

FEASIBILITY OF ONLINE PILATES CLASSES FOR PREGNANT BRAZILIAN WOMEN LIVING ABROAD: A PILOT STUDY

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ABSTRACT: Objective: This study analyzes how participation in online Pilates sessions influences the well-being of Brazilian pregnant women living abroad, from the perspective of remote professional practice in Physical Education within women's health care. **Methods:** This is a pilot, quantitative, and descriptive study involving 11 Brazilian expatriate pregnant women participating in remote interventions, using intentional non-probabilistic sampling. Data were collected through structured self-report instruments assessing perceived well-being during pregnancy, including sociodemographic variables and perceptions of gestational feelings and emotions. Data analysis was conducted using descriptive statistics, including frequencies and measures of central tendency. **Results:** Findings indicated an association between participation in online Pilates classes and positive perceptions of well-being. There was a predominance of favorable reports related to physical comfort, functional capacity in daily activities, and perceived health during pregnancy. Participants reported satisfaction with the remote practice, highlighting the continuity of physical exercise while living abroad. Elevated levels of anxiety and emotional burden were also identified, associated with the migratory context, including lack of support networks, cultural differences, and adaptation to the local health care system. **Conclusion:** Online Pilates classes demonstrated potential to contribute to the well-being of Brazilian pregnant women living abroad. The results suggest that this practice constitutes an accessible support strategy during pregnancy, particularly in contexts involving distance from care networks. Participants emphasized the importance of support from doulas, exercise guidance, and participation in groups for pregnant women, indicating the relevance of remote interventions in expanding maternal health care and qualified remote professional teaching.

Keywords: Interdisciplinary; Physical Education for pregnant women; Pilates; Expatriation; Remote Interventions; Human Development and Technologies.

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Viabilidad De Clases De Pilates En Línea Para Mujeres Embarazadas Brasileñas Residentes En El Extranjero: Un Estudio Piloto

RESUMEN: Objetivo: Este estudio analiza cómo la participación en clases de Pilates en línea influye en el bienestar de mujeres embarazadas brasileñas residentes en el extranjero, desde la perspectiva de la práctica profesional remota en Educación Física en el cuidado de la salud de la mujer. **Métodos:** Se trata de un estudio piloto, cuantitativo y descriptivo, que incluyó a 11 mujeres embarazadas brasileñas expatriadas participantes de intervenciones remotas, mediante muestreo intencional no probabilístico. Los datos se recopilaron a través de instrumentos estructurados de autorreporte que evaluaron el bienestar percibido durante el embarazo, incluyendo variables sociodemográficas y percepciones relacionadas con sentimientos y emociones gestacionales. El análisis de los datos se realizó mediante estadística descriptiva, incluyendo frecuencias y medidas de tendencia central. **Resultados:** Los hallazgos indicaron una asociación entre la participación en clases de Pilates en línea y percepciones positivas de bienestar. Se observó una predominancia de reportes favorables relacionados con el confort físico, la capacidad funcional en las actividades de la vida diaria y la percepción de salud durante el embarazo. Las participantes reportaron satisfacción con la práctica remota, destacando la continuidad del ejercicio físico mientras vivían en el extranjero. También se identificaron niveles elevados de ansiedad y carga emocional, asociados al contexto migratorio, incluyendo la falta de redes de apoyo, diferencias culturales y la adaptación al sistema de salud local. **Conclusión:** Las clases de Pilates en línea demostraron potencial para contribuir al bienestar de mujeres embarazadas brasileñas residentes en el extranjero. Los resultados sugieren que esta práctica constituye una estrategia accesible de apoyo durante el embarazo, especialmente en contextos de distancia de las redes de cuidado.

Palabras clave: Interdisciplinariedad; Educación Física para embarazadas; Pilates; Expatriación; Intervenciones remotas; Desarrollo humano y tecnologías.

Viabilidade De Aulas De Pilates Online Para Gestantes Brasileiras Residentes No Exterior: Um Estudo Piloto

RESUMO: Objetivo: Este estudo analisa como a participação em aulas de Pilates online influencia o bem-estar de gestantes brasileiras residentes no exterior, a partir da perspectiva da atuação profissional remota em Educação Física no cuidado à saúde da mulher. **Métodos:** Trata-se de um estudo piloto, quantitativo e descritivo, envolvendo 11 gestantes brasileiras expatriadas participantes de intervenções remotas, por meio de amostragem intencional não probabilística. Os dados foram coletados por meio de instrumentos estruturados de autorrelato, avaliando o bem-estar percebido durante a gestação, incluindo variáveis sociodemográficas e



percepções relacionadas a sentimentos e emoções gestacionais. A análise dos dados foi realizada por meio de estatística descritiva, incluindo frequências e medidas de tendência central.

Resultados: Os achados indicaram associação entre a participação em aulas de Pilates online e percepções positivas de bem-estar. Observou-se predominância de relatos favoráveis relacionados ao conforto físico, à capacidade funcional nas atividades de vida diária e à percepção de saúde durante a gestação. As participantes relataram satisfação com a prática remota, destacando a continuidade do exercício físico durante a permanência no exterior. Também foram identificados níveis elevados de ansiedade e sobrecarga emocional, associados ao contexto migratório, incluindo ausência de redes de apoio, diferenças culturais e adaptação ao sistema de saúde local. **Conclusão:** As aulas de Pilates online demonstraram potencial para contribuir com o bem-estar de gestantes brasileiras residentes no exterior. Os resultados sugerem que essa prática constitui uma estratégia acessível de suporte durante a gestação, especialmente em contextos de distanciamento das redes de cuidado.

Palavras-chave: Interdisciplinaridade; Educação Física para gestantes; Pilates; Expatriação; Intervenções remotas; Desenvolvimento humano e tecnologias.

INTRODUCTION

Gestating outside one's country of origin is an experience marked by challenges that extend beyond physical aspects, encompassing cultural adaptation, the reconstruction of support networks, and navigation within unfamiliar healthcare systems^{1,2}. This study emerged from the professional experience of the first author, a Pilates instructor with over ten years of practice, who, during the COVID-19 pandemic, began offering online classes to Brazilian pregnant women living abroad, particularly in Canada, and is currently being supervised by the other two authors within an academic master's program.

This experience originated from the gestAÇÃO project, an interdisciplinary initiative conducted entirely remotely and composed of professionals from various health-related fields, including physiotherapists, osteopaths, physicians, physical education professionals, and doulas. Over a six-month period, the group followed Brazilian women residing in different countries, fostering exchanges between professionals and participants on topics such as local legislation, exercises that may support labor, models of prenatal care, and childbirth-related decision-making. These discussions contributed to a broader understanding of the specificities of experiencing pregnancy outside Brazil^{3,4}.

Pregnancy is understood as a period of significant transformation, involving physical, emotional, and sociocultural adaptations, particularly when experienced outside one's country of origin^{2,5}. Thus, this study addresses two main aspects: first, the emotional and psychological adaptations that influence adherence to and continuity of online physical exercise during pregnancy; and second, the importance of interdisciplinary practice in ensuring safe and comprehensive care for pregnant women, especially in the context of remote interventions^{4,6}.

The study is grounded in the Bioecological Theory of Human Development, proposed by Bronfenbrenner, which conceptualizes development as the result of interactions among social processes, the individual, context, and time commonly referred to in the literature as the PPCT



model⁷. This framework allows for the analysis of how personal and environmental factors such as migration, cultural adaptation, support networks, and access to technology influence the experience of pregnancy.

The aims of this study were to evaluate the feasibility and potential effects of online Pilates classes on perceived well-being among Brazilian pregnant women living abroad, considering the context of remote professional practice in women's health.

METHODOLOGY

Ethical Aspects and Study Design

This pilot study adopted an exploratory mixed-methods approach, combining quantitative data obtained through Likert-scale measures with descriptive qualitative interpretations. This methodological choice is justified by the nature of the phenomenon under investigation, as experiences such as body empowerment, sense of belonging, and emotional well-being during pregnancy in an expatriation context cannot be fully captured by numerical data alone, thus requiring an interpretative analysis grounded in the Bioecological Theory of Human Development (Bronfenbrenner, 1996; 2005; 2006; 2011).

The study was approved by the Research Ethics Committee of São Paulo State University (UNESP) (CAAE: 82753724.5.0000.5398), and all participants provided written informed consent prior to data collection.

Participants

Fifteen Brazilian expatriate pregnant women were invited to participate, of whom eleven completed the questionnaire within the established timeframe, constituting the final sample ($n = 11$). A non-probabilistic purposive sampling strategy was employed, including women who had participated in online Pilates classes conducted by the researcher, primarily residing in Canada and the United States.

Inclusion criteria were: being Brazilian, having experienced pregnancy abroad, and having participated in online Pilates classes for at least three months during pregnancy within the past two years (2024–2025). Participants who did not complete all items of the instrument were excluded. The small sample size represents a limitation of the study, restricting the generalizability of the findings and reinforcing its exploratory nature.

Data Collection Procedures

Data were collected an online questionnaire distributed via WhatsApp, consisting of two sections: (1) sociodemographic information, including country of residence, duration of expatriation, gestational trimester, and history of physical exercise practice; and (2) perception scales using a five-point Likert format (1 = strongly agree; 5 = strongly disagree), addressing emotional well-being, motivation for physical exercise, and the experience of living abroad during pregnancy. The scales were developed by the authors based on the Bioecological Theory of Human Development and the literature on exercise during pregnancy, encompassing variables such as sense of belonging, body safety, and perceived social support.



Online Pilates sessions were delivered synchronously, with a frequency of one to two sessions per week and an average duration of 40 minutes per session, over approximately 40 weeks. The questionnaire was administered retrospectively to former participants at least three months postpartum, allowing them to evaluate their experiences with a temporal distance from the intervention.

The primary outcome was perceived maternal well-being during pregnancy, operationalized through self-reported Likert-scale measures encompassing emotional domains (e.g., anxiety, calmness, and emotional balance), perceived physical comfort, and functional capacity in activities of daily living.

Quantitative data were analyzed using descriptive statistics. Qualitative data were interpreted descriptively, aiming to understand the meaning of the reported experiences, grounded in and interpreted according to the principles of the Bioecological Theory of Human Development (Bronfenbrenner, 2005; 2006; 2011), as outlined in the introduction.

RESULTS

The data collected from the 11 participants were analyzed based on perception scales assessing feelings related to the experience of pregnancy abroad and engagement in physical exercise. The results revealed two main patterns: elevated levels of anxiety and emotional burden associated with the migratory context, contrasted with predominantly positive emotional states linked to the practice of the Pilates method.

Regarding the experience of pregnancy abroad, participants reported both emotional challenges related to the absence of support networks, cultural differences in obstetric care models, and adaptation to the local healthcare system and moderate levels of perceived support, suggesting that the migratory context may also foster new forms of social support.

Based on the descriptive data, most participants (90.9%, $n = 10$) reported having received some form of prenatal care services from Brazil, while only one participant (9.1%, $n = 1$) did not. Participants also identified the types of prenatal care they considered most important during pregnancy. The results, presented in Figure 1, highlight the diversity of valued support, including not only clinical care but also informational, emotional, and educational forms of assistance.



Types of prenatal support and assistance

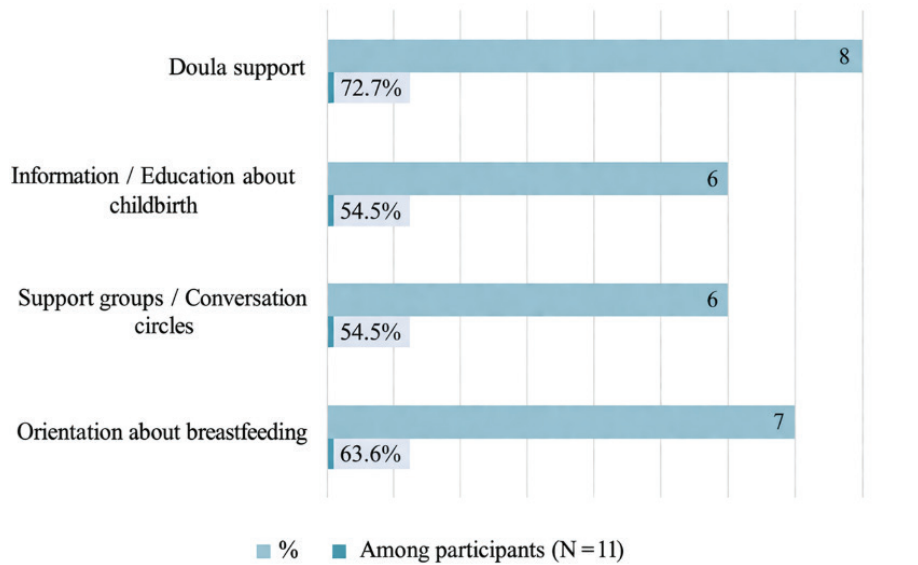


Figure 1. Types of prenatal support and care considered relevant by pregnant women (n = 11).
 Source: Prepared by the authors based on the study data (2026).

The perception of prenatal support and care was analyzed using absolute (n) and relative (%) frequencies. Regarding the types of support considered relevant during pregnancy, assistance provided by doulas was the most frequently reported (72.7%, n = 8), followed by guidance on physical exercise particularly the Pilates method (63.6%, n = 7) and participation in pregnancy groups or discussion circles (54.5%, n = 6).

Informações sobre o parto foram igualmente mencionadas por 54,5% (n = 6). Esses dados indicam que, além do cuidado clínico, as participantes atribuíram grande valor a formas de apoio emocional e educativo.

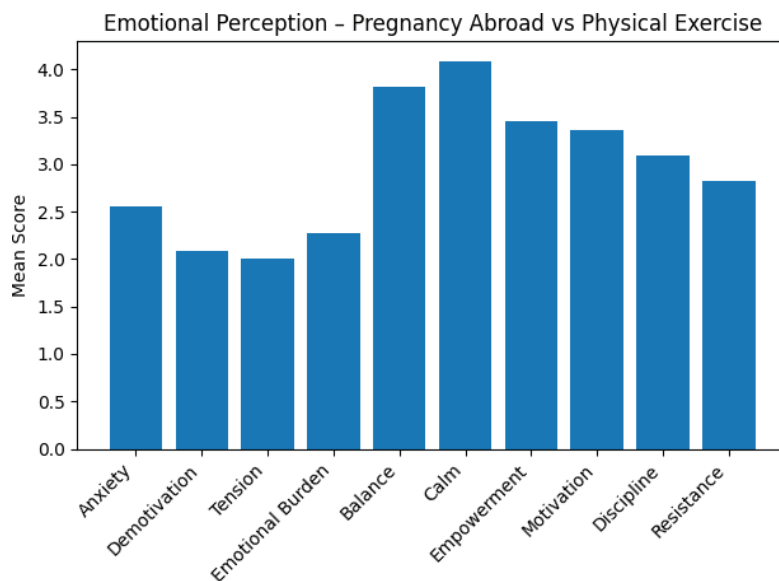


Figure 2. Emotional perception associated with pregnancy abroad and engagement in physical exercise.
 Source: Prepared by the authors based on the study data (2026).



As shown in Figure 2, a clear contrast can be observed: while anxiety and emotional burden presented higher mean values in the overall gestational context, the practice of Pilates was associated with predominantly positive indicators.

The results were analyzed using mean (M) and standard deviation (SD), interpreted as follows: values up to 0.50 indicate consensus among participants; 0.51–1.00 indicate moderate variation/consistent trend; and values above 1.00 indicate greater variability/heterogeneous experiences. Regarding physical exercise practice, feelings of calmness (M = 4.09; SD = 0.83) and balance (M = 3.82; SD = 0.87) were prominent, showing moderate variation among participants and suggesting a consistent positive trend. Perceptions of body empowerment (M = 3.45; SD = 1.21), motivation (M = 3.36; SD = 0.92), and discipline (M = 3.09; SD = 1.22) showed intermediate mean values, with empowerment and discipline presenting greater variability, indicating heterogeneous experiences among participants.

Negative indicators tension (M = 2.00; SD = 1.18), demotivation (M = 2.09; SD = 0.94), and emotional burden (M = 2.27; SD = 1.01) showed low mean values, suggesting an overall positive experience. Feelings of resistance (M = 2.82; SD = 1.17) and anxiety (M = 2.55; SD = 1.13) also presented high variability, indicating that some participants still experienced emotional or physical challenges during the practice.

DISCUSSION

This pilot study provides compelling preliminary evidence that online Pilates may act as a dual-modality intervention simultaneously mitigating emotional distress associated with expatriation and promoting positive psychophysiological states during pregnancy.

The coexistence of elevated anxiety and emotional burden alongside positive perceptions linked to Pilates practice reflects the complexity of pregnancy in migratory contexts. This duality aligns with ecological models of health, in which adverse contextual factors (e.g., absence of support networks) coexist with protective behavioral strategies such as structured physical activity.

The positive emotional outcomes observed, particularly calmness and balance are consistent with previous evidence indicating that Pilates promotes mind body integration, breathing control, and autonomic regulation. These mechanisms are associated with improvements in psychological well-being and stress reduction during pregnancy^{8,9}.

Recent systematic reviews demonstrate that Pilates during pregnancy contributes not only to psychological outcomes but also to physiological improvements, including reduced pain and enhanced maternal experience. Additionally, Pilates has been associated with shorter labor duration and improved neonatal outcomes, reinforcing its relevance in maternal health care^{9,10}.

The findings related to physical comfort and functional capacity are also supported by the literature, which indicates that Pilates improves posture, reduces musculoskeletal pain, and enhances functional performance in pregnant women. These adaptations are particularly relevant in the context of bodily changes and biomechanical overload during pregnancy¹¹.

An important contribution of this study lies in highlighting the role of remote exercise as a mediator of social support. In expatriate populations, digital environments may partially compensate for disrupted social networks, fostering belonging and emotional connection key determinants of maternal mental health¹².



The results support current trends toward hybrid and remote models of care in maternal health. Technology-mediated interventions, such as online Pilates, align with interdisciplinary approaches and expand access to care, particularly for populations facing geographical or cultural barriers.

From a clinical perspective, these findings suggest that online Pilates can be considered a safe, accessible, and low-cost complementary strategy to support maternal well-being, especially among women experiencing social vulnerability or reduced access to in-person services. Health professionals, including physiotherapists and exercise specialists may incorporate remote Pilates programs into prenatal care to enhance both physical and emotional outcomes^{13,14}.

This study has limitations, including the small sample size, non-probabilistic sampling, and reliance on self-reported measures, which limit generalizability and may introduce response bias. Furthermore, the retrospective design and lack of a control group restrict causal inferences. Future studies with larger samples, longitudinal designs, and controlled methodologies are warranted.

CONCLUSION

The findings of this study indicate that pregnancy in an expatriation context is associated with elevated levels of anxiety and emotional burden, influenced by the absence of support networks, cultural differences in obstetric care models, and challenges related to adaptation to local healthcare systems. In contrast, participation in online Pilates was associated with positive emotional states, such as calmness, balance, and body empowerment, highlighting its role as a relevant strategy for emotional regulation and body awareness during pregnancy.

Furthermore, participants valued expanded forms of care that go beyond the traditional clinical model, emphasizing the role of doulas, pregnancy support groups, and guidance on physical exercise as essential resources for coping with the physical and emotional demands of this period. These findings underscore the importance of interdisciplinary and woman-centered approaches in maternal care, particularly in international contexts.

Finally, the interactions fostered in the online environment—characterized by support, exchange of experiences, and relationship building—demonstrate the potential of remote interventions as spaces for care, belonging, and continuity of physical practices. In this context, online education and guidance programs expand the scope of practice for physical education professionals, contributing to the promotion of well-being among expatriate pregnant women and advancing knowledge in the field of perinatal health in globalized settings.

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Declaration on the Use of Artificial Intelligence

The authors used the tool Claude.ai for purposes such as grammatical revision, data organization, and reference management. All intellectual and scientific decisions related to the content of this manuscript are the sole responsibility of the authors.

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