Evaluating metaverse support groups for displaced populations: A randomized controlled trial with Ukrainian refugees

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Abstract

This randomized controlled trial (N = 152) evaluated the efficacy of immersive, avatar-based metaverse support groups for Ukrainian refugees. Participants were randomized to metaverse, in-person, or waitlist group therapy conditions. Significant reductions were observed in depression and anxiety with concurrent improvements in well-being and social support. Metaverse outcomes were comparable to in-person groups and superior to waitlist. Therapeutic alliance significantly moderated outcomes, particularly in immersive settings. Findings support metaverse-based interventions as scalable and effective approaches for displaced populations.

1. Introduction

The war in Ukraine has created a large-scale humanitarian crisis, placing a substantial mental health burden on displaced populations (Buchcik et al., 2023). Access to care is further limited by logistical, linguistic, cultural, resource, and stigma-related barriers. Support groups are a well-established, low-cost intervention for promoting psychological well-being, particularly among individuals facing shared adversity (Worrall et al., 2018); however, traditional in-person groups are difficult to scale in humanitarian contexts due to geographic dispersion and limited resources. Online virtual environments – particularly those described as "metaverse" platforms – offer a promising middle ground. These systems allow users to interact via avatars in shared, three-dimensional spaces, combining accessibility with embodied social presence. Emerging research suggests that such environments may enhance engagement, reduce stigma, and foster meaningful interpersonal connection (Cerasa et al., 2024; Vila et al., 2024). However, research is needed to determine whether this approach can provide the sense of presence, engagement, and interpersonal connection that underpin effective face-to-face group interventions and produce positive outcomes. The present study addresses a critical gap in the literature by conducting a randomized controlled trial (RCT) to evaluate the efficacy of metaverse-based support groups compared to both in-person groups and a waitlist control condition. This work provides one of the first rigorous empirical tests of immersive group interventions for refugee mental health.

2. Methods

2.1. Study design

A three-arm parallel-group randomized controlled trial was conducted to compare:

1. Metaverse-based support groups
2. In-person support groups
3. Waitlist control

Participants (N = 152) were randomized in a 1:1:1 ratio and assessed at four time points: baseline, mid-intervention (after session 2), post-intervention, and 3-month follow-up . Mixed-effects linear models were used to analyze longitudinal changes.

2.2. Participants

Participants were Ukrainian refugees residing in Romania, recruited through NGOs and refugee centers. The sample was predominantly female (98%) with a mean age of 47.3 years. Inclusion criteria required participants to be adults not currently engaged in formal mental health treatment. Recruitment yielded approximately 1,000 initial contacts, with 152 participants meeting eligibility criteria and randomized. Retention was 44% at post-intervention and 43 participants at follow-up.

2.3. Intervention

Both metaverse and in-person groups followed an identical structure: five weekly 90-minute sessions facilitated by licensed psychotherapists. Sessions included check-in, discussion, psychoeducation, and group sharing, grounded in cognitive behavioral therapy (CBT) and trauma-informed principles. The metaverse condition was delivered in a browser-based immersive environment modeled after a Kyiv location (using spherical photoreal imagery), where participants interacted via avatars using spatialized voice communication. This setup enabled real-time group interaction while preserving anonymity and reducing social inhibition.

2.4. Outcome measures

Primary outcomes:

- Depression (PHQ-9)
- Anxiety (GAD-7) Secondary outcomes:
- Well-being (WHO - Five Well-Being Index (WHO, 1998))
- Perceived social support - Multidimensional Scale of Perceived Social Support (Zimet et al., 1988)
- General psychological distress (DSM-5-TR Level 1 Cross-Cutting Symptom Measure (LeBeau, 2014)
- Gender-based violence (GBV) awareness (NGO-developed)

Therapeutic alliance (The Working Alliance Inventory – Short Form (Munder et al., 2010)) was assessed as a moderator of outcomes.

3. Results

3.1. Main effects

Active Metaverse and in-person intervention conditions showed comparable improvements and both outperformed the waitlist condition. Across the pooled sample, significant improvements were observed from baseline to post-intervention:

- Depression decreased significantly ($\beta \approx -4.99$, $p < .001$)
- Anxiety decreased significantly ($\beta \approx -4.47$, $p < .001$)
- Well-being increased significantly ($\beta \approx +7.18$, $p < .001$)
- Social support increased significantly ($\beta \approx +10.69$, $p < .001$)
- Psychological distress decreased significantly ($\beta \approx -15.66$, $p < .001$)

Critically, metaverse-based groups achieved comparable outcomes to in-person groups across all primary and secondary measures. This finding supports the viability of immersive digital environments as an alternative delivery modality for group-based interventions.

3.2. Follow-up effects

At the 3-month follow-up, most treatment effects attenuated, though reductions in general psychological distress remained significant. This suggests that while short-term benefits are robust, maintenance strategies may be necessary to sustain gains.

3.3. Therapeutic alliance

Therapeutic alliance emerged as a significant moderator of outcomes, particularly for:

- Depression
- Well-being
- General distress

Notably, alliance effects were strongest in the metaverse condition, suggesting that meaningful therapeutic relationships can be formed in immersive digital environments – and may even be enhanced under certain conditions.

4. Discussion

This study provides one of the first rigorous demonstrations that metaverse-based support groups can produce clinically meaningful improvements in mental health outcomes among displaced populations. The results are notable for several reasons. First, the magnitude of improvement across outcomes is consistent with prior research on in-person, group-based psychosocial interventions, suggesting that metaverse delivery does not compromise efficacy. Second, the equivalence between metaverse and in-person groups challenges assumptions that digital interventions are inherently less effective or less engaging. The metaverse environment offers unique affordances that may contribute to these effects:

- Anonymity through avatar representation
- Reduced salience of identity markers
- Increased psychological safety

- Enhanced sense of presence compared to traditional online platforms
- Enhanced access to care

A key mechanism underlying these findings appears to be therapeutic alliance. Despite the mediated nature of interaction, participants in the metaverse condition formed strong relational bonds with facilitators and group members. This aligns with prior work suggesting that avatar-mediated environments can reduce stigma and facilitate self-disclosure by minimizing social evaluation pressures. Previous research suggests that interactions with virtual human representations often elicit a heightened sense of safety and lower perceived stigma when individuals disclose personal concerns, compared to direct encounters with human providers (Lucas et al., 2014, 2017; Mozgai et al., 2017). This effect has been attributed to the reduced salience of social identity markers, the perception of anonymity, and the minimization of impression management pressures in avatar-mediated settings. Drawing on classic theories of stigma and self-presentation (Goffman, 1959, 2022), the Metaverse may provide a unique environment in which participants can explore sensitive topics without the same fear of negative evaluation or social judgment that often arises in face-to-face groups. In group therapy delivered via avatars, these affordances may lower barriers to self-disclosure, foster more candid exchanges, and strengthen therapeutic alliance among participants. Designing refugee-focused Metaverse platforms with sensitivity to these psychological mechanisms – through features that preserve anonymity while also cultivating trust – may therefore be critical for maximizing engagement and therapeutic outcomes. These features may be beneficial for refugee populations, who often face stigma and barriers to open disclosure in traditional settings. Notably in the current study, stronger therapeutic alliances in the metaverse group led to better symptom outcomes, demonstrating that relational dynamics remain central even in virtual interventions.

While reductions in general distress persisted at the 3-month follow-up, the attenuation of anxiety and depression benefits highlights the need for sustained engagement strategies to support longer-term stress and trauma recovery. It is important to note that the original study design, out of caution at this early stage, specified exclusion of participants scoring above the PTSD cutoff of 27 on the National Stressful Events Survey PTSD Scale (LeBeau, 2014). In practice, however, the vast majority of screened individuals exhibited elevated PTSD symptoms, likely reflecting the humanitarian crisis context of the sample. Excluding these participants would have substantially limited both the generalizability and ethical relevance of the findings. Consistent with best practices for trauma-informed research and following consultation with field clinicians, these individuals were retained in the study. Clinicians were trained to monitor participant distress throughout the sessions and to provide immediate support or referrals when necessary. Taken together, these findings suggest that participants with elevated PTSD symptoms may require longer-term and more consistent engagement to achieve enduring mental health benefits, particularly given the ongoing stressors they face. Future interventions may therefore benefit from incorporating booster sessions, sustained access to virtual support communities, and integration with other support systems or more intensive evidence-based treatments.

5. Limitations

Several limitations should be noted:

- High attrition rates (44% retention at post-intervention)
- Predominantly female sample, limiting generalizability
- Reliance on self-report measures
- Lack of formal fidelity monitoring
- Potential selection bias due to NGO-based recruitment

Despite these limitations, the randomized design, use of validated measures, and consistency of findings across sensitivity analyses strengthen confidence in the results.

6. Conclusion

This study demonstrates that metaverse-based support groups are both feasible and effective for improving mental health outcomes among refugee populations. The findings suggest that immersive digital environments can replicate key therapeutic processes – particularly alliance – while overcoming barriers associated with traditional care. As global displacement and mental health needs continue to rise, scalable, accessible, and culturally adaptable interventions are urgently needed. Metaverse-based group therapy represents a promising direction for extending psychosocial support to underserved populations worldwide.

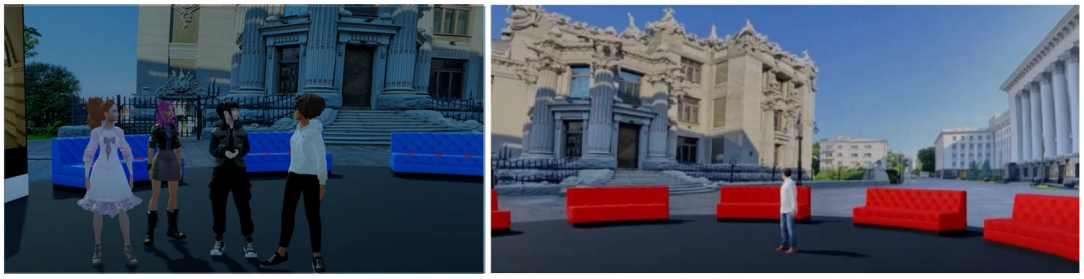

Figure 1: Spherical Metaverse Environment with Avatars.

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