Special Session

TEXTO & CONTEXTO ENFERMAGEM
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FROM BRAZIL TO CANADA: TRANSLATION AND CROSS-CULTURAL ADAPTATION OF AN APP FOR BREASTFEEDING PREMATURE BABIES

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ABSTRACT

Objective: Translating and culturally adapting the AmamentaCoach app, originally developed in Brazil, for use by mothers of premature babies in Canada, through international research collaboration.
Method: This is applied research in the form of technological development, in which the World Health Organization's recommendations for the translation and cultural adaptation of instruments were taken into account. Five Canadian researchers who are experts in breastfeeding promotion evaluated the appearance, language, and content of the new version of the app. An 18-item instrument was used with Likert scale response options indicating the degree of agreement for each statement, where *1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree*, and *5=Strongly Agree.*
Results: In the first round of evaluation, the total Content Validity Index (CVI-T) was 0.72, and 6 of the 18 items did not reach CVI-I ≥0.8. A total of 59 screens (74%) of the app were modified, especially in terms of language and the quality of the translation of the texts, reaching CVI-T=0.87 in the second round.
Conclusion: *The Breastfeeding Coach app* showed expressions adjusted to Canadian reality, meaningful images, and new auxiliary resources specific to Canada. Changes in content and attenuations in the rhetorical textual pattern, prompted by cultural differences in the nurse-client relationship and the woman's role in these two different societies, sought consistency with the reality of breastfeeding practices in Canada.

DESCRIPTORS: Mobile apps. Breastfeeding. Premature newborn. Methodological research in nursing. Educational technology. Maternal and child nursing. International educational exchange.

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DO BRASIL AO CANADÁ: TRADUÇÃO E ADAPTAÇÃO TRANSCULTURAL DE UM APLICATIVO PARA AMAMENTAÇÃO DE PREMATUROS

RESUMO

Objetivo: traduzir e adaptar culturalmente o *app* AmamentaCoach, originalmente desenvolvido no Brasil, para utilização por mães de prematuros no Canadá, mediante colaboração internacional de pesquisa.
Método: pesquisa aplicada na modalidade de desenvolvimento tecnológico, em que foram consideradas as recomendações da Organização Mundial da Saúde para tradução e adaptação cultural de instrumentos. Cinco pesquisadoras canadenses *experts* em promoção da amamentação avaliaram a aparência, linguagem e conteúdo da nova versão do *app.* Foi utilizado um instrumento com 18 itens com opções de resposta em escala Likert indicando o grau de concordância para cada afirmação, em que *1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree*, e *5=Strongly Agree.*
Resultados: na primeira rodada de avaliação, o Índice de Validade de Conteúdo total (IVC-T) foi de 0,72 e 6 dos 18 itens não alcançaram IVC-I ≥0.8. Modificaram-se 59 telas (74%) do *app*, especialmente quanto à linguagem e qualidade da tradução dos textos, atingindo-se IVC-T=0,87 na segunda rodada.
Conclusão: o *app The Breastfeeding Coach* apresentou expressões ajustadas à realidade canadense, imagens significativas e novos recursos auxiliares próprios do Canadá. Alterações no conteúdo e atenuações no padrão retórico textual, instadas pelas diferenças culturais na relação enfermeiro-cliente e no papel da mulher nessas duas distintas sociedades, buscaram coerência com a realidade das práticas de amamentação no Canadá.

DESCRITORES: Aplicativos móveis. Aleitamento materno. Recém-nascido prematuro. Pesquisa metodológica em enfermagem. Tecnologia educacional. Enfermagem materno-infantil. Intercâmbio educacional internacional.

DE BRASIL A CANADÁ: TRADUCCIÓN Y ADAPTACIÓN TRANSCULTURAL DE UNA APLICACIÓN PARA AMAMANTAMIENTO DE PREMATUROS

RESUMEN

Objetivo: traducir y adaptar culturalmente la aplicación *AmamentaCoach*, desarrollada originalmente en Brasil, para uso de madres de bebés prematuros en Canadá, a través de una investigación internacional de colaboración.
Método: investigación aplicada en forma de desarrollo tecnológico, en la que se consideraron las recomendaciones de la Organización Mundial de la Salud para la traducción y adaptación cultural de instrumentos. Cinco investigadoras canadienses expertas en promoción de la lactancia materna evaluaron la apariencia, el lenguaje y el contenido de la nueva versión de la aplicación. Se utilizó un instrumento con 18 ítems con opciones de respuesta en una escala Likert que indica el grado de acuerdo para cada afirmación, donde 1=Muy en desacuerdo, 2=En desacuerdo, 3=Neutral, 4=De acuerdo y 5=Muy de acuerdo.
Resultados: en la primera ronda de evaluación, el Índice de Validez de Contenido (IVC-T) total fue de 0,72 y 6 de los 18 ítems no alcanzaron el IVC-I ≥0,8. Se modificaron 59 pantallas (74%) de la aplicación, especialmente en lo que respecta al idioma y la calidad de la traducción del texto, alcanzando IVC-T=0,87 en la segunda ronda.
Conclusión: la aplicación *Breastfeeding Coach* presentó expresiones ajustadas a la realidad canadiense, imágenes significativas y nuevos recursos auxiliares específicos de Canadá. Los cambios en el contenido y las atenuaciones en el patrón retórico textual, provocados por las diferencias culturales en la relación enfermero-paciente y el papel de las mujeres en estas dos sociedades diferentes, buscaron coherencia con la realidad de las prácticas de lactancia materna en Canadá.

DESCRIPTORES: Aplicaciones móviles. Amamantamiento. Recién nacido prematuro. Investigación metodológica en enfermería. Tecnologia Educacional. Lactancia materna e infantil. Intercambio educativo internacional.

INTRODUCTION

Exclusive breastfeeding is recognized not only as the ideal form of nutrition but also as a therapeutic intervention for preterm newborns (PTNB), the most vulnerable population in which the benefits of breast milk are most pronounced[1]. Among its many advantages for PTNB, breast milk offers a range of immunological protection factors and is able to reduce the occurrence of retinopathy of prematurity, bronchopulmonary dysplasia, atopy and necrotizing enterocolitis, the latter being one of the main causes of death in this population[2].

However, for women who experience preterm birth, deciding to breastfeed, and initiating, establishing, and maintaining breastfeeding (BF) are greater challenges than those following a full-term birth. The reasons for this can be multifactorial. In a preterm puerperium, these women are more likely to face challenges in their health-related to obstetric complications. Oral motor and gastrointestinal tract immaturity can make enteral feeding difficult and delayed for babies under 32 weeks, and mothers may perceive their milk to be of less value while it is not being used. In addition, stressful care routines due to the baby's state of health and physiological instability can make it difficult for the mother to provide skin-to-skin care, which can limit her milk production, and maternal physical and mental stress reduces the release of oxytocin and impairs the milk ejection reflex[3].

Despite the evidence supporting the practice, and the World Health Organization's (WHO) recommendation that children receive breast milk exclusively until six months of age and in a supplemented form until two years of age or older[4], the prevalence of BF in this group is lower than recommended[3,5].

It is known that non-breastfeeding is a worldwide problem and is associated with global economic losses of around US$ 302 billion per year, which positions BF as a key strategy for promoting global sustainable development[6]. Recognizing the global challenge of increasing breastfeeding rates in the context of prematurity, it is necessary to develop strategies that are specifically designed for this population and that can be tried out in various scenarios, expanding geographical, cultural, and linguistic boundaries.

It should be borne in mind that online technologies have been gaining preference among women as a source of perinatal guidance and support[7], and that the current generation of mothers search for social media, smartphone applications (mobile apps), and online forums as reliable sources of information[8]. In addition, the recent coronavirus pandemic (COVID-19) epidemiological scenario has imposed restrictions on face-to-face interactions that have driven the development and use of technology-based care interventions. These resources are proving to be a way of enabling continuity of care and promoting breastfeeding in such situations.

In this sense, the Brazilian app AmamentaCoach was developed[9] considering the lack of mobileHealth resources designed to support mothers of premature babies on their breastfeeding journey[10]. The definition of the content of the 80 screens of the AmamentaCoach app was based on the theoretical model of self-efficacy in breastfeeding[11] and Positive Psychology[12], the scientific evidence related to the management of BF in PTNB4, and the preferences/needs of the target population. Thus, its focus is to provide support and information for mothers of premature babies, addressing prematurity, lactation, breastfeeding, maternal emotions, resilience, and motivation. In addition, as the aim is to strengthen maternal self-efficacy for breastfeeding, the app provides the *Breastfeeding Self-Efficacy Scale-Short Form* (BSES-SF) for mothers of sick and/or premature babies[13], so that users can measure their self-confidence throughout the breastfeeding journey. It also offers a diary to record milk withdrawals, feedings, the actions of the support network, and maternal experiences. Finally, as in a coaching process based on Positive Psychology, the user can set goals for actions related to the breastfeeding journey and managing her emotions and can monitor her performance.

In a previous stage, the AmamentaCoach app was validated by ten experts in the areas of BF, psychology, coaching, and design, achieving content validation indexes (CVI) >0.8 in all items related to appearance, content, and relevance in the second round of evaluation. Subsequently, under a comprehensive qualitative approach, a user experience study – *UX* (in press) was carried out with 10 Brazilian women. The women reported pleasant experiences using the app, highlighting its acceptability in both the pragmatic and hedonic aspects of *UX*.

A recent review revealed a scarcity of accessible English-language apps in Canada for NICU parents and issued a warning about the quality and credibility of the few apps identified[14]. Considering that the complete development of a new app is often expensive and laborious, expanding and adapting an existing resource is recommended. With this in mind, we decided to expand the AmamentaCoach app, initially developed in Portuguese, to a new version in English, and adapt it for mothers of premature babies in Canada. This would be an important step in expanding the potential of this technological resource to promote breastfeeding in preterm babies, since English is considered to be the most widely spoken language in the world, implying a greater likelihood of further studies for cultural adaptation in other countries.

In view of the above, the aim of this study is to translate and culturally adapt the AmamentaCoach *app*, originally developed in Brazil, for use by mothers of premature babies in Canada, through international research collaboration.

METHOD

This is an applied research project in the form of technological development[15] involving participants from the South and Midwest regions of Brazil and the provinces of Ontario and Nova Scotia in Canada. Several factors motivated the choice of Canada as the target country. Firstly, the interest in collaborating with the Canadian research team that developed the construct of maternal self-efficacy for breastfeeding[12], which was adopted as the main theoretical framework for the development of the *app.* Secondly, the high rates of immigrants living in Canada[16] constitute an interesting ethnic and cultural plurality for future experiments in the use of the app by diverse populations of women. Thirdly, by identifying a need for resources using mHealth for mothers of premature babies identified in this location[14].

The team responsible for translating and culturally adapting the *app* was composed of the authors of the original *app* plus four Canadian researchers, totaling four IT professionals (three undergraduates), four PhD nurses, and two PhD psychologists.

The recommendations of the World Health Organization (WHO) for the translation and cultural adaptation of instruments were observed[17]: 1. Involve qualified translators, who are proficient in the language to be translated (source language) and have the language to be translated into (target language) as their native language and are familiar with the concepts and terms involved in the content; 2. Highlight terms and phrases that present problems; and 3. Back-translate the highlighted terms and phrases by independent translators who are not the original translators.

Initially, the Poedit software was used to generate a list of the 516 phrases and words of the source code in the original language – Brazilian Portuguese – paired with a translation into the target language – Canadian English. Two of the authors, one Canadian and fluent in Portuguese, and the other Brazilian and fluent in English, analyzed the file with the translations proposed by the software. At this stage, they identified potentially problematic questions, phrases, or terms, discussed them and made initial refinements to the translation. The terms or phrases that were still problematic were presented to four other authors to come up with better alternative expressions: three Brazilians who are fluent in English and one Canadian who is not fluent in Portuguese.

Considering the reality of women living in Canada, the research team made the first necessary changes to the *app*'s appearance, including replacing images and the logo. In addition, links to websites external to the *app* that complement its content were replaced with links to Canadian or English-language websites dealing with the same subjects, prioritizing portals from official bodies such as *Health Canada, Online Ontario Breastfeeding Services,* and the *International Lactation Consultant Association* (ILCA).

After discussions and adjustments, the edited version of the file with the phrases and words from the source code was returned to the developer, as were requests for changes to images and external links. The team's developers generated a first prototype of the app in English, named *The Breastfeeding Coach app*.

For this validation stage, a panel of *experts* was formed for convenience, and the inclusion criteria were: (1) having a PhD; (2) having clinical or research experience in breastfeeding promotion in Canada; (3) being fluent in English. Six eligible researchers were listed from the research group's academic contacts. They were contacted by e-mail and received a letter with information about the study and the Free and Informed Consent Form (FICF). Information on training, professional experience, and areas of expertise was collected using a structured questionnaire on Google Forms. A document was sent by email containing screenshots of *The Breastfeeding Coach app*, asking the *experts* to freely write their observations and suggestions alongside each screen within 3 weeks. An evaluation tool with 18 statements about the app's appearance, content, and language was also designed and used. There were five Likert scale response options indicating the degree of agreement for each statement, where *1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree*, and *5=Strongly Agree*.

The comments made by the experts were characterized according to the main target of the recommendation – language, appearance, instructional content, motivational content, screen flow, or cultural/contextual adaptation – and the data set was submitted to descriptive statistical analysis. The recurrence of recommendations among experts was also analyzed, with priority given to the most recurrent (common to three or more *experts*).

The agreement between the experts on the 18 statements about the app contained in the evaluation instrument was calculated using the content validity indices (CVI). The CVI was calculated both at the item level (CVI-I) and for the entire instrument (CVI-T). To calculate the CVI, the agreement rating was recoded as 1 (answers 4 or 5) or 0 (answers 1,2, or 3), that is, the percentage of answers marked as 4=*Agree* and 5=*Strongly Agree* by the experts on each item evaluated was considered. The validity criterion for the items considered was CVI ≥ 0.8[18], assuming that the app would be reformulated according to the suggestions related to the items with insufficient CVI and that the altered screens would be returned to the *experts* until CVI-T ≥0.8 was reached.

RESULTS

The joint work of the team of developers and Brazilian and Canadian researchers resulted in the development of the 80 screens that made up *The Breastfeeding Coach app*, some examples of which are shown in Figure 1.

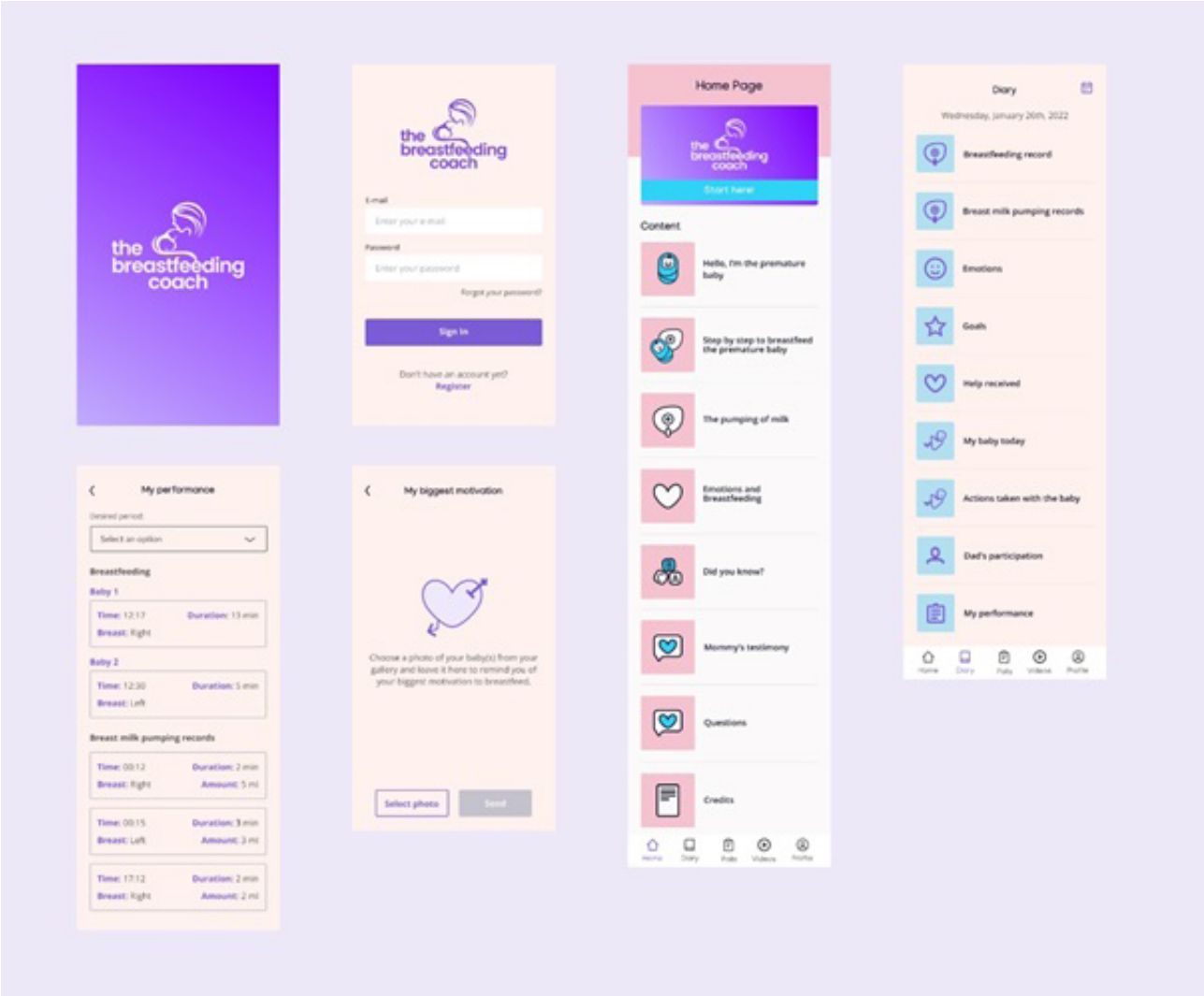

Figure 1 – Examples of screens from *The Breastfeeding Coach* app.

The panel of experts was formed by five researchers who responded to the invitation, with an average age of 50. Regarding training, two were nutritionists, and three were nurses, all of them PhDs. All had experience in research involving BF promotion strategies; in addition to this field, three were also experienced in studies on maternal self-efficacy for breastfeeding, two in using *mHealth* interventions, one in positive Psychology and/or health coaching, and one in the breastfeeding of PTNBs. They were active in the provinces of Ontario and Nova Scotia, linked to five different teaching and research institutions.

There was a lot of input from the experts on adapting the *app* to the Canadian reality, involving two rounds of evaluation. In the first round, 154 comments were recorded across the app's 80 screens, corresponding to an average of 2 comments per screen and 31 comments per expert. This trend continued in the second round, in which a further 136 comments were recorded, representing an average of 2.3 comments per screen (n screens re-evaluated = 59) and 27 comments per expert. In both rounds, most of the comments were suggestions for improving the language and textual quality of the *app*'s content in its English version.

The analysis of the evaluations led to a broad refinement of The Breastfeeding Coach app, especially – but not limited to – the items that did not reach CVI-I ≥0.8, as well as the suggestions for changes that were common among three or more experts. Thus, the modifications to improve the *app*

included: general revision of the translation; adjustments to the tone of the content to make it more empathetic and inclusive for users; replacement of five figures; adaptation of technical terms to the context and reality of Canada, such as the nomenclature of hospital sectors to which premature babies can be referred at birth. The *experts* also suggested the inclusion of some content: links to parental support services and maternal mental health promotion websites in Canada, tips on the transition from feeding a baby with breast milk to direct breastfeeding, information on the use of breast pumps, and an explanation defining "resilience", all of which were accepted. As a result, of the 80 screens, 59 (74%) were altered in some way.

The changed screens and the items that did not reach the desired CVI-I in the first evaluation round were sent for a second round. As shown in Table 1, the CVI-T increased when comparing the first evaluation round (0.74) with the second (0.87). Of the 18 initial items, 6 did not reach CVI-I ≥ 0.8 in the first evaluation by the panel of experts, and in the second, only one item did not, referring to language (0.4).

Table 1 – Agreement between experts (N=5) regarding the content validity indexes of The Breastfeeding Coach app. Londrina, PR, Brazil, 2023

Items evaluated by the experts	CVI-I[i] 1st round	CVI-I[i] 2nd round
1- The illustrations are appropriate for the target audience	0.8	n/a[ii]
2- The illustrations are clear and easy to understand	1	n/a
3- The illustrations are aligned with the context of the premature baby's breastfeeding process	0.8	n/a
4- The illustrations used elucidate the educational content	1	n/a
5- The number of illustrations in the *app* is adequate	1	n/a
6- The colors and sizes of the illustrations are appropriate	1	n/a
7- The colors used in the texts make them easier to read	0.8	n/a
8- The fonts, sizes, and style used in the texts are appropriate	1	n/a
9- The instructions are clear and unambiguous	0.8	N/A
10- The language used is compatible with the target audience	0.6	0.4
11- The texts are concise and sufficient	0.4	1
12- The content is suitable for guiding and clarifying mothers' doubts	0.2	0.8
13- The content is attractive and is likely to encourage mothers to continue browsing the *app*	0.8	n/a
14. The content is suitable for supporting mothers	0.4	1
15. The information presented is scientifically correct	0.6	1
16. The *app* has the potential to promote behaviors and attitudes favorable to breastfeeding premature babies	0.8	N/A
17. The content can help women regulate their motivations, thought processes, and emotional states to be able to breastfeed	0.8	n/a
18. I would recommend the *app* to mothers of premature babies who want to breastfeed	0.2	1
Total Average CVI	0.72	0.87

[i]CVI-I: Content validity index per item
[ii]n/a: item not assessed.

DISCUSSION

The rigor with which the experts evaluated *The Breastfeeding Coach app* was evident in their more than 290 descriptive comments, which complemented the quantitative evaluation and improved the validation process. As a result, a refinement of text, content, and appearance resulted in a version of the app with shorter sentences, appropriate definitions of technical expressions, prioritization of common Canadian expressions, as well as more meaningful images and new external auxiliary resources specific to Canada.

Language-related aspects

The translation of applications differs from the translation of instruments, traditional texts, books, or academic articles, is less reported in the literature, and lacks specific guidelines. It is a process in which the premise of absolute content maintenance and reliability between versions does not apply. Instead, the Brazilian *app* in Portuguese served as a framework from which a new *app* in Canadian English was developed, taking the translation of its content as a starting point, but prioritizing adapting it to the new context.

In the translation process, subtle differences in the meaning of health vocabulary words can create different structures and alter the use of language. Ensuring this subtlety of care was challenging, a fact evidenced in the first round of evaluation by the amount of suggestions from the experts on language adjustments, and by the CVI <0.80 in items *10 – The language used is compatible with the target audience and 11 – The texts are concise and sufficient*.

The programming language is present in the corpus of the textual content of every *app*, which is a hindrance to the translation process. It uses a file whose text is not in its entirety, but fragmented, with the sentences in an order that does not correspond to the sequence displayed in the app, and intertwined with a structure called XML – *Extensible Markup Language*. This is a critical point in the decision-making process regarding the choices made by the translation team since it is impossible to know where a given context occurs in the application. This peculiarity requires a review of the translated text already deposited in the app, to identify the necessary adjustments, which happened in the first round of evaluation of the screenshots by the *experts.*

Although the language has not yet reached desirable levels of agreement, it is hoped that the semantic, idiomatic, and conceptual equivalences will soon be improved in a pilot study to be carried out with the target population – mothers of premature babies in Canada. It should be noted that even so, in the second round of evaluation, the average CVI-T assigned was sufficient for us to consider it good evidence of content validity[18], and the *experts* judged the *app* to be recommendable for mothers of preterm babies who wish to breastfeed.

Content-related aspects

The difficulty in transferring the content originally conceived in Portuguese into English may partly explain the *experts*' low level of agreement with item 12 – *The content is suitable for guiding and clarifying mothers' doubts* in the first round. In addition to the textual issue, some of the experts' doubts about the content referred to some advantages of breast milk mentioned in the *app* that are supported by evidence that is still incipient, such as the correlation between BF and infant intelligence. The effects of breastfeeding on neurodevelopment used to be unclear, with inconsistent research results and confounding factors making it difficult to interpret studies. However, recent evidence shows that breastfeeding has a small positive effect on intelligence quotient (IQ) in later childhood[19] and a dose-response relationship between the duration of breastfeeding and language skills and non-verbal intelligence during childhood and early adolescence[20].

Another explanation for the low initial agreement regarding item 12 lies in some cultural and professional differences regarding the management of BF between Brazil and Canada. These differences were revealed in some of the *experts*' observations regarding using a cup to feed the PTNB, the recommendations for packaging and storing human milk, and using breast pumps to remove milk rather than manual extraction.

A Cochrane review identified that avoiding the use of bottles when preterm babies need complementary feeding probably increases the duration of any breastfeeding, exclusive or mixed, and most of the evidence showed a benefit in using the cup[21], which corroborates the recommendations of the World Health Organization[4] and the Ministry of Health[22]. The results of another review, however, showed that using the cup did not increase BF rates among babies born between 34 and 38 weeks and 6 days[23]. In this sense, although proving the efficiency and effectiveness of the cup technique for feeding infants requires further studies, a video demonstrating it was included in the AmamentaCoach *app*, considering that it is a common practice in Brazilian services and in the reality of the *app*'s users. A similar video has also been added to *The Breastfeeding Coach app*, as the cup is also considered a device for offering breast milk among breastfeeding women in Canada[24], although it seems to be less common than in Brazil.

The AmamentaCoach *app* uses the recommendations on packaging and storing milk contained in the technical standards of the Global Network of Human Milk Banks (*Rede Global de Bancos de Leite Humano*) – rBLH Brazil, available on its official website (https://rblh.fiocruz.br/normas-tecnicas-e-manuais). Some *experts* indicated the timeframes and conditions of conservation and storage practiced in Canada, according to the guidelines of the *Academy of Breastfeeding Medicine*[25]. Thus, this content was altered by the cross-cultural adaptation of the app to reflect local protocols in Canada.

There are three methods of extracting breast milk: manual extraction, extraction with a pump, and a combination of the first two. Originally, the *app* only illustrated the manual milk extraction technique, which is most commonly practiced in Brazil and recommended in a Brazilian technical reference manual[22]. In this sense, the *experts* suggested providing specific explanations and illustrations on the use of breast pumps, as many parents in Canada seem to be more familiar with the use of pumps than with manual extraction[26]. It is worth noting that both extractions are recommended without robust evidence of better efficacy for one or the other, as long as they respect the woman's preference and conditions[22]. It was also necessary to adjust the terms relating to the practice in the app, using *"pumping breastmilk"* when referring to milk extraction with a pump, and *"hand expressing breastmilk"* when referring to manual extraction, a distinction that does not exist in Brazilian Portuguese.

The *app* offers a feature that was initially named *"Distraction box"* which gives users access to personalized music *playlists* and games such as crossword puzzles and jigsaw puzzles. The relevance of this content aroused doubts among three *experts*, who questioned why the user would need to be distracted, and what the suggested times for access – whether it would be, for example, between feeds. One of the authors, a Brazilian who has been working professionally in Canada for over seven years, explained the dissonance of using the term *"distraction"*, which refers to being strongly distracted, such as ignoring something, when the intention would be to relax or entertain. So, instead, the feature was renamed *"Relaxation box"*.

Depending on the care model adopted by the institutions, the routine of mothers of hospitalized premature babies can include periods of distance from their child, which can intensify anxiety and stress, and distraction can be an ally in promoting relaxation. Some mothers also reported adopting relaxation strategies at times when they were using breast pumps, which helped them to "pass the time and deal with it"[27].

On screens with content related to the father/partner, three experts recommended not using the expression *"daddy"*, but a more inclusive alternative, such as *"partner"*, *"care partner"* or *"co-parent"*, and the suggestion *"partner" was accepted*. Regarding the *app*'s specific content on the father's participation in baby care, one *expert* considered that it could be exclusionary for users who did not have a partner or who were homosexual. However, in both versions of the *app*, the screens with content related to the father/partner are programmed according to the data entered by the user in the initial registration; therefore, these screens are only displayed to those who report having a partner. The decision to keep these screens, with adjustments to the language, is in line with the World Health Organization's understanding of the importance of including fathers/families in breastfeeding education and support programs[4].

Tone adjustments: improving empathy in communication with the user

In the original writing of the *app*'s content, to achieve an effect of emphasis and persuasion, very emphatic statements were used, especially when the text talked about the advantages of BF or the importance of systematically expressing milk, for example. In this sense, when evaluating *The Breastfeeding Coach app*, the *experts* generally thought that the text should be less authoritarian, always replacing the imperative instructional textual mode with suggestive phrases. Examples include *"(...) you must pump every 3 hours at least"*, replaced for *"(...) it is recommended to pump every 3 hours at least",* and *"Be sure to use the 'Kangoroo care' method"*, replaced with *"Consider using the 'Kangoroo care' method".* It was also suggested to replace the phrase *"There is nothing better than feeding a baby only breastmilk for the first six months"* with *"It is recommended that babies receive only breastmilk for the first six months of life, followed by breastfeeding in combination with other foods for up to 2 years or more. You can strive to give as much breast milk as possible to your baby".*

This more welcoming language, which shows care for the mental health of mothers who are unable to breastfeed or comply with any recommendations made by the app, is more consistent with the theoretical principles that underpin it and alerted us to a revision of the language of the original *app* in Portuguese as well.

In addition, there were suggestions to rewrite phrases that generalized maternal experiences or emotions in some way to better accommodate different possibilities of experiences and emotions. One example occurred with a screen containing the statement*, "Despite the challenges, know that breastfeeding a baby born prematurely is possible and that it's worth every effort."* In this case, one of the *experts* pointed out that not all women may conclude that breastfeeding is worth every effort.

The strength of the argument highlighting the advantages of BF, especially the supremacy of human milk for infants, is a hallmark of public health campaigns in Brazil[28] and is also common in Brazilian practice, in professional approaches to pregnant and postpartum women. This characteristic seems to be poorly counterbalanced with protective measures for maternal mental health, especially for women who, for a variety of reasons, do not breastfeed their children, breastfeed for less time, or do not exclusively breastfeed until the sixth month. In a qualitative study, the words of a mother of a premature baby revealed how attempts at encouragement by health professionals could be perceived as oppressive by women: "*Because the nurses force you to have milk! You must have milk anyway! They said: 'Keep trying!'*"[29:1034]. The discrepancy between the meanings related to breastfeeding contained in the discourses of professionals and organizations and the possible meanings produced by those who breastfeed can generate guilt and shame in women[28]. Caring for maternal mental health, both for those who breastfeed and those who don't, should be as much of a priority as efforts to provide breast milk for children, bearing in mind that most of the research evidence shows an association between the practice of breastfeeding and a lower incidence of maternal mental health problems[30].

Aspects related to appearance

Regarding design changes, there was no need to change the color pattern, or the style of the fonts used, but there was a need to change some of the images to help identify mothers of premature babies. Two of the suggestions accepted, for example, were to replace an image of a newborn baby with one using a nasogastric catheter for feeding and to include an image of a woman using a breast pump. These adjustments align with the theoretical model of maternal self-efficacy for breastfeeding, in which vicarious experience and role modeling increase self-confidence, and the most effective model is demographically and psychosocially similar to that of the target audience[12].

Study limitations

This study had some limitations. The panel was drawn from experts working in two of the ten Canadian provinces – Ontario and Nova Scotia, which may restrict the representativeness of this population. Only screenshots of the app were submitted for evaluation, which made it possible to evaluate its appearance and content, but not its usability.

It is necessary to test *The Breastfeeding Coach app* with the target population and then clinically validate the technological resource to evaluate its usability, user satisfaction, and effectiveness, which is planned for future studies. Soon, a pilot study will be carried out with the target population in Canada and will continue this first stage of translation and adaptation of *The Breastfeeding Coach App*. This evaluation will provide an opportunity to refine the language of the app's textual content.

FINAL CONSIDERATIONS

Translating and culturally adapting a Brazilian *app* to the Canadian reality proved challenging. This is an unusual route in Brazilian nursing research – exporting a technological resource developed in-house – since, however, its global potential is clear given the expertise accumulated around breastfeeding in Brazil.

The content was modified to make it consistent with the reality of premature breastfeeding practices in Canada. Attenuations in the rhetorical pattern demanded by cultural differences in the relationship between the professional and the client and in the role women occupy in Canadian society were also made.

This study shares the experience of translating and culturally adapting a Brazilian *app* for the Canadian context through a multi-professional partnership between Brazilian and Canadian *experts*, who were essential in this experience that is practically unavailable in the literature. Coordination with other research groups is a promising route that can support the expansion of studies conceived in developing countries and, consequently, allow for greater contributions to society.

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NOTES

ORIGIN OF THE ARTICLE

Excerpted from the thesis – App AmamentaCoach: development, validation, and experience of use by mothers of premature children (App AmamentaCoach: *desenvolvimento, validação e experiência de uso por mães de filhos prematuros*), presented to the Postgraduate Program in Nursing, State University of Londrina, in 2022.

CONTRIBUTION OF AUTHORITY

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APPROVAL OF ETHICS COMMITTEE IN RESEARCH

Approved by the Ethics Council of Universidade Estadual de Londrina, obtaining the Certificate of Presentation for Ethical Appreciation (*Certificado de Apresentação de Apreciação Ética*, CAAE) 27703419.8.0000.5231, opinion number: 3.852.898.

CONFLICT OF INTEREST

None.

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