The F-A-X Pathway: Integrating XR and Arts-Based Action Research in Feminist Art Therapy

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Abstract. First-generation immigrant women have low fertility rates and face structural barriers and psychological challenges such as limited access to healthcare, fragmented social support networks, and cultural barriers. As a solution to these multidimensional dilemmas, this study proposes the F-A-X Pathway, an integrated framework that can bridge Feminist Art Therapy (FAT), Arts-Based Participatory Action Research (AB-PAR), and Extended Reality (XR). This study is a mixed-method study grounded in the methodology of digital health interventions and online co-creation workshops, with a critical-pragmatic paradigm. Usability, adherence and psychosocial outcomes were quantitatively and qualitatively evaluated through surveys, longitudinal follow-up interviews and multimodal interaction analysis. The study results show that F-A-X Pathway leads to the following outcomes: physical rehabilitation, psychological therapy, and subjectivity re-definition. Moreover, joint co-creation processes facilitated peer-support to thrive within the group as empowerment started taking its course and counter-narratives of structural oppression bloomed. In addition to contributing to the digital transition of art therapy, this study also offers an adaptable and transferable model for marginalized maternal populations living in cross-cultural contexts.

Keywords: Feminist Art Therapy, Participatory Action Research, Extended Reality, Immigrant Women, Maternal Health

1. Introduction

This decline in the fertility of foreign-born women is larger than for native-born, particularly among immigrant Chinese women, who have historically low total fertility rates [1]. This tendency comes not only from the lessening of individual desire to reproduce but also from confluence of the crises that arise due to material and mental conditions desiring pregnant delivery under systemic oppression. These include: lack of medical resources, disjointed social support systems, underdeveloped public health systems, language and cultural obstacles, vulnerability due to intercultural institutional voids [2]. These interlocking constraints challenge maternal health and reproductive ambitions, thwart the socialization of experience, and restrict collective empowerment. It is therefore urgency-driven to publish this as we explore the pathway that synthesizes feminist art therapy (FAT), arts-based participatory action research (AB-PAR), and extended reality (XR) co-

creative spaces, as a way of combating isolation by sharing in trauma. This pathway is known as the F-A-X Pathway.

However, there are three limitations in existing research: First, it is overly simplistic due to the segregation of methods and disciplines, which leads to a lack of interdisciplinary integration, making it difficult to address individual healing alongside structural oppression simultaneously [3]. Second, there is a severe lack of systematic research on first-generation Chinese immigrant pregnant women at present; therefore, this group has been marginalized by both academia and practice. Third, the art therapy-based XR is isolated and lacks systematic methodology and evaluation mechanisms [4]. At the practical level, this article aims to create an embodied space of healing and empowerment for a generation of immigrant pregnant women through our F-A-X Pathway; at the paradigm level, demonstrating its potentiality as a transferable research path; while at the academic level, we are responding to structural oppression by proposing an explanatory framework that allows us to tackle cross-cultural maternal and childbirth experiences.

Two core research questions guided the development of this article: RQ1:Will the F-A-X Pathway lead to adherence and sustainability in remote prenatal care, maternal, and infant care as well as breastfeeding guidance? RQ2: How to promote trauma repair, subjectivity construction and even group empowerment through virtual postpartum care and co-creation workshops, which can form a transferable research model?

2. F-A-X pathway foundations and framework

Based on feminist theory, the FAT focuses on addressing women's structural oppression, as well as their physical and psychological trauma — mostly through art. It emphasizes the work of depathologization and subjectivity formation [5]. AB-PAR considers the art to be a tool and medium of knowledge production and social intervention in terms of participation, action and equality. This makes the research a collaborative practice, and can help to spur social change [6]. XR, encompassing virtual, augmented and mixed reality provides immersive, embodied and multimodal interaction. This characteristic gives it the possibility of widening geographic and temporal boundaries, as well as being an element that enhances the expressive power of art therapy and social intervention. [7] The three are also independent and complementary, in terms of value orientation, research method and media function. FAT gives ethical grounds for critique and healing, AB-PAR delineates a research pathway and an action oriented practice of co-creation, while XR represents the level of immersion and interaction that maximizes therapeutic and intervention effectiveness—together these represent the components necessary to build a cohesive framework.

In light of this, the article introduces the F-A-X Framework, a tripartite alignment of values (F), methods (A) and media (X) suggested to guide healing practice and research evaluation for migrant pregnant women. This framework aims to create a bridge between healing from individual trauma and collective empowerment, whilst also creating the groundwork that can act as a blueprint for other oppressed populations. It thus maps onto three vectors: F gives a normative basis for depathologization and structural critique; the A translates values into paths of participatory co-creation and cyclical action; while X supports and magnifies these practices, providing conditions for embodied, multimodal, multi-temporal interaction. Those three things are not just additive, but work in concert—interrogating why (F) and how (A), via which terrain of media (X)—as the basis for a principled research agenda. The F-A-X framework delineates these three components into five central dimensions for trauma rehabilitation, subject construction, bodily recovery, usability and acceptability, and outputs. More specifically, F is oriented toward ethics and critique, A guarantees

participation and equality, and X supports diverse interaction. This connection is instrumental in having consistent and operational theory, methods and media happen in practice.

In contrast with non-systematic applications, the F-A-X Framework is innovative in four aspects: first the systematic isomorphism of values, method and media, so as to ensure concept-practice consistency; second it not only integrates physical rehabilitation but also responds to the multiple needs of pregnant women by integrating psychological healing, social support and emotion expression in parallel; third it establishes a multimodal evidence chain that focuses on both quantitative-qualitative and interactive-longitudinal tracking characteristics to improve research verifiability; finally this project achieves cross-cultural adaptation through symbolic rewriting as well as contextual reconstruction in XR and provides marginalized groups with inclusive transferable healing path.

3. Research methodology

This study aims to disentangle intersectional oppression experienced by pregnant immigrant women, exposing their multi-layered physical and psychological trauma in a critical paradigm [8]. It applies a feminist lens, urging the depathologization of postpartum depression and the phenomenon of "parenting silos." It also encourages pregnant women to reconstruct their subjectivity through art and storytelling, as well as the production of knowledge and collective empowerment [9]. It is, as part of itself, practical: the critique and the feminist perspective in a usable format, a kit. Built on the XR-centered AB-PAR framework, the study describes an association between personal healing and social action to ensure findings are adaptable across disciplines and cultures [10].

Pregnant immigrant women and those who recently gave birth face physical and psychological trauma on a routine basis from unwanted, or poorly available medical treatment, insufficient postpartum rehabilitation, and inadequate breastfeeding training. The absence of outside help, language and cultural differences, and maternal discipline can all work together to worsen isolation and depression. With the AB-PAR approach and reflexive practice, two complementary intervention pathways were designed: an XR telemedicine platform for physical rehabilitation and social support, and an online co-creation workshop for psychological healing and emotional expression. Through a series of multi-identity reflection journals and feedback from the participants, the academics were able to iterate upon their design and prototype in a manner that mitigated the risk of power asymmetry by ensuring embodied and critical thinking.

Participant Recruitment and Relationship Building: Rather than direct recruitment, the research team offering companionship through Chinese community centers, mother-infant mutual support groups and confinement service networks supported by volunteers. By increasing collaboration with cultural brokers (midwives, social workers, and community leaders) , this research augment trust during recruitment while negotiating ethical challenges [11].

Ethical Considerations: A real-time, multi-staged informed consent strategy used a tiered approach, with options for project participants to opt-in to be static or dynamic as they retained agency over what to do with their work and the knowledge they co-created amongst themselves. The research and writing process adhered to the principles, protocols of emotional safety, withdrawal and referral outlined in trauma-informed standards. This also ensured continual communication through online check-ins and follow-up visits, in order to avoid secondary trauma [12].

Data Collection: In order to assess the usability, acceptance, and stability of the platform intervention in a context of physical rehabilitation by adapting three scales (SUS, UTAUT, and CSQ)+ adherence metrics such as interaction data. The research design is based on the principle of doctor first, peer backup, which emphasizes perinatal care, rehabilitation, and lactation guidance.

Pre- and post-tests and longitudinal follow-up were employed, augmented with qualitative data from interviews and focus groups [13]. At the same time, the second psychological healing program was in the form of online workshops, which included modules such as supportive virtual space design, media exploration, art development, peer- sharing dialogue, co-constructing knowledge, and cross-cultural postpartum care [14]. The data from workshops was collected from audio tracks, videos, art archives, and embodied interaction traces. Additionally, the researcher will administer altered questionnaires before, during, and after the program, as well as at three- and six-month follow-up periods. More specifically, these surveys highlight postpartum depression, social support, self-efficacy and psychological well-being.

Data Analysis: A mixed-method approach consisting of qualitative and quantitative analyses was employed. Qualitative analysis includes thematic, narrative, and artistic approaches by Nvivo coding and word cloud presentations. Such analysis focuses on cultural assimilation, trauma recovery, and the construction of subjects [15]. To show the cross-media translation of embodied experience, the technique of multimodal interaction analysis was employed to integrate data elicited from language, gestures, art work, and platform comments. The backbone methods of quantitative analysis are Descriptive Statistics and Longitudinal Trend Analysis. Those offer experience ratings and adherence indicators to reveal the effectiveness of the intervention in research [16]. Quantitative and qualitative aspects are complementary — the former can expose experiences and narratives while the latter can demonstrate evidence of usability, acceptance, and adherence. The broader methodology is nested within a critical-embodied-contextual approach and the importance of aligning with both methodology and values , as well as bias checks.

4. Result

The proposed F-A-X Pathway in this study is of significant potential at an application level. First, the XR-based system & prototype shows us the feasibility and potential effectiveness for physical rehabilitation and psychological healing. These provide a technical and methodological basis from which to implement interventions. Second, at the individual level, this framework can reflect the recurring cultural obstacles and traumatic narratives experienced by immigrant pregnant women in postpartum care and promote the reconstruction of subjectivity through embodied and symbolic practices. Third, the collective co-creation process may enhance peer support and group empowerment. Ultimately, these experiences are further magnified by symbolic rewriting into public discourse that could eventually result in the formation of different discourses and the destabilization of both maternal disciplines and structural symbols.

Apart from these deductive results, the power of F-A-X Pathway is in method innovation. It shows how multimodal XR interactions can deepen and diversify embodied healing and emotional expression, recognizing individual healing as naturally leading to collective empowerment, collective social critique, and the birth of alternative systems of discursive sense-making. Accordingly, this study forms a critical practice chain of individual healing → subject reconstruction → collective empowerment → structural answering which not only expands the terrain of art therapy but also serves as an embodied and contextualized path for practicing feminist social justice, participatory action research, and decolonial knowledge production.

The originality of this study is proposing a transferable F-A-X Framework in responding to the psychological and physical trauma, as well as structural oppression posed by "the intersecting matrix of childbirth." This pathway is undoubtedly highly promising, not only on a theoretical level but also practically, but with it comes huge challenges. First, the prototypes of digital therapy require interdisciplinary technology and practical experience for researchers and art therapists; if not, such

practitioners will not be able to fully develop their own function. Second, the reliance of this framework on XR could widen the digital divide and lead to other new forms of technological oppression [17]. Third, localizing and contextualizing the approach is crucial: only by being rooted in the cultural context and practical needs of immigrant pregnant women can it ensure effectiveness and sustainability. Lastly, empirical pilots and longitudinal evaluations should provide further testing and optimization.

5. Conclusion

Using pregnant and postpartum Chinese immigrant women as an empirical context, this study breaks from Euro-American norms to provide a more diverse setting for digital/feminist research [18]. It started a new approach to XR-driven AB-PAR research with its dual framework of physical recovery and psychological healing, addressing the digital transformation of art therapy. The F–A–X Pathway is both critical and therapeutic, responding to intersectional oppression and facilitating healing or the repair of someone's trauma. Through trans-disciplinary, cross-media, multi-sensory and embodied practices, it paved a new path for art therapy, digital healing and participatory action research. This approach enables underrepresented communities to state their views and contribute towards public discourse as well as applies to different sectors. This reaches wide-ranging domains including migration-related concerns, post-disaster trauma, education, community building and policy advocacy [19].

It is only with institutional and cross-sectoral support that the full potential of any development of the F-A-X pathway can be realized. Interdisciplinary mapping and integration are required from the policy perspective, as UNESCO and national public health systems need to interlink digital healing and art therapy through public services that simultaneously dismantle barriers to access and enable participation and responsiveness for marginalized groups [20]. Professionally, the International Art Therapy Association and the Feminist Network for Research should facilitate deeper connections between art therapists, XR developers, sociologists, psychologists, and policy makers towards an integrated methodology/technology/social practice. It is necessary to have a cross-temporal, multi-domain tracking and feedback mechanism that continuously evaluates therapeutic effectiveness and cultural adaptability in the future. Simultaneously, we need to develop an iterative optimization process, which makes its sustainable application in various contexts. Although this study presents a new F-A-X Pathway, it still has some limitations. The digital therapy prototype development is based on the multidisciplinary technical knowledge and experience of researchers and art therapists. That said, it is still only at a low level right now, usability-wise, because the research is limited to using these current sample sizes and experimental conditions. Future studies should widen the net so that different immigrant groups or cases across regions are included to ensure generalizability of findings and the cultural applicability of the framework as a whole.

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