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Reaching the Hardest to Reach:

Lessons Learned from a Feasibility Trial to Assess Online Services for Low-Income, Intimate Partner Violence Survivors in Brazil

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Abstract[1]

Digital platforms are increasingly proposed to reach survivors of intimate partner violence (IPV) in low- and middle-income countries, yet few feasibility data exist. We assessed the viability of Mapa do Acolhimento, a volunteer-run Brazilian service that recently introduced video counselling by psychologists and remote navigation by social workers. Women (≥18 y) who self-registered between January and April 2024 and remained unmatched after 24 h (n = 316) were randomized 1:1:1 to counselling (T1 = 127), navigation (T2 = 90) or care-as-usual referrals (CAU = 99). Pre-specified feasibility metrics were recruitment yield, covariate balance, 90-day retention, and instrument performance. The online funnel enrolled 18.6 survivors per week initially, declining to 8.1 as social-media click-through rates fell; 91% resided in high-connectivity municipalities, and 41% screened positive for severe anxiety or depression. Baseline balance was achieved on 19/20 variables; race/ethnicity was imbalanced (Black/Indigenous 24% in T2 vs 6% in CAU; $\chi^2 = 11.7$, $p < .01$). Overall retention was 14.2% (45/316); dropout was higher for survivors with high baseline anxiety, defined as the maximum value on the study's adapted two-item anxiety index (aOR = 1.74), and for those using shared devices (aOR = 1.59). The PHQ-2 and GAD-2 displayed acceptable reliability ($\alpha = .78$), but 28% of respondents exited immediately after the mental-health block, indicating survey-length fatigue. An unanticipated platform upgrade reduced eligible intake by ≈60%, rendering an adequately powered RCT infeasible. Findings show that a volunteer platform can recruit and randomize high-risk women at national scale, but rural reach, risk-responsive retention, and streamlined volunteer reporting must be strengthened. We propose evidence-based adjustments, plain-language messaging, hybrid recruitment, adaptive follow-up, and mobile-first reporting, and we outline methodological safeguards for future digital IPV trials in resource-constrained settings.

JEL classification: I14; J16; C93; O35

Keywords: intimate partner violence; digital health; feasibility study; Brazil; randomized field experiment

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1. Background and Rationale.

Intimate partner violence (IPV) remains pervasive in Brazil, disproportionately affecting women from low-income and rural communities. Nationally representative data indicate that approximately 23% of Brazilian women experience physical or sexual IPV during their lifetime, while psychological violence prevalence exceeds 50% (WHO, 2021; Kwaramba et al., 2019). Annual IPV prevalence is around 7.6% overall and is patterned by socioeconomic and health-related vulnerability, with higher prevalence among younger, lower-income women and women reporting poorer health (Vasconcelos et al., 2021; Signorelli et al., 2023; Giacomini et al., 2023). The health consequences of IPV are severe and include chronic pain, cardiovascular disease, physical injuries, psychological trauma, and increased risk of intentional injury or violent death (Kitzmann et al., 2003; Coker et al., 2000; Nesca et al., 2021). Further, survivors are often socially isolated, limiting their access to necessary support services (Capaldi et al., 2012).

Despite the profound impacts of IPV, survivors often face difficult and fragmented pathways when seeking formal support. Barriers to accessing services include personal and psychological factors such as fear, distress, shame, and self-blame (Scheffer Lindgren & Renck, 2008), social factors such as stigma and surveillance by abusive partners (Signorelli et al., 2023b), and structural factors including inadequate infrastructure, insufficient human resources, poor intersectoral coordination, and limited rural service availability (Robinson et al., 2021; Schraiber et al., 2012). As a result, survivors may face fragmented and difficult pathways when seeking formal help (Meneghel et al., 2011).

To address these structural and logistical barriers, researchers have begun evaluating technology-based interventions such as online counseling, web-based decision aids, text-message interventions, online support groups, and telehealth services (El Morr & Layal, 2020; Emezue et al., 2022). A recent systematic review and meta-analysis suggest that technology-based interventions produced small, short-term reductions in depression, anxiety, and physical violence victimization among female IPV survivors, although the evidence base remains concentrated in high-income settings and includes few studies from LMICs (Emezue et al., 2022). Despite high internet penetration in Brazil and over 90% household smartphone access, evidence on rigorously evaluated digital IPV interventions remains limited in LMIC settings; notably, Emezue et al.'s review identified no RCTs from Latin America (IBGE, 2022; Emezue et al., 2022).

In Brazil, Mapa do Acolhimento (henceforth, "Mapa") is a leading volunteer-driven platform established in 2016, providing survivors of IPV with online psychological support and remote caseworker assistance. Traditionally, Mapa matched survivors to in-person volunteer psychologists and legal advocates; however, to address growing demand and geographic disparities, Mapa introduced fully remote services in 2023. These include video-based psychological counseling and social worker-led remote navigation assistance to facilitate survivors' access to complex public support networks. This study asks whether a volunteer-run, algorithm-driven digital platform in Brazil can (i) recruit and randomize a socioeconomically diverse cohort, (ii) retain high-risk survivors over 90 days with acceptable data completeness, and (iii) deploy ultra-brief self-administered instruments that perform adequately under privacy and bandwidth constraints, feasibility criteria largely undocumented in Latin America.

Initially, we planned a randomized controlled trial (RCT) to evaluate these digital modalities rigorously. However, an unanticipated operational change in Mapa's matching algorithm significantly reduced the number of unmatched participants eligible for the study, making it impossible to achieve the originally intended sample size. Instead of terminating the evaluation, we pivoted to a feasibility study, consistent with guidance on adaptive trial redesigns (Eldridge et al.,

2016; Bowen et al., 2009). Specifically, our study addresses four key feasibility dimensions crucial for subsequent programmatic and methodological developments: (i) whether the digital platform effectively recruits a diverse national cohort of IPV survivors, (ii) the integrity and effectiveness of the embedded randomization process under real-world conditions, (iii) retention rates and data completeness for high-risk survivors over a 90-day follow-up period, and (iv) the acceptability and psychometric robustness of ultra-brief self-administered survey instruments among survivors facing significant privacy and digital-access barriers.

This study thus contributes to a nascent but critical body of literature on digital IPV interventions in LMICs, offering empirical evidence from Brazil at a moment when such interventions are rapidly scaling despite limited evaluative research to inform their design and implementation (Emezue et al., 2022). Furthermore, we situate our findings within broader theoretical frameworks related to barriers in IPV service access, such as extractive violence and bargaining power models, providing a richer analytical context for interpreting our empirical observations (Eswaran & Malhotra, 2011; Bobonis et al., 2013).

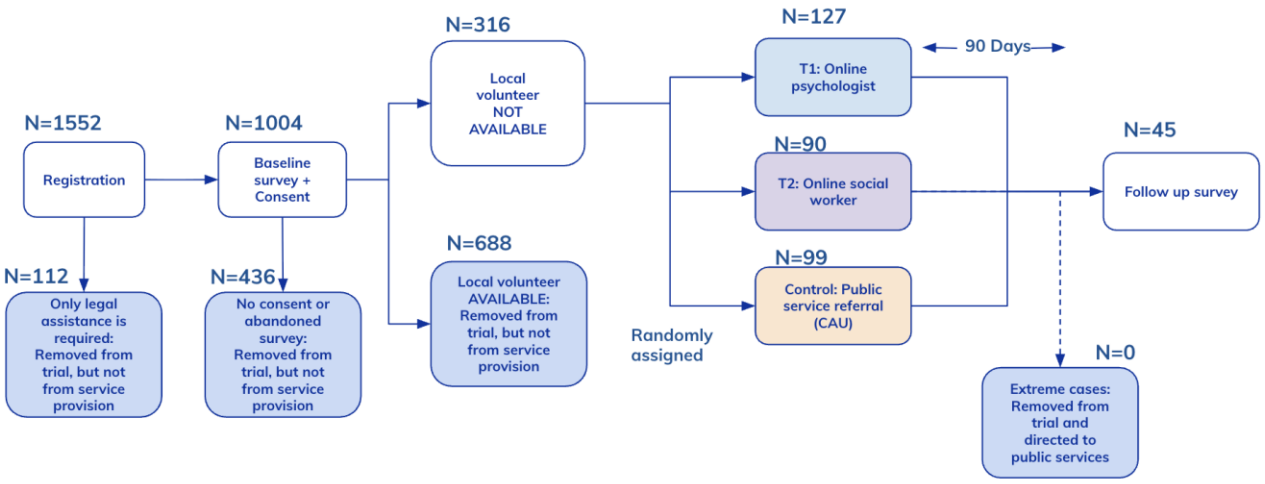
The remainder of the paper proceeds as follows. Section 2 outlines the shift from the original RCT to a feasibility design. Section 3 presents results on recruitment, randomization, retention, and instrument performance. Section 4 derives operational implications for Mapa do Acolhimento, and Section 5 extracts methodological lessons for future digital IPV trials. Section 6 concludes with limitations, policy implications, ethical considerations, and data availability.

2. Evolution of the Study Design—From Efficacy Trial to Feasibility Inquiry

Initially, the research aimed to conduct a randomized controlled trial (RCT) evaluating two innovative online interventions provided by Mapa do Acolhimento (Mapa): short-term psychological counseling by volunteer psychologists and remote navigation assistance delivered by professional social workers. Participants eligible for randomization were women aged 18 or older who self-identified as survivors of sexual or intimate partner violence and remained unmatched by Mapa's volunteer network 24 hours post-registration. Eligible participants were randomly assigned through an automated, concealed, 1:1:1 allocation into one of three arms: online psychological counseling (T1), online social-work navigation support (T2), or care-as-usual referral to public services (CAU). Randomization integrity was ensured through weekly audit scripts designed to flag timing anomalies or manual overrides, thereby preserving allocation concealment (Eldridge et al., 2016). This design choice also reduced the risk of inadvertent selection bias when allocation occurred within an active service platform.

Upon consent, survivors completed a baseline survey administered electronically via Qualtrics. The instrument was deliberately lean: adapted two-item measures of depressive symptoms and anxiety based on the PHQ-2 and GAD-2 items, scored as study-specific continuous indices from 2 to 8 rather than as standard 0–6 clinical screeners (Kroenke et al., 2003; Löwe et al., 2008), two WHOQOL-BREF items for subjective quality of life (WHOQOL Group, 1998), a 13-item safety-behavior index adapted from prior work on the use and perceived usefulness of safety behaviors among IPV survivors (Hanson et al., 2021), and the four-item IPV module from Brazil's National Health Survey (IBGE, 2019). Pages were mobile-optimized, all items were skippable, and each screen carried a prominently placed quick-escape button to mitigate surveillance risks on shared devices. To protect confidentiality, identifiers were encrypted and stored separately from de-identified analytical files.

Figure 1 – Final Experimental Flow with N's.



The pre-registered impact design differentiated survivor-reported outcomes, collected across all arms at baseline and 90 days, from service-process indicators, which were only observable in the treatment arms through Mapa's administrative back end. Survivor-reported outcomes comprised depressive and anxiety symptom scores, perceived quality of life, 30-day IPV exposure, and uptake of recommended safety strategies. Process metrics included the number and duration of counselling or navigation sessions and volunteer-reported case status ("closed" vs. "ongoing"). The absence of administrative process data in the CAU arm is a limitation for implementation evaluation but does not compromise comparability on psychosocial outcomes, which were self-reported in all arms.

Power and Sample Size. Power calculations were conducted prior to launching the trial. A meta-analysis of psychosocial interventions for IPV survivors reported heterogeneous effects across outcome domains, including an effect size of 0.40 standard deviations (SD) on emotional well-being outcomes and up to 1.16 for self-esteem (Arroyo et al., 2017). Using 0.40 SD as our minimum detectable effect (MDE), an intertemporal correlation (ρ) of 0.60 for psychosocial outcomes, $\alpha = 0.05$, and 80% power, the ANCOVA formulation (McKenzie, 2012) yields a required group size of 63 participants per arm (189 total across three arms). Allowing for 20% attrition, consistent with web-based IPV trials (Hegarty et al., 2019), we targeted 100 participants per arm (300 total). For context, if true effects were as large as 1.16 SD, detectable differences would require only about eight participants per arm. Reporting this range illustrates the sensitivity of power to plausible effect sizes. We will also report post hoc detectable effect sizes for each primary outcome given the realized endline sample (Goodman & Berlin, 1994).

Rolling Enrollment and Sample Control. Participants were enrolled on a rolling basis during a three-month recruitment window as they registered and were allocated services by Mapa. Every eligible survivor was automatically invited to participate. Because recruitment depended on platform flow and volunteer availability, the research team had limited control over the final sample size. Mapa reinforced participation by sending email reminders to registrants who had not enrolled within one week.

Data Integration and De-duplication. Survey data were merged with registration, triage, and case-status databases using a unique anonymous identifier generated by Mapa's system and passed to

Qualtrics via URL tags. This linkage avoided duplication between registration and baseline instruments and enabled tracking of case assignment and service uptake without compromising confidentiality.

Ethical and Safety Protocols. Given the sensitivity of IPV research, ethical safeguards were central. Extensive IPV modules were replaced with the brief IBGE items to reduce potential distress or suspicion by abusive partners (IBGE, 2019). Severe violence was screened at registration and during volunteer interactions; affirmative responses triggered an immediate safety assessment and referral to emergency services (police, shelter, hospital). Volunteers completed mandatory two-hour online training and risk-management simulations. Ethical approval was granted by the Federal University of Paraná (CAAE 6.203.531 The study procedures were designed to minimize participant risk, including through voluntary survey items, confidential data handling, a quick-escape button, and participant control over recontact preferences.

Implementation Challenges and Adaptive Adjustments

Recruitment commenced in January 2024 through targeted social-media advertising and organic traffic to Mapa's platform. Five weeks later, Mapa upgraded its matching algorithm from a one-to-one model (one volunteer per survivor) to a one-to-many model, allowing volunteers to support multiple survivors simultaneously. While operationally efficient, this change sharply reduced the pool of unmatched registrants, the sole sampling frame for the trial. Monthly unmatched cases fell from roughly 90 to about 35. Click-through rates on digital ads also declined over time (2.3% to 0.7%), compounding recruitment constraints.

To contextualize the impact on study eligibility, between January and April 2024, 1,552 survivors contacted Mapa. Of these, 112 sought only legal assistance and were excluded; 1,004 consented and completed the baseline survey; 688 were matched to in-person volunteers and thus ineligible for randomization; leaving 316 unmatched women who entered the experiment (T1 = 127; T2 = 90; CAU = 99). Ninety-day follow-up was completed by 45 participants (14.2%), with no exclusions due to activation of safety protocols. Attrition was differential by baseline anxiety and device privacy, patterns we quantify in Section 3.

On 19 February 2024, the steering group concluded that the powered effectiveness trial was no longer feasible. Consistent with guidance on adaptive redesign and feasibility assessment (Eldridge et al., 2016; Bowen et al., 2009), the study was re-scoped to focus on four feasibility domains: recruitment reach, randomization integrity, retention and data completeness, and instrument acceptability.

Pragmatic A/B Test of Survivor Communications

A formative behavioral audit revealed that only about 45% of survivors ever sent a first message to the assigned professional. To address this friction, we reviewed templated communications in Mapa's CRM, interviewed eight staff and volunteers, and analyzed aggregate case-status trends. The initial match-notification email (220 words, legalistic tone, weak call-to-action) was replaced by a 95-word version with a clear confidentiality assurance and a salient prompt ("Take the first step, contact your psychologist [or social worker] today"). Between 13 June and 15 July 2024, newly matched survivors were randomized 1:1 to receive the standard (n = 244) or simplified message (n = 232). "Contact" was defined as sending at least one WhatsApp, SMS, or email within 14 days. The simplified message increased contact from 44.3% to 48.7%, a 4.4 percentage-point uplift (95% CI: −4.7, 13.4). Although the confidence interval includes zero, the low marginal cost led Mapa to adopt the simplified template. The modest effect size, however, underscores the structural nature of engagement barriers,

corroborating evidence from other digital IPV interventions (Hegarty et al., 2019; Emezue et al., 2022).

Final Pivot to a Feasibility Focus

Cumulative recruitment shortfalls, high attrition, and limited administrative completeness made an adequately powered impact evaluation unattainable. On 16 July 2024, the project was formally reframed as a feasibility study. Ethical safeguards and operational protocols remained unchanged, but analytical attention shifted to assessing whether (i) a volunteer platform could recruit a socioeconomically diverse national cohort, (ii) embedded randomization held under real-world constraints, (iii) high-risk survivors could be retained with sufficient data completeness, and (iv) ultra-brief instruments were acceptable and psychometrically sound in this population. The feasibility lens also allowed us to reflect on design trade-offs, such as questionnaire brevity versus measurement depth, and to document context-specific operational risks (e.g., platform upgrades) that future embedded trials should anticipate.

The next section presents empirical findings on these four domains: recruitment, randomization, retention, and instrument performance, and links them to implications for both program implementation and the design of future digital IPV evaluations in resource-constrained settings.

3. Feasibility Findings

Guided by pilot/feasibility trial reporting standards (Eldridge et al., 2016) and broader frameworks on feasibility dimensions (Bowen et al., 2009), we assess four domains essential for determining whether a full-scale effectiveness trial is warranted: recruitment reach, randomization integrity, retention and data completeness, and instrument acceptability. Rather than reiterating descriptive tables, we interpret the quantitative patterns in light of existing evidence on digital IPV interventions and online research with hard-to-reach populations (Hegarty et al., 2019; Emezue et al., 2022).

3.1. Recruitment and Sample Characteristics

A total of 316 survivors were enrolled, exceeding the mid-course target of 300 but below the original powered goal of 480. Weekly enrollment fell from 18.6 to 8.1 as digital advertising performance waned, with click-through rates declining from 2.3% to 0.7%. This pattern illustrates the practical limits of relying on a single social-media recruitment channel, even though social media can be an efficient tool for recruiting research participants (Darko et al., 2022). The sample exhibited marked urban concentration: 91% lived in municipalities with reliable fixed-line internet, despite roughly one quarter of Brazilian women residing in lower-connectivity areas (IBGE, 2022). Socioeconomic indicators suggest heterogeneity and 74% reported incomes in the lowest two national quintiles, yet 26% held tertiary education, pointing to connectivity, not education, as the more binding inclusion filter. Baseline psychosocial burden was high: mean mean adapted two-item depressive-symptom and anxiety indices were 6.5 and 6.9 (0–10 scales) , respectively, on study scales ranging from 2 to 8, and recent IPV exposure was common (55% psychological, 28% physical).

Randomization achieved balance on 19 of 20 measured baseline covariates. A statistically significant imbalance emerged in race/ethnicity (Black or Indigenous: 24% in T2 vs. 13% in T1 and 6% in CAU; $\chi^2 = 11.7$, $p = .003$), underscoring the value of stratification or restricted randomization when specific vulnerability markers are considered important at baseline (Schulz & Grimes, 2002).

3.2. Participant Engagement and Usage of Online Services

Ninety-day follow-up completion was 14.2% (45/316), far below the 80% retention assumed in power calculations and lower than in many web-based IPV or safety-aid trials including I-DECIDE in Australia and iCAN Plan 4 Safety in Canada (Hegarty et al., 2019; Ford-Gilboe et al., 2020). Follow-up rates of this magnitude are uncommon but not unprecedented in e-health: Eysenbach's "law of attrition" posits that steep drop-offs are endemic to digital interventions, particularly when sustained engagement is burdensome or risky (Eysenbach, 2005). Two mechanisms appear salient here. First, psychological burden: participants with high baseline anxiety were substantially more likely to disengage. This is consistent with the broader IPV digital-intervention literature, which highlights mental-health burden, safety concerns, and privacy constraints as important considerations for engagement and follow-up (Emezue et al., 2022; Hegarty et al., 2019). Second, technology-facilitated surveillance and device insecurity: survivors using shared or borrowed phones dropped out more often, echoing research documenting partner monitoring and privacy risks as barriers to digital help-seeking (Freed et al., 2017; Dragiewicz et al., 2018). Technical frictions (slow 3G connections, time-outs) and rigid survey windows likely compounded abandonment.

Post hoc, using the realized endline sample sizes ($n_{CAU} = 16$, $n_{T1} = 22$, $n_{T2} = 7$) and the same assumptions as in the pre-analysis plan (PAP) ($\rho = 0.60$, $\alpha = 0.05$, power = 0.80), the ANCOVA minimum detectable effects are 0.79, 0.68, and 1.20 SD, respectively; a pooled approximation ($n \approx 15$ per arm) yields ≈0.82 SD. These magnitudes underscore why an impact analysis was untenable and motivate the pivot to feasibility (Goodman & Berlin, 1994; McKenzie, 2012). Attrition was not random: women with the maximum baseline value on the study's adapted two-item anxiety index were 74% more likely to disengage (adjusted OR = 1.74, 95% CI [1.10, 2.76]), and those using shared or borrowed phones had higher dropout odds (adjusted OR = 1.59, 95% CI [1.03, 2.46]). Administrative data were incomplete (≈50% on-time volunteer case-status forms), limiting precise estimates of dosage, but available traces indicate that initial reach seldom translated into sustained service use, particularly among participants facing acute safety or privacy constraints.

3.3. Barriers Encountered

Most barriers we encountered, like privacy risks, device/connectivity limitations, and psychological burden, mirror patterns documented in digital IPV and e-health research (Eysenbach, 2005; El Morr & Layal, 2020; Emezue et al., 2022; Hegarty et al., 2019). Our estimate that ~72% of respondents used low-end smartphones is consistent with LMIC contexts, yet the interaction with rigid follow-up windows is less often quantified. During the recontact consent process, participants selected the days, times, and communication mode through which they could safely receive follow-up invitations. However, 63% of non-completers attempted the survey outside these self-nominated safe windows, suggesting that fixed scheduling, even when participant-defined at baseline, may be ill-suited for survivors negotiating dynamic safety risks. This insight is echoed, but rarely measured, in prior work (Emezue et al., 2022).

Two features are less commonly described in IPV trials. First, an exogenous platform upgrade, Mapa's shift to a one-to-many matching algorithm, shrunk the eligible sampling frame mid-study. While service-environment volatility is acknowledged in embedded designs (Bowen et al., 2009), few studies report such a pronounced supply-side shock to eligibility. Second, incomplete administrative reporting (~50% on-time volunteer forms) constrained our ability to measure intervention dosage. Implementation science notes fidelity and documentation gaps in volunteer-driven programs (Hasson, 2010; Proctor et al., 2011), but digital IPV trials seldom detail this constraint. Here, volunteer burden and reporting friction eroded the very process data needed to interpret outcomes.

3.4. Acceptability and Performance of Survey Instruments

Despite operational hurdles, instrument reliability was acceptable: PHQ-2/GAD-2 $\alpha = .78$; safety-strategy index $\alpha = .81$, suggesting acceptable internal consistency in this sample. These findings are consistent with prior work showing that IPV survivors use a range of safety behaviors whose perceived usefulness can vary across strategies (Hanson et al., 2021; Kroenke et al., 2003; Löwe et al., 2008). Yet psychometric adequacy did not guarantee usability. Roughly 28% of respondents quit immediately after the mental-health block, consistent with survey fatigue dynamics in digital health settings (Rolstad et al., 2011). Missingness for violence items (18–25%) was higher among shared-device users, indicating perceived disclosure risk. These results support the literature highlighting the need for digital IPV tools to account for privacy, safety, and access constraints, and suggest that future research instruments may need to be shorter and more adaptive to survivors' device capacity and safety conditions (El Morr & Layal, 2020; Emezue et al., 2022).

The feasibility evidence indicates that recruitment is digitally scalable but socially and geographically selective; randomization is workable but demands stratification; retention hinges on adaptive, privacy-sensitive protocols; and ultra-brief instruments can be psychometrically sound yet operationally fragile. These patterns motivate two sets of implications: (i) operational adjustments for platforms like Mapa do Acolhimento (communication, outreach, data systems) and (ii) methodological guardrails for embedded digital IPV trials (sample planning, stratification, adaptive follow-up, measurement brevity). We elaborate these in Sections 4 and 5.

4. Programmatic Lessons for Mapa do Acolhimento

Drawing directly on the empirical patterns uncovered in this feasibility study, we identify four operational implications for digital IPV platforms such as Mapa do Acolhimento. Each implication is linked to observed effects in our data and positioned relative to existing implementation evidence.

4.1. Low-cost Behavioral Tweaks and Real-Time Experimentation Measurably Increased Initial Contact.

Our embedded A/B test, reducing the match-notification email from 220 to 95 words, raised first contact by 4.4 percentage points (44.3%→48.7%). Although the 95% CI includes zero, the intervention's near-zero marginal cost and immediate operational adoption by Mapa justify continued experimentation. Behavioral communication theory and survey methodology emphasize that message length, salience of the call-to-action, and readability influence response rates (Dillman et al., 2014; Kohavi et al., 2020). In IPV settings specifically, survivor-facing communications must balance clarity, brevity, privacy, and safety. However, the incremental gain from a single, short rewrite in a live IPV service is rarely quantified.. Our trial provides that empirical increment and justifies routine A/B testing of survivor-facing messages on the devices survivors actually use (low-end Android phones).

Trade-offs and Feasibility. The principal cost is staff time to draft and randomize variants; the infrastructure (CRM/email platform) already exists. However, repeated experimentation can introduce "message fatigue" or ethical concerns if survivors perceive manipulation. Pre-registering message variants and focusing on content that affects safety and engagement, not persuasion per se, can mitigate this. Future cycles should record (i) incremental cost per percentage point gain in contact and (ii) heterogeneity of effects by device type and baseline anxiety in order to understand who benefits most.

Measuring Impact. Beyond first contact, subsequent engagement (e.g., number of sessions) and safety outcomes should be tracked to ensure that increased contact translates into meaningful support, not just initial responsiveness.

4.2. Hybrid (Offline + Low-bandwidth) Outreach Is Required to Correct the Urban Bias.

Digital advertising recruited 316 survivors in four months but produced a sample in which 91% lived in high-connectivity municipalities, whereas ~25% of Brazilian women reside in low-connectivity areas (IBGE, 2022). Click-through rates collapsed from 2.3% to 0.7% over the recruitment period, illustrating the fragility of single-channel digital recruitment. This is consistent with broader evidence that social-media recruitment can be useful but may raise concerns about representativeness, access, and implementation guidance (Darko et al., 2022). Prior scoping reviews of digital IPV interventions in LMICs note that digital divides, device access, and connectivity constraints can limit reach among low-income, rural, and otherwise marginalized survivors, but they often lack precise undercoverage estimates for national platforms such as Mapa (Emezue et al., 2022).

Trade-offs and Feasibility. Offline channels, community radio, health-post referrals, and women's groups carry higher coordination costs (staff time, travel, materials). Yet if each offline referral yields even a modest number of additional rural participants, the cost per rural enrollee may compare favorably to declining returns from paid ads. Future implementations should log channel-specific costs and yields to permit cost-effectiveness comparisons (cost per eligible enrollee, cost per retained participant).

Implementation Detail. A rolling outreach calendar (e.g., fortnightly radio spots, monthly health-center trainings) can be integrated into existing NGO schedules. Low-bandwidth tools (SMS campaigns, Unstructured Supplementary Service Data [USSD] menus) should be piloted where smartphones are scarce. Critically, these channels must be evaluated, not just deployed, to avoid replicating the evidence-light adoption of digital ads seen here.

4.3. Risk-triggered, Privacy-sensitive Follow-up Protocols Are Warranted by the Observed Attrition Patterns.

Attrition was strongly associated with high baseline anxiety (adjusted OR = 1.74, 95% CI [1.10, 2.76]) and shared or borrowed device use (adjusted OR = 1.59, 95% CI [1.03, 2.46]). This empirically supports flagging these characteristics at baseline and tailoring follow-up accordingly. While privacy-sensitive follow-up is recommended in IPV e-health literature (Emezue et al., 2022; Hegarty et al., 2019), our data specify which risk markers to trigger on and the magnitude of attrition associated with them.

Operationalization. A two-tier system could be automated in the CRM: (i) standard participants receive a 90-day survey plus a brief 30-day check-in, and (ii) high-risk participants (maximum baseline value on the adapted two-item anxiety index; shared device) receive fortnightly ultra-brief micro-surveys or asynchronous voice-note check-ins that minimize typing, data usage, and on-screen time. Delivery modes should be randomized or alternated to protect privacy (e.g., generic subject lines, SMS shields).

Costs and Benefits. The incremental cost is modest (additional SMS/WhatsApp data, staff time for brief calls). Benefits include higher data completeness among precisely those whose outcomes are

most policy-relevant. Future iterations should track marginal gains in retention per added contact in order to refine the intensity of the protocol.

4.4. Mobile-first, Ultra-brief Reporting Workflows Increase Data Completeness in Volunteer Networks.

Approximately half of volunteers did not submit case-status forms on time under the original seven-field web form. Early adoption of a two-field, mobile-friendly prompt improved compliance qualitatively. Implementation science documents documentation fatigue (Hasson, 2010; Proctor et al., 2011), but IPV-specific digital trials seldom quantify its impact on evaluability. Our data show that reporting burden directly constrains dosage measurement.

Design Considerations. The minimal form should capture only (i) whether any contact occurred and (ii) whether the case is ongoing or closed. Additional details can be collected quarterly or via sampling, reducing per-case burden. Monthly feedback snapshots to volunteers, aggregated impact numbers, and anonymized testimonials can reinforce motivation and reciprocity.

Measuring Success. Track completion rates before and after workflow changes and relate them to analytical completeness (e.g., % of participants with at least one dosage data point). A stepped-wedge rollout across volunteer cohorts could rigorously test reporting innovations without disrupting service.

5. Methodological Recommendations for Future Digital IPV Trials

Beyond operational improvements, this feasibility trial offers valuable methodological lessons applicable to researchers and implementers planning future evaluations of digital IPV interventions, particularly in low-resource settings.

5.1. Stratify Randomization on Race and Connectivity—Variables Shown to Imbalance.

Despite random allocation, race/ethnicity was imbalanced ($\chi^2 = 11.7$, $p = .003$), with Black/Indigenous women overrepresented in T2. This indicates that even moderately sized samples cannot rely on chance alone to balance equity-relevant covariates. While restricted and stratified randomization are standard approaches to improving baseline balance on pre-specified variables (Schulz & Grimes, 2002), our trial pinpoints two dimensions, race/ethnicity and municipality connectivity, that should be prioritized in Brazilian digital IPV evaluations. Future PAPs should specify strata and blocking factors ex ante.

Analytical Add-on. In addition to stratification, adjusted analyses (reweighting, covariate adjustment) and pre-specified sensitivity checks (e.g., Lee bounds for attrition) should be included to account for residual imbalances.

5.2. Pre-commit Multimodal Recruitment and Monitor Funnel Metrics to Hedge Against Platform Shocks.

Click-through rates plunged (2.3%→0.7%), and an unplanned algorithm change at Mapa slashed eligibility. Service-environment volatility is mentioned in feasibility frameworks (Bowen et al., 2009) but rarely quantified in IPV trials. Our trial shows that both demand-side (ad fatigue) and supply-side (platform matching changes) shocks can cripple sample accrual.

Design Response. PAPs should include (i) a diversified recruitment plan (at least two offline and two online channels), (ii) quantitative triggers for activating backup channels (e.g., CTR <1% for two consecutive weeks), and (iii) a monitoring dashboard that tracks eligible flow weekly. This moves beyond generic "multichannel recruitment" advice by specifying thresholds and decision rules.

5.3. Flexible Timing and Mode-switching Can Increase the Safe Window to Follow Up.

Sixty-three percent of non-completers attempted follow-ups outside their pre-nominated safe windows, revealing a numeric mismatch between static scheduling and survivors' dynamic safety contexts. Whereas prior work emphasizes the importance of safe contact windows and privacy-sensitive follow-up, our data quantify the extent to which those windows can shift over time.

Methodological Implication. Future trials should program automatic rescheduling after a missed attempt and allow participants to redefine safe windows in real time. Modal flexibility (SMS vs. email vs. voice) should be offered by default. Adaptive reminder algorithms common in mHealth could be ported to IPV contexts, but must be vetted for safety (e.g., neutral sender IDs).

5.4. Sequence Sensitive Items After the Empirically Identified Fatigue Cliff (Post-mental-health Block)

Twenty-eight percent of participants abandoned the survey immediately after the mental-health block; violence items had 18–25% missingness, especially among shared-device users. This pinpoints a fatigue cliff and a privacy-sensitive block. Literature urges brevity and careful sequencing (Rolstad et al., 2011; El Morr & Layal, 2020), but rarely identifies where attrition spikes.

Instrument Design. Place the PHQ-2/GAD-2 later or flag them as optional for high-risk participants; consider adaptive modules that expand only when the participant indicates privacy and time. Pilot A/B tests of instrument order to empirically verify which sequencing minimizes dropout.

5.5. Designing for High Attrition: Conservative Power Targets and Explicit Post Hoc MDEs are Mandatory.

The realized endline sizes (n_CAU = 16, n_T1 = 22, n_T2 = 7) inflated the ANCOVA MDEs to 0.79, 0.68, and 1.20 SD, respectively, making detection of plausible effects infeasible. Goodman & Berlin (1994) warn against misinterpreting underpowered nulls; McKenzie (2012) advocates realistic power planning. Our figures provide concrete benchmarks for digital IPV trials in similar contexts: attrition may reach 50–80%, and PAPs should predefine contingency plans (extended recruitment, repeated measures, Bayesian updating) and adjust MDE targets accordingly.

Beyond Power. Consider outcome distributions and minimal clinically important differences (MCIDs) rather than only SD-based effects. In IPV contexts, even modest absolute changes may be policy-relevant; thus, planning for alternative analytic strategies (e.g., hierarchical models pooling across time points) can salvage information from sparse follow-ups.

5.6. Anticipate Platform Volatility in Embedded Digital Trials.

The shift from a one-to-one to a one-to-many matching algorithm cut the eligible pool by roughly 60% within weeks. Few IPV trials quantify how partner-platform decisions affect feasibility.

What This Adds: We show that partner-platform volatility is not a peripheral risk but a core feasibility dimension. Future PAPs should include scenario analyses estimating how different

operational changes would affect sample size, retention, and power, and negotiate data freeze periods or research flags with implementing partners where possible.

6. Limitations and Strengths

Feasibility studies are designed to illuminate implementation risks rather than to provide definitive evidence of effectiveness (Bowen et al., 2009); nonetheless, the present findings must be interpreted in light of several methodological, operational, and structural constraints.

Methodological Constraints. Attrition was pronounced: 85.8% overall and disproportionately concentrated among survivors with severe baseline anxiety and those accessing the platform on shared devices. This selective loss threatens internal validity and mirrors the "law of attrition" in e-health interventions (Eysenbach, 2005). In addition, the baseline questionnaire was not field-piloted because of service timelines, a decision that almost certainly amplified survey fatigue: 28% of participants exited immediately after the mental-health block. Finally, the unanticipated change from a one-to-one to a one-to-many matching algorithm reduced the available recruitment pool by roughly 60%, leaving only 45 complete end-lines, 19% of the PAP target, thereby inflating minimum detectable effects to impractical levels.

Operational Constraints. Seventy-two per cent of respondents used low-memory Android phones on intermittent 3G networks, yielding a 15% partial-completion rate attributable to time-outs. Volunteer documentation was likewise incomplete: only 52% of psychologists and 47% of social workers filed case-status forms on schedule, consistent with documentation fatigue described by Hasson (2010). These gaps restrict dosage measurement and compromise process evaluation.

Structural Constraints. Brazil's IPV service infrastructure remains urban-centric; consequently, control-arm participants in rural municipalities often had no proximate formal services. Generalizing effects to the rural quarter of Brazil's female population is therefore unwarranted without complementary offline interventions and infrastructure investment.

Strengths. Despite these limitations, the study achieved nationwide reach through exclusively digital channels, implemented concealed algorithmic randomization with weekly integrity audits, and generated the first psychometric evidence for ultra-brief Portuguese IPV instruments (PHQ-2, GAD-2, safety-strategy index). These contributions extend the measurement toolkit available for IPV research in Lusophone LMICs.

7. Conclusion and Integrated Policy Implications.

Digital platforms offer a scalable conduit for reaching IPV survivors who remain chronically underserved by bricks-and-mortar services. Our evidence shows that a volunteer-driven platform can enroll several hundred high-risk women within months, yet also reveals three quantifiable barriers to scale: (i) geographical and digital exclusion of low-connectivity areas; (ii) high, differential attrition driven by psychological burden and device insecurity; and (iii) documentation gaps that impair evaluability. These barriers are not novel in abstract terms, but our trial quantifies their magnitude and interaction in a middle-income Latin American context, thereby extending the evidence base on digital IPV implementation beyond the mostly high-income RCT settings summarized in prior reviews (Emezue et al., 2022).

From these data we distill three evidence-based implications for stakeholders:

Lesson 1: Digital reach is real, but digital equity is not. Nationwide advertising enrolled 316 survivors in four months, yet 91% lived in high-connectivity municipalities and click-through rates fell from 2.3% to 0.7%. Practitioners must therefore complement online recruitment with proven low-bandwidth channels (community radio, SMS opt-in) before claiming national coverage, and governments can accelerate equity by subsidizing data allowances or installing IPV kiosks in primary-care facilities.

Lesson 2: Retention hinges on adaptive, privacy-sensitive design. Attrition rose to 85.8%, driven by baseline anxiety (aOR 1.74) and shared device use (aOR 1.59). Implementers should flag these risk markers at intake and auto-trigger ultra-brief, asynchronous follow-ups; researchers should assume ≥50% attrition and pre-specify adaptive timing in analysis plans. These practices convert abstract safety concerns into concrete protocol elements.

Lesson 3: Data completeness depends on light-touch workflows and platform stability. A seven-field case-status form cut volunteer reporting in half, while an unannounced algorithm change slashed the eligible pool by 60%. Volunteer-driven platforms must adopt mobile-first, two-click reporting and negotiate research-freeze periods, or at least early-warning flags, before altering matching algorithms. Trialists should embed sensitivity analyses for such shocks in their PAPs.

Collectively, these lessons show that digital IPV platforms can extend support to hard-to-reach survivors, but only if equity gaps, adaptive safety needs, and data-system fragilities are addressed up front. By quantifying each barrier, this feasibility study transforms generic advice into empirically grounded design parameters for Brazil and comparable LMIC contexts.

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Appendix A

Table 1. Baseline profile of enrolled participants (N=316)

Variable	**Control** Mean (sd)	**T1 Online Psychologist** Mean (sd)	**T2 Online Social Worker** Mean (sd)
Demographics			
Age (Years)	33.4 (11.72)	33.03 (9.93)	33.51 (11.78)
Number of Children (Count)	1.74 (0.86)	1.72 (0.92)	1.66 (0.89)
Employed (1 = Yes, 0 = No)	0.35 (0.48)	0.37 (0.48)	0.31 (0.47)
Cohabitating (1 = Yes, 0 = No)	0.49 (0.5)	0.62 (0.49)	0.56 (0.5)
Race: Black or Indigenous (1 = Yes, 0 = No)	0.06** (0.24)	0.13** (0.33)	0.24** (0.43)
Mental health and well-being			
Adapted PHQ-2 Depressive Symptoms Index (2–8 Study Scale)	6.61 (1.56)	6.43 (1.64)	6.42 (1.61)
Adapted GAD-2 Anxiety Index (2–8 Study Scale)	6.68 (1.5)	6.89 (1.34)	7.05 (1.42)
Quality of Life Index (1-10 Scale)	7.12 (2.3)	7.6 (2.4)	7.4 (2.35)
Safety Strategies			
Safety Strategies Index (0-1 Scale)	0.79 (1.02)	0.86 (0.9)	0.72 (0.98)
Violence (last 30 days)			

Psychological Violence (1 = Yes, 0 = No)	0.43 (0.5)	0.58 (0.5)	0.65 (0.48)
Digital Violence (1 = Yes, 0 = No)	0.28 (0.45)	0.27 (0.45)	0.31 (0.47)
Threat of Violence (1 = Yes, 0 = No)	0.34 (0.48)	0.41 (0.49)	0.42 (0.5)
Physical Violence (binary) (1 = Yes, 0 = No)	0.23 (0.42)	0.3 (0.46)	0.31 (0.46)
Physical Violence (index) (1-10 Scale)	4.71 (2.31)	4.83 (2.2)	4.17 (2.63)
Sexual Violence (1 = Yes, 0 = No)	0.36 (0.48)	0.33 (0.47)	0.38 (0.49)
N	99	127	90
* p<0.10, ** p<0.05, *** p<0.01			

Table 2. Attrition at 90-day follow-up by study arm

	Control	**T1: Online Psychologist**	**T2: Social Worker**
Attrition	83.84%	82.67%	92.22%
N Baseline	99	127	90
N 3 Months	16	22	7
Difference from Control (p-value)	–	0.8173	0.0748

Appendix 2: Pre-Analysis Plan:

Balance

To assess the internal validity of our experiments, we check for balance on covariates between treatment groups by comparing them at baseline on all demographic and outcome variables. We conduct two-sample t-tests for all baseline variables individually, as well as an F-test of joint significance to examine the overall comparability of the two groups.

Empirical Strategy

We estimate intent-to-treat (ITT) effects of assignment to Mapa's online-only psychological services and remote caseworker support.

For the majority of outcome variables in which both baseline measurements are available, we use the analysis of covariance (ANCOVA) estimator, which has the greatest statistical power in randomized controlled trials with multiple survey waves (McKenzie, 2012). Specifically, we fit the ordinary least squares (OLS) regression models of the form

$$Y_{i1} = \beta_0 + \beta_1 T1_i + \beta_2 T2_i + \beta_3 * Y_{i0} + \Gamma \mathbf{X}_i + \varepsilon_{it} \qquad (1)$$

where Y_{it} is the measurement of outcome Y for individual i at during survey wave $t \in \{0,1\}$, $T1$ and $T2$ are binary indicators for whether the individual was offered Mapa services (either an online psychologist referral or a social worker, respectively), and $\mathbf{X}$ is a vector of individual-level demographic control variables, including state fixed effects and an indicator for whether the measure was missing at baseline.

Note that we also utilize OLS equation (1) in the case of binary outcome measures, using a linear probability framework.

For the subset of measures which are collected only at endline, we estimate models of the form

$$Y_i = \beta_0 + \beta_1 T1_i + \beta_2 T2_i + \Gamma \mathbf{X}_i + \varepsilon_i \qquad (2)$$

With the same interpretation as above.

Dependent Variables

We utilize the following measures outlined above to construct the following dependent variables:

Quality of Life (QOL): The three QOL items included in the questionnaire are scored 1–5 according to the scale provided by the World Health Organization (WHO). We add the two item scores together to create a single QOL index. Higher values correspond to greater subjective life satisfaction.

Depressive Symptoms: The scores (1–4; "Never" to "Nearly every day") of the two adapted PHQ-2 items are added to create a depressive symptoms index ranging from 2 to 8. Higher values correspond to more depressive symptoms. This index was used as a continuous study measure and not as a standard PHQ-2 diagnostic screener.

Anxiety: The scores (1–4; "Never" to "Nearly every day") of the two adapted GAD-2 items are added to create an anxiety index ranging from 2 to 8. Higher values correspond to more anxiety symptoms. This index was used as a continuous study measure and not as a standard GAD-2 diagnostic screener.

Violence Victimization:

- Psychological violence (binary)
- Digital violence (binary)
- Economic violence (binary)
- Threat (binary)
- Physical violence:
    - Physical violence index = number of physical violence types reported by survivor
    - Physical violence binary = 1 if any physical violence reported, 0 otherwise
- Sexual violence = 1 if any sexual violence reported, 0 otherwise

Safety Strategies:

- Safety Strategies Index: Building on prior work measuring the perceived usefulness of safety behaviors among IPV survivors, we calculate the percentage of attempted safety strategies that the respondent identifies as useful = (safety strategies identified as useful / safety strategies utilized) × 100 (Hanson et al., 2021).

Life outcomes:

- Employment: 1 if respondent is employed (formally or informally), 0 otherwise
- Cohabiting: 1 if respondent identifies as cohabiting with a partner or spouse, 0 otherwise

Psychometric Validation

Although all instruments used in the questionnaire have previously been validated in Brazil, in many cases we are utilizing them with a new and distinct population. Therefore, we report internal consistency using Cronbach's alpha for each of the following scales or subscales: WHOQOL, PHQ-2, GAD-2, and Safety Strategies Index (Brown, 2006).

Missing Data

All questions in both baseline and endline surveys are strictly voluntary. If an individual answers a question at endline but does not provide the same information at baseline, they are still included in the analysis. To deal with the missing baseline data, we utilize the “dummy variable adjustment” by including an indicator variable for whether the information was missing at baselinez and code the missing value as a constant outside the range of feasible values (by convention, -99), following the method developed by White & Thompson (2005).

Attrition

We are particularly concerned about the danger posed to this study by attrition bias, also known as selective attrition. We test for differential attrition between treatment groups by conducting a two-sample test of proportions on the response rates for the endline.

If we observe differential attrition across treatment groups, we will conduct a robustness check following Lee (2009), in which we calculate bounds on the impact estimates by assigning the highest and lowest values observed in the data, alternatively, to the missing observations.

Multiple Hypothesis Correction

To deal with the threat of spurious results given multiple outcome measures, we conduct a robustness check utilizing the Bonferroni correction for multiple hypothesis testing (Abdi, 2010). These robustness tests will be included in an appendix to the paper.

In the case that any deviations from this pre-analysis plan are necessary due to unforeseen aspects of the data collection process, we will include a section and table of deviations in the paper.