionalization of practical knowledge associated with invasive, often unnecessary and potentially iatrogenic procedures, resulting in the loss of female autonomy and the distancing of women from their families.[1-2]

It is therefore essential to reestablish the physiological nature of childbirth and to promote women's autonomy in the process of labor and delivery through care practices grounded in evidence-based interventions that have demonstrated beneficial outcomes.[3] In 1996, the World Health Organization (WHO) issued recommendations grounded in the best available evidence, which were reaffirmed in 2018 and remain valid to this day.[4] These guidelines suggest the promotion of positive childbirth experiences for women, particularly with respect to autonomy and knowledge. The provision of scientifically based information will thus enable improvements in health outcomes during pregnancy and childbirth.[5]

Aiming to empower individuals involved in the childbirth process and to facilitate their access to information that supports informed health-care decision-making, games are an alternative that can have a positive impact. Their use of interactive and participatory media offers a valuable tool for effective communication and health education.[6-7] A game-based educational approach can integrate play features and specific content, motivating the learning process with a focus on problem solving, which enables the active participation of those involved,[7] encouraging them to develop autonomy as service users.

Games are being used successfully in the health field, helping in the therapeutic care of children and adults with chronic diseases (such as diabetes, asthma and cancer) and promoting paternal involvement in childbirth,[6-8] with the possibility of improving the level of knowledge and changing the user's behavior. Therefore, in a broad international literature review, serious games are considered a type of intervention indicated to improve health outcomes,[9] indicating the need for investment in this kind of studies, which can contribute to health literacy.

Games interact with users by allowing them to make choices that can change the outcome of the story, providing a flexible space for repeated testing of educational strategies.[9] Moreover, it is possible to provide immediate feedback of the player's actions and choices inside the game. In the context of labor and delivery, games are a tool to promote reflection on information and support autonomous choices.

The study's objective is to validate the text and image content on best practices in labor and delivery for the creation of a game aimed at pregnant women and their companions.

## Method

This is a development and innovation research[10] that comprises a Knowledge Translation project, using the Knowledge-to-Action (KTA) cycle,[11] which promotes the application of scientific evidence in clinical practice, filling the gap between theory and practice in a dynamic manner. The model involves synthesis, dissemination and exchange of knowledge, and includes the development of educational tools and resources for health improvement. The KTA framework has two cycles that comprise the

creation and application of new knowledge. In the present study, the action cycle was developed according to the following stages:

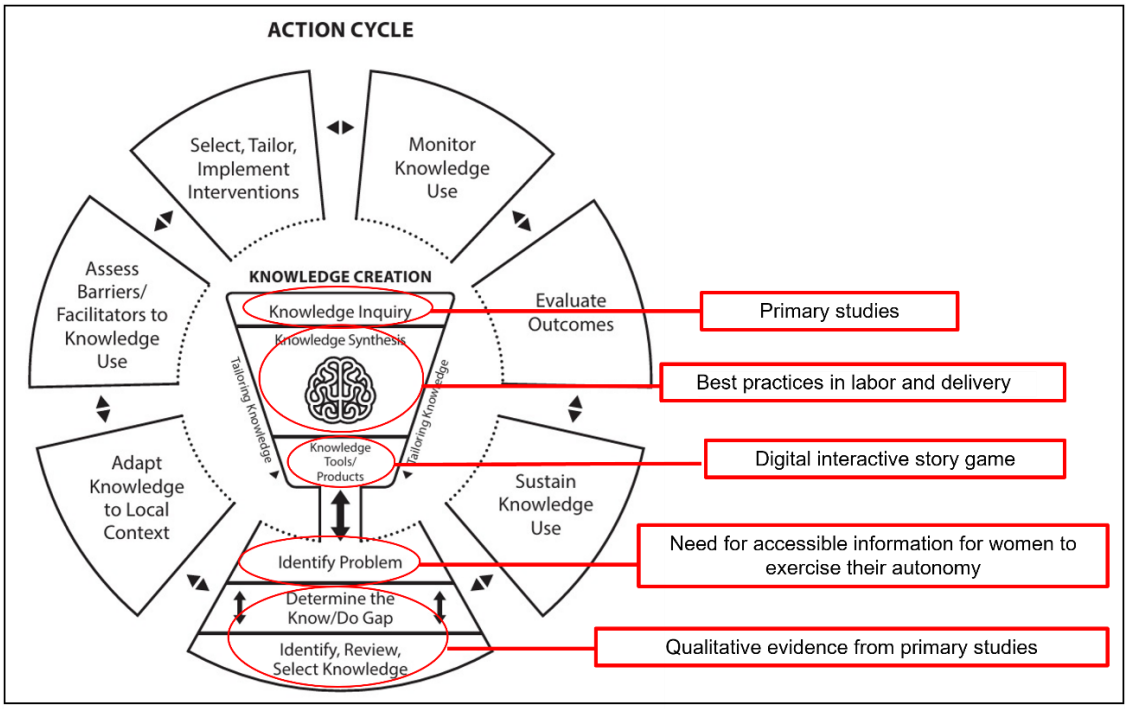


**Figure 1 –** Application of the study in the action cycle, Brazil, 2024[11]

To implement the creation cycle, the following steps were developed:

Stage 1: Content selection. Once the problem was identified (need for accessible information for women), the Knowledge Inquiry element was developed, which consisted of deriving the knowledge from primary studies. This made it possible to review existing knowledge and identify gaps, which revealed that women are unaware of the indications of best practices for normal birth and tend to perform actions prescribed by professionals rather than performing autonomous actions during childbirth and, when they do, they rely on empirical knowledge.[12-13] Moreover, an integrative literature review was carried out on the benefits of using technologies in the labor and delivery process. This review retrieved studies on the development of courses/classes, teaching materials, birth plans, educational guidelines[14] and a validated card game focused on best childbirth care practices for use in group activities.[15]

The knowledge gap identified consisted of best practice recommendations for normal birth care, indicating the need for translating this knowledge so that

pregnant women and their companions can make informed decisions during the childbirth process, using a digital game as a resource. The content for translation was selected based on the WHO's guidelines for positive childbirth experiences.[6,16]

Stage 2: Creating the game's narrative. The process of creating the textual content was based on the synthesis of evidence and obstetric recommendations. It was designed and developed collaboratively (Figure 2) through meetings between researchers from the main project and professionals in the obstetric field. Once the content was adapted, professionals in Literature and Advertising reviewed the text for internal coherence (ensuring the language suited the textual genre) and external coherence (aligning the text's content with real-world context). The content was then validated by specialists.

Stage 3: Creating the images and the game. The images were produced by a professional illustrator with a degree in Industrial Design with an emphasis on Visual Programming. To support the production of the game's content, meetings were conducted with experts in game design and creation, ensuring that the images would help players feel represented and engaged with the story. The preceding steps influenced the selection of the knowledge translation tool, which resulted in choosing a digital interactive story game. Once completed, the narrative and the images were uploaded into the Twine platform. This software enables the integration of text and images, supports interactive storytelling, is free to use, and allows for easy sharing. The game's mechanics are based on the player's decisions regarding situations related to labor, best childbirth care practices and their resulting outcomes.

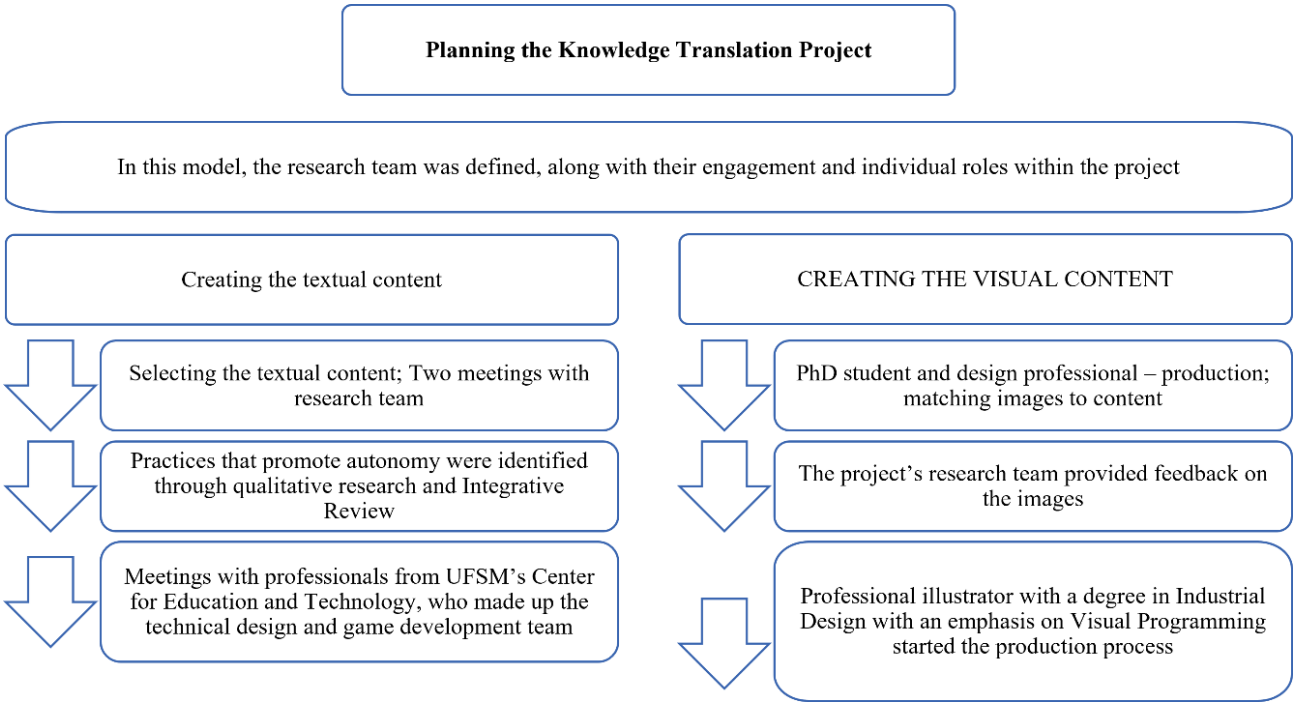


**Figure 2** - Planning the Knowledge Translation Project, Brazil, 2024

After creating the content, data was collected to validate the game's textual and visual content between December 2022 and February 2023. Experts were selected through the Lattes platform with filters focused on the obstetrics field. Forty experts were invited via email, with the option to nominate new participants through snowball sampling. Fifteen responses were received.

Data was collected using a Likert-type questionnaire, which included both text and image content, along with a consent form for participation in the validation process. Both the questionnaire and consent form were incorporated into a Google Forms survey and distributed via email and/or social media (WhatsApp).

To conduct the Content Validation Index (CVI), the goal was to address the question: "Are the content and the game suitable for supporting health education on best childbirth care practices for the target audience of women and their companions?". Experts were encouraged to suggest, add, or modify the items as needed. As part of the inclusion criteria, the experts were asked to provide details about their qualifications. Those who met at least three of the criteria on the Fering scale[17] were included. All experts scored three or higher.

To analyze the data, responses were exported into a Microsoft Excel spreadsheet for CVI calculation, which measures the level of agreement among experts regarding the content to be validated. The experts were asked to rate the relevance, clarity, and appropriateness of each piece of text and image content.

The content was categorized into the following options: 1 = irrelevant; 2 = requires revision; 3 = relevant, suggests minor changes; 4 = absolutely relevant. To calculate the CVI, a value of 0 was assigned to options 1 and 2 and a value of 1 was assigned to options 3 and 4. The total scores were then summed and divided by the number of responses received for each item. The content was considered acceptable if it scored at least 0.78. A lower score indicated insufficient relevance, clarity, and/or appropriateness.[18]

Regarding ethical considerations, this research adhered to the guidelines set by the Brazilian National Health Council: Resolution No. 510/2016, which exempts evaluation by the Research Ethics Committee for "research that aims to deepen the theory of situations that arise spontaneously and contingently in professional practice, as long as they do not disclose data that could identify the subject". Additionally, Resolution No. 674/2022, which further supports these provisions, was also complied with.

## Results

Among the 15 experts, 13 were female, with an average age of 39. Fourteen held nursing degrees, eight had a PhD (the highest academic qualification), and six were engaged in teaching, research and extension. Moreover, seven experts were based in the state of Rio Grande do Sul (RS), four in Santa Catarina (SC), two in Rio de Janeiro (RJ), one in Pará (PA), and one in Maranhão (MA). The overall CVI score was 0.93, reflecting high ratings in relevance, clarity and appropriateness, confirming the content's validation for inclusion in the digital interactive story game.

The interactive story was designed to provide multiple choices, presenting best childbirth care practices within a story where the player decides the course of events. Therefore, women were given several attempts to play, as the story features three possible outcomes, each conveying the main message of best

practices in different ways. The outcomes shift according to the decisions made by the players (women and/or their companions). The initial textual content aims to encourage women and their companions to seek care at an obstetric center. Additionally, the narrative acknowledges the diverse healthcare realities in Brazil by including options for women who can safely remain at home with guidance until active labor, as well as those who do not have this possibility.

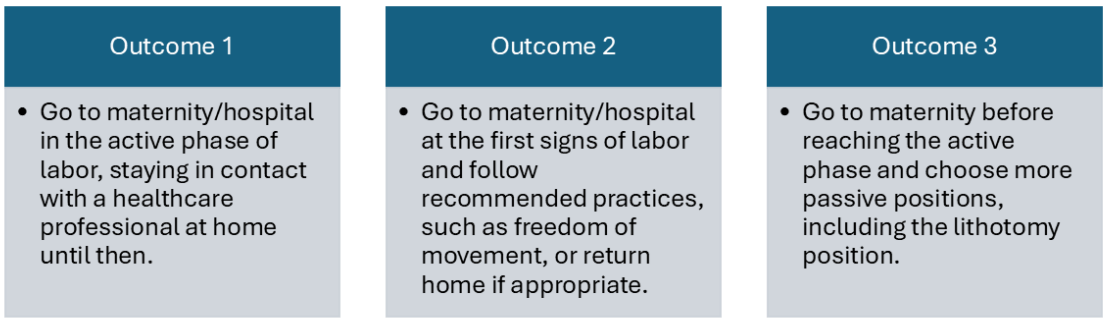


**Figure 3 –** Game outcomes, Brazil, 2024

The textual content in the first part of the game corresponds to outcome 1, assuming the player's care context allows for this choice. Nine items were evaluated, covering topics such as recognizing the first signs of labor, pain relief strategies women can use at home, and the importance of creating a birth plan during prenatal care. The second part presents the content related to outcome 2, while the third part focuses on recommended childbirth practices, non-pharmacological pain relief methods, and the rights of women in labor, which are elements that apply across all three outcomes.

The fourth part focuses on recommended practices for the second stage of labor, such as upright birthing positions, skin-to-skin contact, and golden hour. The fifth part addresses non-recommended practices, such as the routine use of oxytocin, trichotomy, routine episiotomy, and the Kristeller maneuver. Finally, the game's sixth part presents the content for outcome 6, where the player chooses a more passive attitude.

Table 1 displays the analyzed textual content, the overall CVI score, and the adjustments suggested by experts (in bold).

**Table 1** – Textual content and overall CVI score of the analyzed content, Brazil, 2024

| Part | Content | Overall CVI | | |
|---|---|---|---|---|
| | | R | C | A |
| 1 | Ana is expecting a baby girl named Alice, and in this story, you will take on the role of Ana. Pedro is her husband, and they also have a three-year-old son, João. You are 39 weeks and 5 days pregnant. It's a hot summer night, Sunday, February 28th; the clock reads 12:15 a.m. and you wake up. In recent weeks, no sleeping position has felt truly comfortable. Since reaching 37 weeks and 4 days of pregnancy, you've been experiencing prodromal labor or **practice contractions** [[irregular contractions]]. **The contractions intensify and you think to yourself:** will Alice come into the world today? [[irregular contractions]]. You head to the bathroom, noticing that the contractions feel different; they're becoming [[regular contractions]]. You experience two contractions every ten minutes, each lasting about 10 seconds. So, you decide:<br>Choice 1- [[To go to the hospital]<br>Choice 2- [[You think it's better to wait for active labor at home]] | 0.92 | 0.9 | 0.96 |
| | **Practice contractions**, also known as prodromal labor, do not necessarily signal the onset of labor. **They typically last about 10 seconds and occur at irregular intervals**. In contrast, regular contractions indicate that labor has begun, occurring at least once every **10 minutes and lasting approximately 30 seconds**.<br>NOTE: This option contains information that can be accessed. **After reading, you will be redirected to the start of this level.** | | | |
| 2 | It's 2 a.m. and you arrive at the maternity ward, experiencing two contractions every 10 minutes, each lasting about 15 seconds. The nurse examines you and says you are 4 cm dilated. You feel intense pain in your lower back and under your belly. The nurse discusses the option of you staying at home until labor reaches the active stage.<br><br>Choice 1- [[Return home]]<br>Choice 2- [[Staying in a quiet place at the hospital]]<br>Choice 3- [[Information about labor]] | 0.99 | 0.91 | 0.98 |
| | After walking for a while, the pain becomes overwhelming, so you decide to step into the shower. You let the warm water fall, which brings relief, eases the pain, and helps labor progress. Time seems to stretch, and your husband gently massages you and reassures you that Alice will arrive soon. How are you feeling?<br><br>Choice 1- [[Insecure]]<br>Choice 2- [[Secure]] | | | |
| 3 | You're anxious and scared of the pain. As you look around, everything is unfamiliar. All you want is a quiet, dimly lit space where you can relax. There are other ways to ease tension. You recall researching about them during pregnancy and decide to ask the nurse about your options:<br><br>Choice 1- [[Interventions during labor]]<br>Choice 2- [[Non-pharmacological (**non-invasive**) pain relief methods]] | 0.95 | 0.87 | 0.95 |

| | | | | |
|---|---|---|---|---|
| | As the pain intensifies, you try to relax by sitting on a birthing ball under the warm shower, **gently moving with the nurse's assistance**. Pedro stands beside you, looking scared, but he reassures you that everything will be okay. You can feel the pain growing stronger.<br><br>Choice 1- [[Change methods]]<br>Choice 2- [[Drink water and eat]]<br>Choice 3- [[**Remain** in a quiet place]] | | | |
| **4** | It's **10:35 a.m**., and the **healthcare professionals** assess you and your baby. You are 10 cm dilated. **They tell you that labor** has reached the expulsive stage and say, "when the contraction comes, you will feel the urge to push the baby out!" You start considering your options.<br><br>Choice 1- [[Positions]]<br>Choice 2- [[Non-recommended interventions]] | 0.97 | 0.92 | 0.91 |
| | Upright positions help the baby move through the birth canal more easily and reduce the **risk of unnecessary interventions**. Among these positions, you have the **freedom to choose**:<br><br>Choice 1- [[**Squatting**]]<br>Choice 2- [[Lying on your side]]<br>Choice 3- [[On hands and knees]]<br>Choice 4- [[Semi-sitting]] | | | |
| | Alice is born! You hold her in your arms, skin to skin. You, Alice, and Pedro stay there together for a while. At this moment, you feel very emotional. The pain has eased. The doctor asks Pedro to cut the umbilical cord once it stops pulsating. Alice instinctively searches for your breast; she is very active, making this a great time to **stimulate** breastfeeding.<br>Choice 1- [[Shared room]] | | | |
| **5** | The nurse explains that some practices were once **routinely** used but are no longer recommended, as they do not help labor progression and can cause discomfort. These include:<br>Choice 1- [[Perineal shaving]]<br>Choice 2- [[IV fluids]]<br>Choice 3- [[Enema]]<br>Choice 4- [[Multiple vaginal examinations]]<br>She says that you can:<br>Choice 5- [[Use non-pharmacological (**non-invasive**) pain relief methods and perform exercises that help labor progression]]<br>Choice 6- [[Learn about your rights]] | 0.86 | 0.86 | 0.94 |
| | You want a natural birth with minimal interventions. You recall that during your previous delivery, IV fluids were used. For speeding up labor, **the use of [[IV fluids with oxytocin]] is a practice that requires** caution.<br>Therefore, moving around and adopting comfortable positions can help labor progress naturally without interventions. With this in mind, you decide to ask for information about:<br>Choice 1- [[Non-pharmacological (**non-invasive**) pain relief methods]]<br>Choice 2- Pharmacological pain relief method]] | | | |
| **6** | You are lying down, feeling the pain intensify. The nurse comes to | 0.98 | 0.97 | 0.91 |

| | | | | |
|---|---|---|---|---|
| | assess you and advises that using a birthing ball, taking a shower, or walking can help relieve the pain. You are 6 cm dilated. You ask for some water and to:<br>**Choice 1- [[Learn what you can do to help with dilation and Alice's birth]]**<br>**Choice 2- [[Get information about possible interventions during labor]]**<br>Choice 3- [[Stay lying down]] | | | |
| | It's **1:00 p.m**. After several contractions, Alice is born, and you have her in your arms! At this moment, you feel very emotional. The pain has eased, and now you hold Alice against your chest, skin to skin, with Pedro by your side.<br>The doctor asks Pedro to cut the umbilical cord once it stops pulsating. Alice is already searching for your breast; she is very active, making **this** a great time to **stimulate** breastfeeding. The doctor then examines you and notices a perineal tear that requires suturing.<br>Choice 1- [[Shared room]] | | | |

Caption: R: Relevance; C: Clarity; A: Appropriateness; "[[ ]]" indicates the link/choice for the next content in the game's storyline.
Note: adjustments requested by experts are shown in bold.

The final visual content, created by the illustrator in collaboration with the researchers, obstetric professionals, and the visual programmer, was anchored in the participatory model of the knowledge translation project, which played a key role in ensuring the quality of the final product (Figure 4).

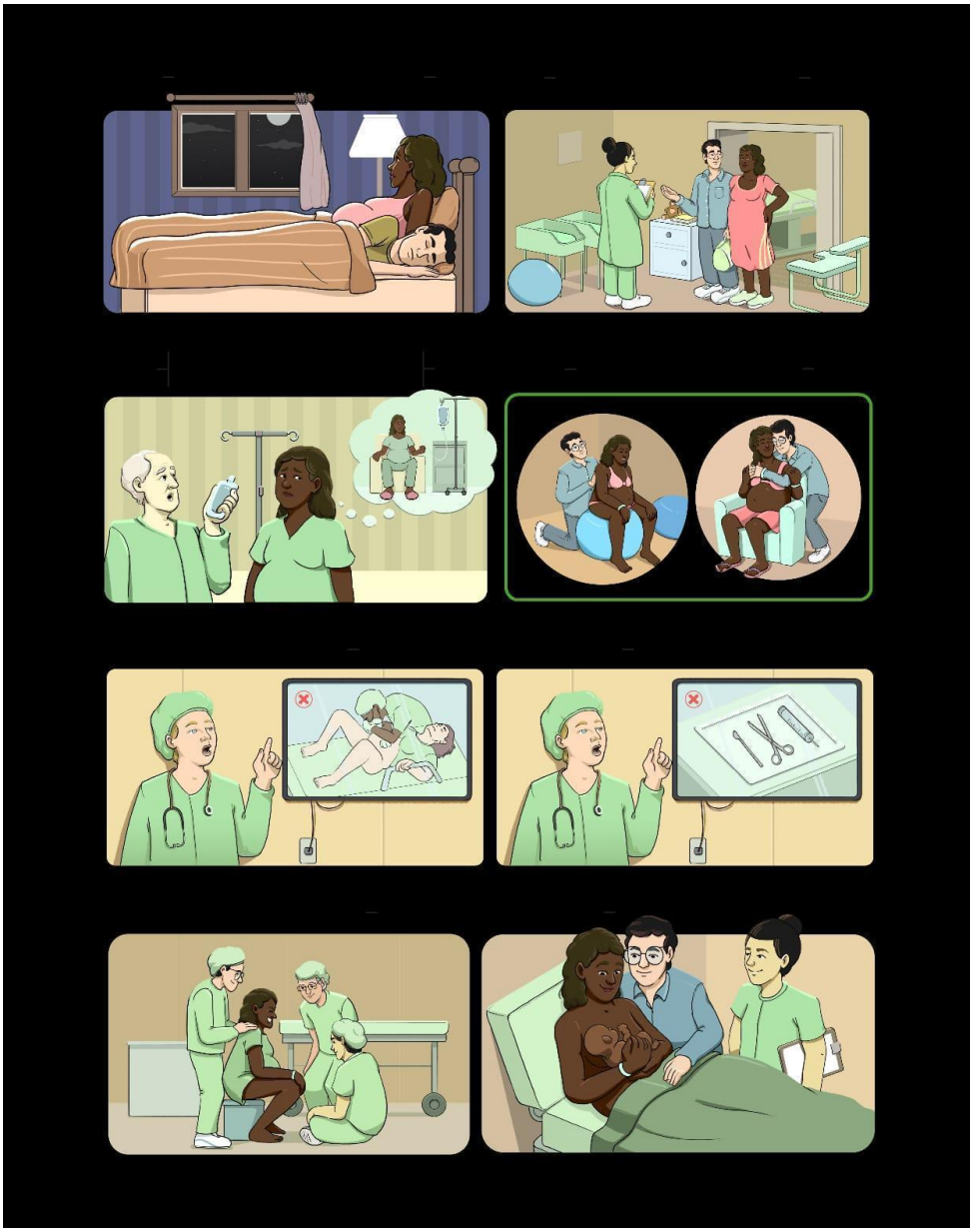

**Figure 4** – Examples of the game's illustrations, Brazil, 2024

The game was titled "Our Choices, Our Birth" and offers players the opportunity to reflect on the process of labor and delivery, as well as recommended and non-recommended practices, through the characters' experiences. At the start, when identifying the onset of labor, the woman is presented with different action choices. According to her decisions, she experiences various labor outcomes. Players can also play multiple times, exploring all scenarios and possible outcomes.

## Discussion

The agreement rate among the experts indicated that the textual and visual content of the game is relevant, clear, and appropriate, and has been validated for use with the target audience of pregnant women and their companions. Its content is structured around outcomes related to best practices for a positive childbirth experience for women and is presented in an interactive story game.

Interactive strategies that combine storytelling with digital components, including text and images, are a potential tool for achieving educational goals, especially critical thinking, which is a central objective of educational initiatives.[19] They represent an innovative tool due to their ability to open new spaces for health communication.[7]

The digital game is a technological product that breaks the fragmentation of knowledge, as its creation gave meaning to scientific knowledge about best practices in childbirth, connected it to the everyday knowledge of women and their companions, and translated it for use in the care/education and education/care process. It can also be accessed during pregnancy as an opportunity for pregnant women and their companions to reflect on the care the woman will receive at the maternity ward, such as the right to have a designated healthcare professional during childbirth or the right to visit the maternity ward before labor begins.

The recommendation to wait before going to the maternity ward can improve women's experience, as hospitalization during the latent phase of labor predisposes women to negative experiences and is associated with increased intrapartum interventions.[20] For this reason, the introductory section of the game (Part 1) presents the onset of labor. The digital game encourages women to reflect on the appropriate time to seek care and explores options for making choices that contribute to a positive birth experience. This approach aligns with the WHO's recommendation for admission to healthcare facilities during the active phase of labor, as it reduces the risk of unnecessary interventions without increasing

adverse maternal and neonatal outcomes, helps prevent routine cesarean sections, and enhances maternal satisfaction with childbirth care.[4] International studies show that clinical decision support systems for maternity care can improve safety and reduce interventions during labor and should be human-centered.[21]

In contexts where this approach is not feasible, several alternatives are presented. Part 2 corresponds to Outcome 2 of the game, in which the decision is to seek the maternity ward at the onset of labor, adopting an active stance supported by recommended practices and relevant information. This may positively impact women's autonomy by providing information that can empower women and their companions, thereby contributing to the reduction of unnecessary interventions, given the ongoing need to improve childbirth and neonatal care in Brazilian maternity facilities.[22]

Part 3 contains textual content on recommended practices, addressing non-pharmacological pain relief methods and the woman's rights. This information is accessible across the various outcomes of the game. The presence of a companion is recommended due to its benefits in supporting the physiological process of childbirth. The companion should also be informed of these practices, aiding in the communication between healthcare professionals and the woman, in order to protect and promote her choices. Some of the benefits of allowing a companion of the woman's choice are the support provided in the care process and the establishment of a bond with the newborn.[24]

Moreover, the content also considered pain as one of the key elements shaping women's social representations of childbirth. Pain and fear influence the behavior of pregnant women and become sources of other aversive emotions and concerns related to childbirth[25]. The fear of pain, when combined with a lack of information about the different modes of birth, contributes to the perception that vaginal birth is inherently associated with suffering and pain.

In this context, providing information on non-pharmacological pain relief methods has a positive impact, aiding in the perception of pain as a part of the childbirth process while preserving positive birth experiences. This approach allows women to experience pain in accordance with the care provided by health professionals.[26] Among the methods mentioned are relaxation techniques,

hydrotherapy, massage, walking, breathing exercises, water immersion, sitting on a birthing ball, pelvic movements, music therapy, and aromatherapy.[4]

According to the National Guidelines for Normal Childbirth Care, an environment with music is one of the strategies recommended for pain relief during labor. The aforementioned methods can be used in combination with one another[16], and women can choose those they are comfortable with, such as using a birthing ball along with lumbosacral massage or combining hydrotherapy with massage. This information encourages women to actively plan their labor and delivery.

In Part 4, the textual content addresses recommended practices for the second and third clinical stages of labor, including upright positions, skin-to-skin contact, and golden hour. Freedom of movement and position during labor and delivery considers the benefits of upright positions in facilitating changes in the maternal pelvis and promoting fetal descent. It is well established that perineal integrity is better preserved when women adopt upright positions during childbirth.[26]

Skin-to-skin contact is effective during the first hour after birth in preventing hypothermia and promoting breastfeeding.[4] However, it is still inadequately implemented when guidance is provided only within obstetric centers and maternity wards. It is essential that the benefits of this practice be discussed during prenatal care, so that it makes sense to women at the time of delivery.[27-28] It is important to emphasize the necessity of enhancing the quality of prenatal care by expanding the use of educational resources that encourage reflection and support women's autonomy.

Non-recommended practices are presented in Part 5, including the routine use of oxytocin, perineal shaving (trichotomy), episiotomy, and the Kristeller maneuver. Part 6, in turn, depicts the player's choice to adopt a passive stance. Historically and culturally, there may be a perception among pregnant women that these interventions are necessary, and their absence may be mistakenly interpreted as a failure in care, even though such practices can cause harm and suffering.[12-13] Therefore, these procedures were highlighted in both the textual and visual content of the game to inform women that, although some professionals may still perform them, they are not recommended and should be refused.

The content of the digital game also addresses non-recommended practices such as the routine use of oxytocin, multiple vaginal examinations, the lithotomy position, and episiotomy. The routine administration of oxytocin is an inadequate practice that remains prevalent, with its highest incidence occurring among women who are admitted early to the hospital (with cervical dilation <6 cm).[20]

The Kristeller maneuver involves applying fundal pressure during the second stage of labor with the intention of accelerating delivery. This procedure is associated with an increased risk of severe perineal lacerations, uterine rupture, and dyspareunia.[4] Although it has not been recommended since the publication of the WHO's guidelines in 1996, it still occurs in childbirth care, in association with early hospital admission.[20] This persistence may indicate the need for continuous professional education aimed at promoting evidence-based obstetric practices.

Cervical dilation, when assessed in isolation, does not reliably indicate the imminence of birth, and multiple vaginal examinations often cause discomfort. For this reason, the World Health Organization recommends a minimum interval of four hours between vaginal examinations and the use of intermittent fetal heart rate auscultation as a method of monitoring fetal well-being in healthy pregnant women during labor.[4] Consequently, alternative methods for assessing the active phase of labor have been proposed, such as the observation of the purple line, which is an effective, though underutilized, indicator of cervical dilation and fetal descent.[27] This practice should be encouraged in order to challenge the prevailing notion that labor progression depends solely on cervical dilation.

The lithotomy position is not recommended, as it does not benefit the progress of labor. Nevertheless, approximately 90% of women in Brazil give birth in this position. As a result, it has become culturally accepted as appropriate for childbirth, not only among healthcare professionals but also by women themselves. The lithotomy position increases the risk of severe perineal trauma, and in longer deliveries it is associated with increased pain and alterations in fetal heart rate.[29]

Another practice of concern is the routine or liberal use of episiotomy, which is not recommended for women undergoing spontaneous vaginal birth.[4] Its use as a preventive measure against perineal trauma and lacerations lacks scientific evidence

and poses a risk to positive birth experiences.[27] Therefore, increasing awareness about this practice can help women resist its normalization. For healthcare professionals, it underscores the need to critically reflect on the current obstetric model.

The practices of enema administration and perineal shaving are also addressed in the content of the game, and although studies support the elimination of these procedures from obstetric care, they are still perceived as beneficial. Despite not being routinely performed in maternity wards, these practices are often carried out prior to hospital admission, indicating that they are culturally ingrained and accepted by many women.[29] The involvement of obstetric nurses reduces the use of non-recommended practices and their associated negative outcomes.[30]

Among the limitations of this study, it is important to highlight the need for evaluation of the game by the target audience, who will be the end users. Additionally, access to the game is dependent on internet availability. These limitations indicate the necessity of adapting the game to accommodate such scenarios, which will allow for the completion of the knowledge-to-action cycle of the KTA framework, a step that is already planned by the research group in a forthcoming research proposal.

The digital game developed in this study contributes to the healthcare of the target population by providing easy access to reliable information and by strengthening obstetric care grounded in scientific evidence, emphasizing recommended practices while discouraging non-recommended ones.

The game holds potential as a facilitative tool for health education, which may support a shift away from the dominant obstetric model toward a care paradigm grounded in evidence-based practice. In the context of humanized care, the game can help bridge the gap between healthcare professionals, women, and their companions, encouraging critical reflection on obstetric practices, fostering positive childbirth experiences and promoting women's autonomy.

## Conclusion

The game "Our Choices, Our Birth" is a digital game with a story grounded in scientific evidence and validated to inform and promote best practices in childbirth for the target audience of pregnant women and their companions. It was developed and

subjected to content validation by the experts who participated in this study, and its creation was guided by the KTA framework.

## References

1. Monguilhott JJC, Bruggemann OM, Freitas PF, D'orsi E. Nascer no Brasil: the presence of a companion favors the use of best practices in delivery care in the South region of Brazil. Rev Saúde Pública. 2018;52(1). doi: 10.11606/S1518-8787.2018052006258.

2. Reis TLR, Honnef F, Padoin SMM, Alves VH, Souza IEO. Promotion of female autonomy during childbirth: intentionality of the actions of health professionals. Rev Baiana Enferm. 2021;35. doi: 10.18471/rbe.v35.42149.

3. Lopes GC, Gonçalves AC, Gouveia HG, Armellini CJ. Attention to childbirth and delivery in a university hospital: comparison of practices developed after Network Stork. Rev Latinoam Enferm. 2019;27:e3181-39. doi: 10.1590/1518-8345.2643-3139.

4. World Health Organization (WHO). Recommendations: intrapartum care for a positive childbirth experience [Internet]. 2018 [cited 2023 Dec 15]. Available from: https://www.who.int/publications-detail-redirect/9789241550215.

5. Kashiha M, Hosseini J, Samadaee Gelehkolaee K. Mothers' perceptions about childbirth preparation classes: a qualitative study. Int J Community Based Nurs Midwifery. 2023;11(4):278-86. doi: 10.30476/IJCBNM.2023.98607.2247.

6. Lohr AM, Raygoza Tapia JP, Valdez ES, Hassett LC, Gubrium AC, Fiddian-Green A, et al. The use of digital stories as a health promotion intervention: a scoping review. BMC Public Health. 2022; 22(1):1180. doi: 10.1186/s12889-022-13595-x.

7. Carvalho FG, Vasconcellos MS. Redesign of a game to prevent exogenous poisoning: adding risks and forms of participation. J Interact Syst. 2023;14(1):119-27. doi: 10.5753/jis.2023.3241.

8. Nour GFA, Silva MAM, Sousa AJC, Moreira ACA, Freitas CASL, Coelho TS, et al. Educational technology to promote father involvement in childbirth and birth. Rev Bras Enferm. 2022;75(5):e20210243. doi: 10.1590/0034-7167-2021-0243pt.

9. Wang Y, Wang Z, Liu G, Wang Z, Wang Q, Yan Y, et al. Application of serious games in health care: scoping review and bibliometric analysis. Front Public Health. 2022 Jun 10;10:896974. doi: 10.3389/fpubh.2022.896974.

10. Sandars J, Cecilio-Fernandes D. Patel R, Gandomkar R. Avoid 'running before we can walk' in medical education research: The importance of design and development research. Med Teach. 2021 Nov; 43(11):1335-36. doi: 10.1080/0142159X.2020.1854452.

11. Vieira ACG, Gastaldo D, Harrison D. How to translate scientific knowledge into practice? Concepts, models and application. Rev Bras Enferm. 2020;73(5):e20190179. doi: 10.1590/0034-7167-2019-0179.

12. Honnef F, Padoin SMM, Paula CC. Reasons for women's autonomous actions in the childbirth process: an understanding based on social phenomenology. Texto Contexto Enferm. 2020;29:e20190283. doi: 10.1590/1980-265X-TCE-2019-0283.

13. Honnef F, Padoin SMM, Paula CC, Langendorf TF. Intentionality of women's actions in labor: a study in social phenomenology. Rev Bras Enferm. 2021;74(Suppl 4):e20200177. doi: 10.1590/0034-7167-2020-0177.

14. Honnef F, Silveira S, Quadros JS, Langendorf TF, Paula CC, Mello SM. Educational technologies for the promotion of positive childbirth experiences: an integrative review. Ciênc Cuid Saúde. 2023;21:e59213. doi: 10.4025/ciencuidsaude.v21i0.59213.

15. D'Avila CG, Puggina AC, Fernandes RAQ. Construction and validation of an educational game for pregnant women. Esc Anna Nery. 2018;22(3): doi: 10.1590/2177-9465-EAN-2017-0300.

16. Ministério da Saúde (BR). Diretrizes nacionais de assistência ao parto normal: versão resumida [Internet]. Brasília (DF): Ministério da Saúde; 2017 [acesso em 2024 jan 08]. Disponível em: https://bvsms.saude.gov.br/bvs/publicacoes/diretrizes_nacionais_assistencia_parto_normal.pdf.

17. Fehring RJ. Symposium on validation models: the Fehring Model. In: Carroll-Johnson RM, Paquette M, editors. Classification of nursing diagnosis: proceedings of the tenth conference. Philadelphia: Lippincott; 1994. p. 55-62

18. Yusoff MSB, Department of Medical Education, School of Medical Sciences, Universiti Sains Malaysia, MALAYSIA. ABC of Content Validation and Content Validity Index Calculation. Educ Med J. 2019;11(2):49-54. doi: 10.21315/eimj2019.11.2.6.

19. Mojtahedzadeh R, Mohammadi A, Hossein Emami A, Zarei A. How digital storytelling applied in health profession education: a systematized review. J Adv Med Educ Prof. 2021;9(2):63-78. doi: 10.30476/jamp.2021.87856.1326.

20. Terto TL, Silva TPR, Viana TGF, Sousa AMM, Martins EF, Souza KV, et al. Association between early pregnant hospitalization and use of obstetric interventions and cesarean: a cross-sectional study. Rev Bras Enferm. 2021;74(4):e20200397. doi: 10.1590/0034-7167-2020-0397.

21. Cockburn N, Osborne C, Withana S, Elsmore A, Nanjappa R, South M, et al. Clinical decision support systems for maternity care: a systematic review and meta-analysis. EClinicalMedicine. 2024.76:102822. doi: 10.1016/j.eclinm.2024.102822.

22. Bittencourt SDA, Vilela MEA, Marques MCO, Santos AM, Silva CKRT, Domingues RMSM, et al. Atenção ao parto e nascimento em Maternidades da Rede Cegonha/Brasil: avaliação do grau de implantação das ações. Ciênc Saúde Colet. 2021;26(3):801-21.doi: 10.1590/1413-81232021263.08102020.

23. AlKhunaizi AN, Al-Otaibi AG, Alharbi MF, Bahari G. Exploring healthcare providers' and women's perspectives of labor companionship during childbirth: an interpretative phenomenological analysis study. Healthcare (Basel). 2024;12(9):869. doi: 10.3390/healthcare12090869.

24. Sabino MC, Costa R, Velho MB, Brüggemann OM, Junges CF, Gomes IEM. Actions performed by the companion during the immediate care of the newborn in public maternity hospitals. Rev Enferm UFSM. 2021;11(e26):1-18. doi: 10.5902/2179769246916.

25. Travancas LJ, Vargens OMC. Factors that generate fear of childbirth: an integrative review. Rev Enferm UFSM. 2020;10:e96. doi: 10.5902/2179769241385.

26. Rocha BD, Zamberlan C, Pivetta HMF, Santos BZ, Antunes BS. Upright positions in childbirth and the prevention of perineal lacerations: a systematic review and meta-analysis. Rev Esc Enferm USP. 2020;54:e03610. doi: 10.1590/S1980-220X2018027503610.

27. Rodrigues DP, Alves VH, Silva AM, Penna LHG, Vieira BDG, Silva SED, et al. Women's perception of labor and birth care: obstacles to humanization. Rev Bras Enferm. 2022;75(Suppl 2):e20210215. doi: 10.1590/0034-7167-2021-0215.

28. Campos PM, Gouveia HG, Strada JKR, Moraes BA. Skin-to-skin contact and breastfeeding of newborns in a university hospital. Rev Gaúcha Enferm. 2020;41(N Esp):e20190154. doi: 10.1590/1983-1447.2020.20190154.

29. Carvalho EMP, Amorim FF, Santana LA, Göttems LBD. Assessment of adherence to best practices in labor and childbirth care by care providers working in public hospitals in the Federal District of Brazil. Ciênc Saúde Colet. 2019;24(6):2135-45. doi: 10.1590/1413-81232018246.08412019.

30. Ribeiro KSC, Magalhães AS, Avelino AHG, Ramos MCS, Santos PWA, Fonseca RAG, et al. Obstetric and neonatal adverse events and association with care models: a cohort study. Texto Contexto Enferm. 2023;32:e20230079. doi: 10.1590/1980-265X-TCE-2023-0079en.

**Acknowledgements:** We acknowledge Matheus Tanuri Pascotini, Marcos Lima Silveira, and Carlo Pozzobon de Moraes for their contributions to the visual content; to Carlos Gustavo Lopes da Silva, who was part of the game design team; and to Letícia de Mello Padoin and Isabele Corrêa Vasconcelos Fontes Pereira, who comprised the language review team. We also thank our collaborators for their engagement in the knowledge translation project: Drs. Jacqueline Silveira de Quadros and Izabel Cristina Hoffmann for their contributions to the textual and visual content; and Berenice de Oliveira Cruz Rodrigues and Marcelo Feltrin, representatives of healthcare professionals working in obstetric care, for their valuable input into both the textual and visual content.

## Authorship contribution

**1 – Fernanda Honnef**
Nurse, Doctor – fernandah.honnef@gmail.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

**2 – Stela Maris de Mello Padoin**
Nurse, Doctor – stelamaris_padoin@hotmail.com
Research conception and/or development and/or manuscript writing; Review and approval of the final version

**3 – Marcelo Simão de Vasconcellos**
Industrial Designer, Doctor – marcelodevasconcellos@gmail.com
Review and approval of the final version

**4 – Tassiane Ferreira Langendorf**
Corresponding author
Nurse, Doctor – tassiane.langendorf@ufsm.br
Research conception and/or development and/or manuscript writing; Review and approval of the final version

**Editor in Chief:** Cristiane Cardoso de Paula
**Associate Editor:** Darlisom Sousa Ferreira

## How to cite this article

Honnef F, Padoin SMM, Vasconcellos MM, Langendorf TF. Digital game on best childbirth practices: validation of text and image content. Rev. Enferm. UFSM. 2025 [Access at: Year Month Day]; vol.15, e9:1-20. DOI: https://doi.org/10.5902/2179769289609