

BMJ Open Improving family functioning and reducing violence in the home in North Kivu, Democratic Republic of Congo: a pilot cluster-randomised controlled trial of Safe at Home

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ABSTRACT

Objective To test the effectiveness of the Safe at Home programme which was developed to improve family well-being and prevent multiple forms of violence in the home.

Design Waitlisted pilot cluster randomised controlled trial.

Setting North Kivu, Democratic Republic of Congo.

Participants 202 heterosexual couples.

Intervention The Safe at Home programme.

Primary and secondary outcome measures The primary outcome was family functioning, with secondary outcomes of past-3 month co-occurring violence, intimate partner violence (IPV) and harsh discipline. Pathway mechanisms assessed included attitudes related to acceptance of harsh discipline, gender equitable attitudes, positive parenting skills and power sharing within the couple.

Results No significant improvements in family functioning were documented for women ($\beta=1.49$; 95% CI: -2.75 to 5.74 ; $p=0.49$) and men ($\beta=1.09$; 95% CI: -3.13 to 4.74 ; $p=0.69$). However, women in Safe at Home reported a OR=0.15 ($p=0.000$), OR=0.23 ($p=0.001$) and OR=0.29 ($p=0.013$) change in co-occurring IPV and harsh discipline; physical/sexual/emotional IPV by their partner and use of physical and/or emotional harsh discipline against their child, respectively, as compared with women in the waitlisted group. Men participating in Safe at Home reported a OR=0.23 ($p=0.005$) change in perpetration of co-occurring violence, OR=0.26 ($p=0.003$) change in any form of IPV perpetration and OR=0.56 ($p=0.19$) change in use of harsh discipline against their child as compared with the waitlist arm. Positive changes were also noted in pathway variables around attitudes, skills and behaviours within couples.

Conclusion This pilot trial demonstrated the Safe at Home programme to be highly effective in preventing multiple forms of violence in the home and improving equitable attitudes and skills in couples. Future research should assess longitudinal impact and implementation at scale.

Trial registration number NCT04163549.

INTRODUCTION

Violence against women (VAW) and violence against children (VAC) in the home is

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A waitlisted pilot cluster-randomised controlled trial design was used to evaluate the effectiveness of one of the first intentionally combined intimate partner violence and child maltreatment prevention programmes.
- ⇒ The study demonstrated high retention of participants throughout, despite being implemented during the COVID pandemic and a volcanic eruption in study sites.
- ⇒ Outcomes were assessed among both men and women in the home, although direct reports from children were not captured.
- ⇒ Findings may be less generalisable to families who did not proactively want to improve their family well-being outside of North Kivu, Democratic Republic of Congo.

endemic globally, with long-term consequences for survivors, their families and communities. Global estimates demonstrate that one in three women experience physical and/or sexual violence at the hands of a partner in their lifetime,¹ and six in 10 children aged 2–14 experience physical violent punishment.^{2 3} While research and programmes on VAC and VAW in humanitarian settings have historically examined and addressed these types of violence separately, the international community has begun to increasingly recognise the intersections between these distinct types of violence in the home.^{4 5} For instance, recent reviews of co-occurring family violence from different contexts have found that children in households affected by intimate partner violence (IPV) experience significantly higher levels of physical and psychological violence, and that IPV and child maltreatment share many of the same risk factors.^{5–9}

In conflict and humanitarian settings where social, institutional and economic structures are weakened and impunity is high, women and children's risk of violence is heightened. Within these fragile settings, studies have revealed that the burden of IPV against women and child maltreatment is staggering.^{10–13} War-related violence has long-lasting impacts on the mental health of both adults and children, leading to both higher use of violent discipline as well as maladjustment among children.^{6,14–17} Indirect experiences of conflict such as increased economic stress are also a shared risk factor for violence and can also lead to increased levels of IPV and child maltreatment within the same household.⁵

IPV and child maltreatment also have intergenerational effects: children who witness IPV, or who experience maltreatment, experience long-term physical and mental health consequences and greater risk of perpetrating and experiencing IPV as an adult.^{18,19} This cycle of violence is amplified in humanitarian settings where families are experiencing additional trauma and stressful life events that compound previous exposure to IPV or violence in childhood.⁶ One study from conflict-affected communities in the DRC found that early childhood experiences of violence were associated with almost two times the odds of co-occurring family violence for both women and men, and conflict-related traumatic experiences and displacement were associated with an additional increase in odds of co-occurring IPV and child maltreatment for women.¹⁹ Breaking this cycle is crucial to prevent endemic violence within families within future generations.

Grounded in feminist and ecological understandings of violence in the home, previous qualitative research in North Kivu²⁰ has highlighted potential shared and modifiable drivers of violence and family functioning such as power sharing, gender norms, acceptance of harsh discipline and positive parenting. Rooted in deep consideration of these gender, age and ability-related power hierarchies, as well as taking an asset-based approach that is sensitive to the traumas families face in insecure environments, Safe at Home was developed to improve a holistic sense of family well-being and prevent co-occurring violence, IPV and harsh discipline against children. The Safe at Home model drew from previously trialled IPV prevention (Engaging Men in Accountable Practice) and parenting programmes (Families Make the Difference) developed in humanitarian contexts.^{21,22} This intervention was intentionally designed to address co-occurring IPV and VAC and was rooted in existing evidence on shared drivers of violence, emerging findings on efforts to address IPV and/or VAC in humanitarian contexts and guidance from global practitioner experts in VAW and VAC prevention.^{5,18,23,24} The Safe at Home model advances previous efforts^{25,26} which used lighter-touch integrations of gender equality and IPV messaging within parenting programmes,^{22,27} child rights messaging within an IPV prevention programme²⁸ or found unintentional positive impacts of IPV prevention programming on reducing child abuse²⁹ though intentional design to

prevent co-occurring violence from the start, rather than adaptation of an intervention focused primarily on IPV or on parenting.

The hypotheses driving the trial were as follows: (1) participants randomised to Safe at Home would demonstrate improved family functioning and reduced IPV and harsh discipline against children; and (2) participants randomised to Safe at Home would demonstrate improvements of potential pathway variables including gender equitable attitudes, non-acceptance of harsh discipline, power-sharing within the couple and positive parenting as compared with the waitlist arm.

METHODS

Trial design

The present study utilised a non-blinded, cluster-randomised controlled trial (cRCT) design in which eight groups across four communities in North Kivu had equal probability of being randomised to receive the Safe at Home intervention or the waitlisted control group (figure 1). Baseline data collection occurred November 2019 to January 2020 and endline data collection occurred August to September 2021.

Changes to trial design

The following changes to trial design are described using the CONSERVE-CONSORT guidelines that were developed in response to the COVID-19 pandemic.³⁰

Extenuating circumstances

During study implementation, two distinct extenuating circumstances influenced the implementation of the Safe at Home intervention and the study design: the COVID-19 pandemic and the eruption of Mount Nyiragongo in North Kivu.

Important modifications

Initially, the COVID-19 pandemic emerged which influenced both the intervention and overall well-being of the communities. COVID-19 did not affect the research design but did influence implementation of the intervention through the following manners. First, there was a 6-month pause in programming during the initial stages of the pandemic. Second, once groups restarted, the randomised groups were divided into smaller morning and afternoon sessions to reduce the group size per public health restrictions. Following COVID-19 protocols presented some challenges: participants generally preferred to interact with others in a larger group, use of opaque face masks impeded ability to respond to non-verbal social interactions such as facial expressions and afternoon sessions were particularly challenging given other competing participant responsibilities.

Additionally, the initial endline was to occur approximately 3 months after the initial cycle of Safe at Home had concluded but this was delayed to nearly 6 months after completion due to the volcanic eruption of Mount

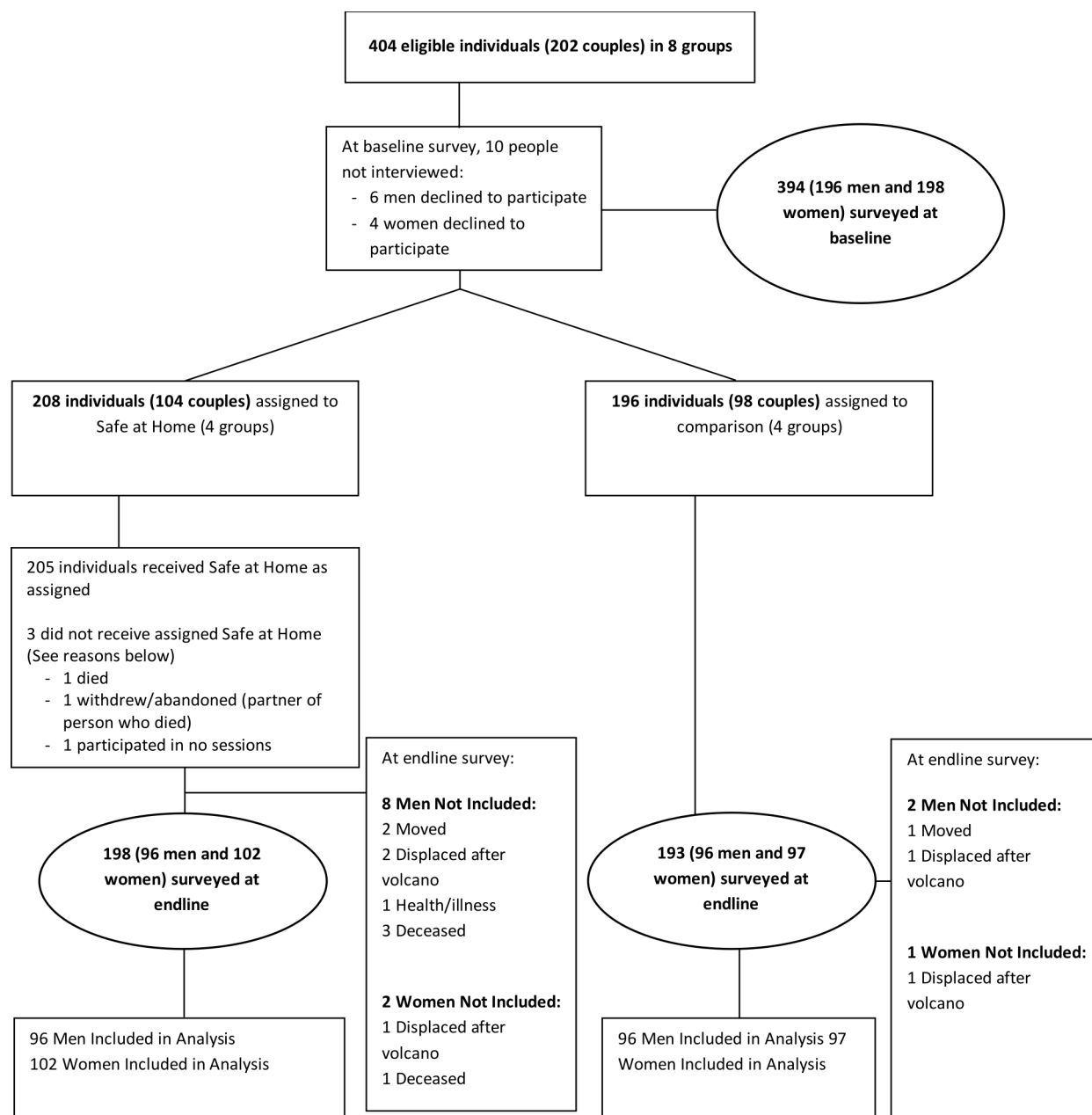


Figure 1 CONSORT flow diagram of trial participants. CONSORT, Consolidated Standards of Reporting Trials

Nyiragongo in North Kivu in May 2021. Over 200 000 people were evacuated from surrounding villages which left hundreds dead and over 120 000 homeless. Study villages were particularly affected by the lava flows and the endline was delayed so that humanitarian assistance could be delivered to the populations. Additionally, the IRC DRC practitioner and study teams were directly affected by the eruption and physical office structures and homes needed to be assessed for safety before teams could return and resume activities.

To avoid continual delays related to COVID-19 travel restrictions, the first and second author trained the Safe at Home DRC-based research team virtually and the senior author led in-person training of the team in DRC, following organisational and government-mandated COVID-19 social distancing and maximum capacity

protocols. Endline data collection was completed from August to September 2021. Additional measures on COVID and volcanic eruptions impacts were added to the endline survey to provide further contextual understanding.

Responsible parties

The investigative and practitioner team, in consultation with the IRC DRC country team, including the safety and security teams, made determinations for when and how programming and research could continue balancing health and overall safety of participants and the practitioner and research teams. Relevant modifications were submitted to the IRC ethical review board for approval.

Participants

In total, 202 couples (n=404) were registered for the programme and all were asked to participate in the study. Inclusion criteria for men and women included: 18 years of age and older, registered for the Safe at Home programme, living with an intimate partner who is also registered for the programme and at least one child aged 6–12, and a speaker of Swahili, Kinyarwanda or French. Exclusion criteria included those less than 18 years of age, being part of a polygamous household given potential differences in relational dynamics not addressed by Safe at Home, not being registered for the programme, or demonstrating obvious mental, cognitive or communication difficulties. At baseline, 394 adults (97.5% of those eligible) completed the survey, and at endline, 391 adults completed the survey.

Study setting

The cRCT occurred in four villages in North Kivu, DRC: Kingarambe, Kalangala, Buhumba, and Munigi. These villages have been affected by vacillating levels of conflict between multiple armed groups and instability over the past decades. The precursors of such instability include Belgium colonial rule of DRC until its independence in 1960 and spillover from the 1994 Rwandan Genocide. Despite a wealth of natural resources, DRC ranks 175 out of 189 countries on the Human Development Index and an estimated 5 million people are internally displaced across the country. North Kivu absorbed a large share of the two million people who were newly displaced in 2020.³¹ A range of conflict-related displacements and disease outbreaks occurred in the region over the course of the project, including cholera and Ebola.

Intervention

The Safe at Home programme is a community-based discussion group series aiming to prevent and respond to IPV and child maltreatment in conflict-affected communities. It includes weekly single-sex discussion groups with coupled men and women and monthly family discussion groups with couples and children, with a total of 24 sessions for men, 18 sessions for women and five family sessions over a period of 6 to 8 months. Groups originally consisted of 15–25 participants but were split into smaller sections partway through the implementation to adapt to COVID-19 maximum capacity protocols. During the weekly sessions, men and women reflect critically and engage in dialogue related to gender, power and privilege, learn about the causes and consequence of VAW and children and gain skills in stress management, psychosocial support and positive parenting strategies. Family sessions focus on improving relationship quality and shared decision-making among partners and participation of children in family decision-making. The programming was piloted through a pre–post test in 2017–2018 which demonstrated promising results in prevention of IPV and VAC. To bridge disparate theories on IPV and VAC prevention, the intervention framing was shifted

towards an asset-based approach to improve family functioning. Additional details on the Safe at Home theory of change and programmatic description are presented in Falb *et al*, 2022.³²

Outcomes

The primary outcome of the trial was a continuous measure of the feminist-grounded family functioning scale (F-GFFS; range: 0–78; Cronbach's $\alpha=0.86$).³³ This 26 item scale was adapted from an South African developed scale³⁴ through free listing exercises with the practitioner team, cognitive interviewing techniques, piloting and psychometric validation, with additional measures added on age and gender dynamics within the home. A higher F-GFFS denotes better family functioning.

The secondary outcomes are binary change in past-3 month physical, sexual and/or emotional IPV and past-3 month psychological or physical harsh discipline.^{35 36} IPV experience was measured using the IPV module from the WHO Multicountry Study on Women's Health and Domestic VAW.³⁵ Harsh discipline against children was assessed using the UNICEF/MICS discipline module,³⁶ which asks about perpetration of physical and psychological violent discipline against the index child, defined for this study as the oldest child between 6 and 12 years of age in the home. A composite measure of co-occurring violence assessed differences in presence of at least one form of IPV (physical, sexual and/or emotional) and at least one form of harsh discipline against children (physical and/or psychological). For violence outcomes, any affirmative response to an instance of violence (eg, hitting) was coded as experiencing that form of violence (eg, physical IPV). Given the exploratory nature of co-occurring violence measurement, additional treatment effects on each form of violence separately and in different combinations are also assessed and included in the online supplemental tables.

Hypothesised pathway variables included gender equitable attitudes (range: 0–22; Cronbach's $\alpha=0.82$; higher score denotes more agreement with gender inequitable attitudes),³⁷ acceptance of harsh discipline (range: 0–19; Cronbach's $\alpha=0.92$; higher score denotes higher acceptance of harsh discipline),³⁶ power sharing between the couple (range: 5–150; Cronbach's $\alpha=0.69$; higher score denotes more balanced power sharing)³⁸ and positive parenting (range: 0–27; Cronbach's $\alpha=0.59$; higher score denotes higher use of positive parenting behaviours).³⁹ Disability for adults and children was assessed through the Washington Group Short Set and Washington Group/UNICEF child functioning module, respectively.^{40 41} Additional scale details have been described elsewhere.³²

Sample size

Since IPV and harsh discipline were the only outcomes assessed through binary rather than continuous measures, sample calculations were based on IPV for conservative estimates. A preliminary pre–post-test of Safe at Home was conducted in 2017–2018 where minimal loss to follow-up

and design effect were documented and were used to inform the pilot cRCT sample size calculation. Given the pre-post-test results, the sample calculations assumed no attrition or design effect a 50% baseline frequency of IPV with a 20% change at endline, with significance set at $\alpha < 0.05$ and $\beta = 80\%$. This yielded a sample size of 186 women and 186 men.

Randomisation

Two groups were formed in each of the four villages based on geographical proximity of participants and to mirror real-life implementation considerations of the programme. Subsequently, one group within each village was randomised to receive the first cycle of Safe at Home, while the other group was randomised to the waitlisted arm. Geographic distance between each village and group helped to mitigate contamination. Randomisation was conducted by the study investigators in Excel after the baseline was completed so as to minimise the potential for bias, given that the study was non-blinded and treatment allocation could not be concealed. The Safe at Home practitioner team communicated the randomisation process and results to the community and participants to ensure fidelity to the trial design.

Analysis

Baseline differences between intervention and waitlist groups overall and for men and women separately were assessed using χ^2 tests, t-tests and Fisher's exact tests when appropriate. Attrition from baseline was small and concentrated in the intervention group ($n=10$, 2.5% of baseline participants). Unadjusted linear and logistic regression models reporting individual-level outcomes, accounting for clustering at the group level, with a time-by-treatment interaction were used to assess the main and secondary effects of the intervention over time, using *xtmixed* (continuous outcomes) and *xtmelogit* (binary outcomes) in STATA V.15.0.⁴² For continuous outcomes, a sensitivity analysis demonstrated that a marginal model with clustered errors by group provided more conservative estimates than a multilevel model which nested individuals within groups; for binary outcomes, the direction and magnitude of association and p-values were similar across models, and a multilevel model with individuals nested within groups was used. Adjusted models accounted for unbalanced demographics of index child age and number of household members. Since the secondary violence outcome, co-occurring violence, is exploratory, family violence outcomes are presented in several ways—the purpose of presentation of multiple violence outcomes is to facilitate comparisons across studies seeking to address IPV, VAC or both, rather than to compare and contrast findings by type of violence. These additional outcomes and intraclass correlation coefficients are found in the online supplemental tables.

Ethics

Data were collected by gender-matched enumerators consistent with best practices in VAW and VAC research. Additionally, in accordance with ethical guidelines on research and evaluation on VAW,^{43–46} only women were asked about their experiences of intimate partner victimisation. This recommended approach for intervention research aims to protect the confidentiality of women and limit any potential conflicts after the enumeration team departed that might result from asking about IPV victimisation and perpetration from respondents in the same household. All participants received information for IRC referral services for case management and completed informed consent at baseline and endline in private spaces. No adverse effects of the intervention were detected during monitoring activities.

Patient and public involvement

The Safe at Home programme was developed and revised based on previous community input during the pre-post-test period. Tools, and in particular, the family functioning outcome was developed in response to the prioritised outcomes of the community and practitioner staff including free listing, focus groups and other techniques to refine the measure.³³ Results were shared with practitioner staff and community members. The burden of the intervention was not assessed by the participants, but both trial arms were offered the intervention in either the primary or waitlisted treatment group.

RESULTS

Participant characteristics by treatment arm at baseline

A total of 404 eligible individuals (202 couples) in eight groups were enrolled in the intervention for the study (figure 1). All individuals who were eligible for the intervention were invited to participate in the study, and only 10 people (four women and six men) declined to participate in the baseline survey. Of those programme, participants who were invited to take part in the study, 394 respondents completed the baseline survey (198 women and 196 men) and 391 respondents completed the endline survey (199 women and 192 men). Of those who completed the baseline survey, 384 completed the endline for a response rate of 97.5% (196 women; 9188 men). Those who dropped out of the study before the endline survey were either displaced, moved or had an illness or death that prevented them from participating. An additional seven respondents who were eligible but did not participate at baseline consented to participate at endline.

Women and men's characteristics were evenly distributed across treatment groups at baseline (table 1). Women were aged 32 years ($SD=8.71$) and men were aged 36 years ($SD=8.71$) on average. Women had low levels of education overall, with approximately two in five women reporting having no education (45.63% in the treatment group and 40.00% in the waitlist group). The majority of

Table 1 Descriptive demographics at baseline among women and men by treatment arm (n=394)

Demographics	Women (n=198)			Men (n=196)		
	Overall	Safe at Home	Control	Overall	Safe at Home	Control
	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)
Age	32.03 (8.71)	32.41 (9.69)	31.62 (7.54)	35.88 (8.71)	36.12 (9.56)	35.62 (7.75)
Highest level of education						
Primary	41.92 (83)	36.98 (38)	47.37 (45)	44.39 (87)	44.55 (45)	44.21 (42)
Secondary	14.65 (29)	16.50 (17)	12.63 (12)	38.78 (76)	38.61 (39)	38.95 (37)
University	0 (0)	0	0	4.08 (8)	4.95 (5)	3.16 (3)
Vocational	0.51 (1)	0.97 (1)	0	0.51 (1)	0	1.05 (1)
None	42.93 (85)	45.63 (47)	40.00 (38)	12.24 (24)	11.88 (12)	12.63 (12)
Disability level						
No disability	21.21 (42)	22.33 (23)	20.00 (19)	39.29 (77)	36.63 (37)	42.11 (40)
Mild disability	60.10 (119)	60.19 (62)	60.00 (57)	42.35 (83)	43.56 (44)	41.05 (39)
Moderate/severe disability	18.69 (37)	17.48 (18)	20.00 (19)	18.37 (36)	19.80 (20)	16.84 (16)
Marital status						
Currently married	52.02 (103)	50.49 (52)	53.68 (51)	67.35 (132)	65.35 (66)	69.47 (66)
Living as if married	47.98 (95)	49.51 (51)	46.32 (44)	32.65 (64)	34.65 (35)	30.53 (29)
Currently displaced	9.09 (18)	12.62 (13)	5.26 (5)	4.08 (8)	4.95 (5)	3.16 (3)
Household composition						
Number of household members	7.21 (2.15)	6.98 (2.11)	7.45 (2.17)	7.20 (2.25)	6.79 (1.98)	7.64 (2.43)**
Index child age	10.01 (2.38)	9.89 (2.32)	10.13 (2.45)	9.82 (2.31)	9.50 (2.35)	10.16 (2.23)*
Index child gender						
Boy	45.96 (91)	43.69 (45)	48.42 (46)	44.39 (87)	47.82 (48)	41.05 (39)
Girl	54.04 (107)	56.31 (58)	51.58 (49)	55.61 (109)	52.48 (53)	58.95 (56)
Index child disability level						
No disability	27.78 (55)	30.10 (31)	25.26 (24)	45.41 (89)	45.54 (46)	45.26 (43)
Some disability	47.98 (95)	48.54 (50)	47.37 (45)	44.90 (88)	42.57 (43)	47.37 (45)
Moderate/severe disability	24.24 (48)	21.36 (22)	27.37 (26)	9.69 (19)	11.88 (12)	7.37 (7)

***P<0.001; **p<0.01; *p<0.05.

women reported some functional difficulty, with 77.67% in the treatment group and 80.00% in the waitlist group reporting mild or moderate disability. A slightly higher percentage of women reported being currently displaced in the treatment group compared with the waitlist group (12.62%–5.26%, respectively). Household composition, marital status and characteristics of the index child were also similar as reported by women in the treatment and waitlist groups.

Men reported higher levels of education overall, with only approximately 12% reporting having no education (11.88% and 12.63% in the treatment and waitlist groups, respectively). The majority of men also reported some functional difficulty, with 63.36% in the treatment group and 57.89% in the waitlist group reporting mild or moderate disability. The proportion of men reporting they were currently displaced was also similar across groups (4.95% and 3.16% in the treatment and waitlist,

respectively). However, reporting of household composition among men differed slightly between groups. Men in the waitlist group reported a slightly higher number of household members than those in the treatment group (7.64, SD=2.43, compared with 6.79, SD=1.98, $p=0.01$). They also reported a slightly higher age for the index child (10.16, SD=2.23, compared with 9.50, SD=2.35 in the treatment group, $p=0.04$). Nevertheless, while these small differences are statistically significant, they are not substantively significant.

Both the treatment and waitlist groups also reported similar levels of each primary and secondary outcome and hypothesised pathway variables at baseline (table 2). Women reported a mean family functioning score of 47.56 (SD=6.29) and 46.37 (SD=4.20) in the treatment and waitlist groups at baseline, respectively. Among men at baseline, those in the treatment group reported a mean family functioning score of 50.40 (SD=6.93) and

Table 2 Primary and secondary outcomes at baseline among women and men by treatment arm (n=394)

Outcomes	Women (n=198)			Men (n=196)		
	Overall	Safe at Home	Control	Overall	Safe at Home	Control
	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)	Mean (SD) % (N)
Primary outcome						
Family functioning	47.99 (5.55)	47.56 (6.29)	46.37 (4.20)	51.08 (6.57)	50.40 (6.93)	48.98 (5.63)
Secondary outcomes						
Co-occurring physical/ sexual/emotional IPV and physical/emotional harsh discipline	56.06 (111)	53.40 (55)	58.95 (56)	44.39 (87)	43.56 (44)	45.74 (43)
Physical, sexual and/or emotional IPV	58.59 (116)	54.37 (56)	63.16 (60)	57.65 (113)	53.47 (54)	62.77 (59)
Physical and/or emotional harsh discipline	83.84 (166)	83.50 (86)	84.21 (80)	74.49 (146)	73.27 (74)	75.79 (72)
Pathway variables						
Acceptance of harsh discipline towards women	2.52 (1.84)	2.38 (1.94)	2.66 (1.72)	0.79 (1.09)	0.80 (1.08)	0.78 (1.11)
Acceptance of harsh discipline towards children	3.01 (1.78)	2.79 (1.82)	3.24 (1.70)	1.94 (1.87)	1.87 (1.91)	2.02 (1.84)
Gender attitudes	17.03 (4.11)	16.99 (4.44)	17.07 (3.74)	13.09 (5.64)	13.07 (5.69)	13.11 (5.61)
Power sharing	86.12 (6.61)	88.29 (7.27)	88.66 (6.66)	90.99 (8.12)	93.68 (8.36)	94.22 (8.70)
Positive parenting	14.51 (3.19)	14.78 (3.30)	14.22 (3.06)	16.44 (3.21)	16.42 (3.35)	16.46 (3.09)

IPV, intimate partner violence.

those in the waitlist group reported a mean score of 48.98 (SD=5.63) (table 2). Levels of violence were also similar at baseline, with approximately half of women reporting co-occurrence of physical, sexual and/or emotional IPV experience and physical and/or emotional perpetration of harsh discipline in both groups (50.49% in the treatment group and 51.58% in the waitlist group). Violence perpetration among men was also similar at baseline between the two groups, with 17.82% of men in the treatment group and 15.79% in the waitlist group reporting co-occurring perpetration of physical, sexual and/or emotional IPV and physical and/or emotional harsh discipline. Hypothesised pathway variables including acceptance of harsh discipline, gender norms, power sharing and positive parenting were all similar across groups for both women and men at baseline (table 2). There were no statistically significant differences in primary or secondary outcomes or hypothesised mediators between the treatment groups.

Estimated intervention effect on the primary outcome: family functioning

In the endline survey, women in the treatment group reported a mean family functioning score of 51.50 (SD=5.83), compared with 48.81 (SD=6.12) in the waitlist group (table 3). This corresponds to a small intervention effect of 1.49 (95% CI: -2.75 to 5.74; p=0.49) accounting for clustering by study group. Among men at endline,

the treatment group reported a mean family functioning score of 51.73 (SD=6.12) and the waitlist group reported a mean score of 49.22 (SD=6.81) (table 4). The estimated intervention effect was also small among men ($\beta=1.09$; 95% CI: -2.71 to 4.88; p=0.58). In both cases, differences were neither statistically significant nor clinically meaningful given the length of the intervention. These intervention effects were slightly attenuated in models which adjusted for statistically unbalanced demographic characteristics at baseline (number of household members and index child age).

Estimated intervention effect on secondary outcomes: IPV and perpetration of harsh discipline

At endline, 19.61% and 57.53% of women reported physical, sexual and/or emotional IPV experience in the treatment and waitlist groups, respectively, and 41.18% and 71.13% of women reported the use of physical and/or emotional harsh discipline against children in the respective treatment groups. When examining the co-occurrence of IPV and harsh discipline, 8.82% of women in the treatment group and 45.36% of women in the waitlist group reported co-occurrence of physical, sexual and/or emotional IPV experience and physical and/or emotional perpetration of harsh discipline. This corresponds with women in Safe at Home having 0.23 times lower odds of reporting IPV experience (95% CI: 0.10 to 0.56; p=0.001) and 0.29 times lower odds of perpetrating

Table 3 Estimated effect of the intervention on primary and secondary outcomes among women

Outcomes	Summary statistics at baseline (n=199)		Intervention effect estimate*	
	Safe at Home (n=102)	Control (n=97)	Basic model	Adjusted model
	Mean (SD)/% (N)	Mean (SD)/% (N)	β (95% CI), p-value	β (95% CI), p-value
Primary outcome				
Family functioning	51.50 (5.83)	48.81 (6.12)	1.49 (−2.75 to 5.74), p=0.490	1.37 (−2.94 to 5.68), p=0.532
Secondary outcomes			OR (95% CI), p-value	OR (95% CI), p-value
Co-occurring physical/sexual/emotional IPV and physical/emotional harsh discipline	8.82 (9)	45.36 (44)	0.16 (0.06 to 0.41), p=0.000	0.15 (0.06 to 0.39), p=0.000
Physical, sexual and/or emotional IPV	19.61 (20)	57.53 (56)	0.23 (0.10 to 0.56), p=0.001	0.23 (0.09 to 0.55), p=0.001
Physical and/or emotional harsh discipline	42 (41.18)	69 (71.13)	0.29 (0.11 to 0.77), p=0.013	0.28 (0.11 to 0.75), p=0.011
Pathway variables			β (95% CI), p-value	β/OR (95% CI), p-value
Acceptance of harsh discipline towards women	0.90 (1.38)	1.82 (1.80)	−0.64 (−1.24 to −0.04), p=0.038	−0.65 (−1.24 to −0.05), p=0.033
Acceptance of harsh discipline towards children	0.98 (1.51)	2.31 (1.85)	−0.87 (−1.61 to −0.14), p=0.020	−0.88 (−1.65 to −0.11), p=0.025
Gender attitudes	10.90 (5.82)	14.11 (4.92)	−3.13 (−4.62 to −1.63), p=0.000	−3.34 (−5.02 to −1.67), p=0.000
Power sharing	96.19 (7.16)	91.91 (7.63)	4.65 (2.58 to 6.72), p=0.000	4.85 (2.60 to 7.10), p=0.000
Positive parenting	17.30 (3.09)	15.73 (3.52)	1.00 (−0.66 to 2.66), p=0.238	0.90 (−0.82 to 2.62), p=0.304

*OR (95% CI), p-value for secondary outcomes of violence, β (95% CI), p-value for all other outcomes. The basic model adjusted for baseline by including time as a covariate in statistical models for individuals clustered within groups. Adjusted models controlled for time and clustering by group, as well as significant demographic differences between treatment groups at baseline (number of household members and index child age). The women's models for the family functioning measure included data from 388 observations, inclusive of both baseline and endline observations. All models for secondary and pathway measures for women included data from 392 observations, inclusive of both baseline and endline observations. IPV, intimate partner violence.

of harsh discipline (95% CI: 0.11 to 0.77; p=0.013), as compared with women in the waitlisted arm. Women in Safe at Home also had a 0.16 times lower odds of reporting co-occurring IPV and harsh discipline (95% CI: 0.06 to 0.41; p=0.000) due to the intervention.

Among men, 9.38% in the intervention group and 30.21% in the waitlist group reported co-occurrence of physical, sexual and/or emotional IPV perpetration and physical and/or emotional perpetration of harsh discipline at endline. IPV perpetration was 20.83% and 57.29% among men in the treatment and waitlist groups, and 36.46% and 53.13% of men reported perpetrating physical and/or emotional harsh discipline, respectively. This corresponds to a 0.25 times lower odds of co-occurring IPV and harsh discipline (95% CI: 0.09 to 0.67; p=0.006); separately, a 0.26 times lower odds in IPV perpetration (95% CI: 0.11 to 0.62; p=0.003) and a 0.56 lower odds in perpetration of harsh discipline (95% CI: 0.24 to 1.34; p=0.194) for men in the Safe at Home as compared with the waitlisted arm, though the change in perpetration of harsh discipline for men was not statistically significant.

In the models adjusted for demographic characteristics that were statistically unbalanced at baseline (number of household members and index child age), inferences for secondary outcomes of violence did not change. Additional exploratory violence outcomes assessed separately

and in different combinations are included in the online supplemental table.

Estimated intervention effect on pathway variables: acceptance of harsh discipline, gender norms, power sharing and positive parenting

At endline, improvements in covariates were statistically significant for both women and men. Among women, acceptance of harsh discipline against women was a mean score of 0.90 (SD=1.38) and 1.82 (SD=1.80) at endline for the treatment and waitlist groups, respectively, resulting in an estimated intervention effect of −0.64 (95% CI: −1.24 to −0.04; p=0.038). Similarly, women in the treatment group had lower acceptance of harsh discipline against children, with a score of 0.98 (SD=1.51) compared with 2.31 (SD=1.85) (β =−0.87; 95% CI: −1.61 to −0.14; p=0.020). A significant intervention effect was also observed for gender attitudes, with women in the treatment group having significantly reduced gender attitudes compared with those in the waitlist group (β =−3.13; 95% CI: −4.62 to −1.63; p<0.001). Men reported similar trends for gender attitudes, with a statistically significant reduction among men in the treatment group compared with the waitlist group (β =−4.58; 95% CI: −7.91 to −1.25; p=0.007). However, while lower acceptance of harsh discipline against women and children were observed in

Table 4 Estimated effect of the intervention on primary and secondary outcomes among men

Outcomes	Summary statistics at endline (n=192)		Intervention effect estimate*	
	Safe at Home (n=96)	Control (n=96)	Basic model	Adjusted model
	Mean (SD)/% (N)	Mean (SD)/% (N)	β (95% CI), p-value	β (95% CI), p-value
Primary outcome				
Family functioning	51.73 (6.12)	49.22 (6.81)	1.09 (−2.71 to 4.88), p=0.575	0.87 (−3.29 to 5.03), p=0.682
Secondary outcomes			OR (95% CI), p-value	OR (95% CI), p-value
Co-occurring physical/sexual/emotional IPV and physical/emotional harsh discipline	9.38 (9)	30.21 (29)	0.25 (0.09 to 0.67), p=0.006	0.23 (0.09 to 0.64), p=0.004
Physical, sexual and/or emotional IPV	20.83 (20)	57.29 (55)	0.26 (0.11 to 0.62), p=0.003	0.23 (0.09 to 0.58), p=0.002
Physical and/or emotional harsh discipline	36.46 (35)	53.13 (51)	0.56 (0.24 to 1.34), p=0.194	0.59 (0.25 to 1.42), p=0.238
Pathway variables			β (95% CI), p-value	β (95% CI), p-value
Acceptance of harsh discipline towards women	0.09 (0.39)	0.52 (1.17)	−0.45 (−0.97 to 0.08), p=0.099	−0.46 (−1.01 to 0.08), p=0.096
Acceptance of harsh discipline towards children	0.61 (1.20)	1.65 (1.93)	−0.89 (−1.86 to 0.08), p=0.073	−0.88 (−1.90 to 0.14), p=0.090
Gender attitudes	5.84 (5.79)	10.46 (6.37)	−4.58 (−7.91 to −1.25), p=0.007	−4.74 (−8.08 to −1.40), p=0.005
Power sharing	99.77 (8.73)	94.25 (8.92)	6.06 (0.22 to 11.91), p=0.042	5.61 (−0.61 to 11.83), p=0.077
Positive parenting	17.52 (3.13)	15.83 (2.82)	1.73 (−0.12 to 3.58), p=0.067	1.69 (−0.23 to 3.61), p=0.084

*OR (95% CI), p-value for secondary outcomes of violence, β (95% CI), p-value for all other outcomes. The basic model adjusted for baseline by including time as a covariate in statistical models and accounted for clustering at the group level. Adjusted models controlled for time and clustering by group, as well as significant demographic differences between treatment groups at baseline (number of household members and index child age). The men's models for the family functioning measure included data from 371 observations, inclusive of both baseline and endline observations. All models for secondary and pathway measures for men included data from 382 observations, inclusive of both baseline and endline observations. IPV, intimate partner violence.

the treatment group, these differences from the waitlist group were only marginally significant when reported by men in this pilot trial (acceptance of harsh discipline against women β =−0.45; 95% CI: −0.97 to 0.08; p=0.099; acceptance of harsh discipline against children β =−0.89; 95% CI: −1.86 to 0.08; p=0.073).

For both women and men, significant intervention effects were observed for power sharing behaviours. Among women, those in the treatment group reported a mean power sharing score of 96.19 (SD=7.16) compared with the waitlist group which had a mean score of 91.91 (SD=7.63). This resulted in an intervention effect of 4.65 (95% CI: 2.58 to 6.72; p<0.001). Among men, the mean power sharing score was 99.77 (SD=8.73) among the treatment group compared with 94.25 (SD=8.92) among the waitlist. The resulting intervention effect on power sharing was therefore 6.06 (95% CI: 0.22 to 11.91; p=0.042). The intervention also had a positive effect on parenting behaviours for both women and men, though the effect was not statistically significant for women and only marginally so for men (women β =1.00; 95% CI: −0.66 to 2.66; p=0.238; Men β =1.73; 95% CI: −0.12 to 3.58; p=0.067).

In the models adjusting for significant demographic differences between the treatment groups at baseline, inferences were the same for both women and men for primary and secondary outcomes. However, among men, the adjusted model for power sharing became only marginally significant, though the estimated effect size was only slightly attenuated.

DISCUSSION

Overall, the Safe at Home pilot trial demonstrated overwhelmingly positive results on the reduction of violence and improvement of hypothesised pathway mechanisms. These results were magnified for women. Nonetheless, there was a small, but insignificant change in the study's primary outcome of family functioning. Conceptually, the use of a feminist grounded measure of family functioning as a primary outcome was important to bridge theoretical and programmatic gaps between the VAW and VAC prevention fields in the development of the Safe at Home programme and study design.³³ This conceptual framing was confirmed through baseline analyses, as family functioning was independently associated with the majority of

secondary outcomes.³² However, over the course of the study, external events such as the COVID-19 pandemic, the eruption of a volcano affecting study villages, and ongoing vacillating armed conflict and displacement may have also differentially affected Safe at Home groups resulting in the lack of change. For example, a higher proportion of the intervention group had experienced displacement due to the eruption of Mt. Nyiragongo at endline as compared with the control group (83.8% and 76.2%, respectively, $p=0.058$). Furthermore, since the programme was originally developed to prevent VAW and children and related pathways rather than family functioning, these findings may indicate a need to further refine programme content to address dimensions of family functioning. Future research seeking to bridge siloed fields should include measurement investigations that meaningfully captures holistic change in families and intentional approaches to prevent violence against multiple people in the home.

Despite the lack of change in family functioning, the impact on reduction of IPV and harsh discipline against children, both jointly and separately, is noteworthy. This trial demonstrates the impact of one of the first intentionally designed programmes to overcome siloes in the VAW and VAC fields globally, developed for humanitarian settings using existing evidence^{5 6 20 22–26 28} and guidance from VAW and VAC practitioners and research experts. Findings bolster the potential multiplicative effect of family strengthening programmes which combine theories and messages from adjacent fields. For example, the changes in IPV may have been amplified by the inclusion of stress management and empathy-related skills-building which are commonly used to promote healthy parent relationships with children. Changes in the use of harsh discipline against children may have been magnified by incorporated a feminist understanding of gender and age power hierarchies in the home. Despite these advancements, additional work to retain men's participation for longer-duration programming remains a challenge. Men and women both attended 13 sessions on average; however, the men's intervention was six sessions longer than the women's intervention. Lower adherence to the full programme among men may have resulted in a reduction of impact as compared with women. The Safe at Home programme team also reflected that challenges to participation by men may have been exacerbated by a loss of livelihoods as a result of the COVID-19 pandemic, whereas they were often travelling more for daily work and unavailable for some sessions.

Theorized mechanisms of change for Safe at Home included acceptance of harsh discipline for women, acceptance of harsh discipline towards children, gender attitudes, power sharing within the couple and positive parenting skills. Again, we see magnified impact for women, although men's changes were largely marginally or statistically significant. These changes suggest that thoughtfully designed programmes which provide opportunities to engage in both same-gender safe

spaces and in mixed-gender couple and family interactions may be a promising avenue to practice new skills and behaviours within the home and is consistent with similar positive impacts of other couple-based programming models.^{25 47 48} Practitioner perspectives noted the increased acceptability of bringing together couples and families to discuss asset-based approaches, particularly given IRC's long-standing reputation in the communities.

The study should be interpreted with limitations in mind. First, the study comprised a sample of participants who showed interest in improving their family well-being and may not be representative of all families in North Kivu, DRC. Future adaptation and implementation studies should assess whether Safe at Home has similar impact in other settings, including exploration of group dynamics and differing design effects in cRCT studies, particularly when delivered at scale. Second, the sample was small due to logistical feasibility and budgetary constraints. Considering the small sample size, the observed intervention effect on violence outcomes is promising, as the low statistical power of the sample could have potentially biased the results towards the null for a more conservative estimate. Third, given study logistics and ethical issues, children's voices are missing from the analyses. Fourth, the study also documents positive change in the waitlisted comparison group between baseline and endline which may attenuate the effect estimates, and may have been particularly true for men who experienced less statistical change than women. This insight points to potential spillover between study arms given the close proximity of group participants in communities. While a limitation of the study, this is a potential positive finding for the Safe at Home programme; organic diffusion of messaging should be further explored as a scaling strategy. Finally, the study and programme implementation was influenced by the COVID-19 pandemic and volcanic eruption which may have minimised the potential effect due to adjustments in programme delivery and the extended period of follow-up after the programme concluded.

Ultimately, the Safe at Home pilot evaluation demonstrated effectiveness of an integrated, evidence-informed programme in improving the knowledge, attitudes, skills and behaviours of families resulting in a reduction of co-occurring violence in the home. While additional work must be undertaken to explore how best to measure holistic family-level outcomes, such combined programmes warrant exploration of more robust testing at scale in contexts where structures and supports exist to meet the specific needs of women and children. Future research should also examine different delivery and diffusion modalities of the Safe at Home programme to increase reach while maintaining commitment to feminist and ethical programme principles and commitments to identify and reach high-risk families or survivors with supplemental, targeted programming.

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