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An Integrated Approach to Increasing Women’s Empowerment and Reducing Domestic Violence: Results of a Cluster-Randomized Controlled Trial in a West African Country

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Abstract

Objective: This is the first experimental study testing the effects of an economic intervention alone and in combination with a family-focused component, on women’s empowerment status and family violence in Burkina Faso.

Method: The three-arm cluster randomized controlled trial with baseline and one-year follow-up included 360 ultra-poor married women from 12 villages. Villages were randomized to the three study arms: *economic intervention for women* (Trickle Up/TU), a *combination of economic intervention and family coaching* (Trickle Up Plus), and waitlist (Control arm). Analysis utilized repeated-measures mixed effects regressions.

Results: Compared to the control group, there was a significant improvement in both the TU arm and the TU Plus arm in women’s financial autonomy and in quality of marital relationships. In addition, women in both intervention arms reported a significant reduction in emotional spousal violence in the past year, with the effect size greater for the combined intervention (TU group OR=0.28, 95% CI 0.10,0.82 p=0.02 and TU+ group OR=0.19, 95% CI 0.06,0.64, p=0.007).

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Conclusions: Economic intervention shows benefits that go beyond changes in financial wellbeing and may increase women's status and improve family relationships. Integrating psychosocial components with economic strategies may be more effective for improving women's empowerment status in West Africa.

Keywords

women's empowerment; violence prevention; intimate partner violence; economic strengthening; West Africa

The U.N. Sustainable Development Goals (SDGs) setting the 2030 agenda for global development added the elimination of all forms of violence against women as a key target (Goal 3), and stated that increasing women's empowerment is both a part of the solution to such violence and an objective in itself (Sachs, 2012). In the Millennium Development Goals (MDGs), meager success in addressing gender equality was partially attributed to the inability to tackle deeply rooted causes of women's disadvantage (Fredman, Kuosmanen, & Campbell, 2016). Economic interventions--gaining popularity in many low-income counties--including group savings, microfinance, and unconditional cash transfers to women have had inconsistent effects—either increasing or decreasing domestic violence or intimate partner violence (IPV). Increases in violence were attributed to disrupted balance of power and gender norms within the household; while decreases in violence were attributed to women's increased decision-making power within the household (Bourey, Williams, Bernstein, & Stephenson, 2015; Green, Blattman, Jamison, & Annan, 2015; Gupta et al., 2013; Hughes, Bolis, Fries, & Finigan, 2015; Vyas, Jansen, Heise, & Mbwapo, 2015; Vyas & Watts, 2009) as well as to the reduced stress in the relationship due to improved economic well-being and food security (Hidrobo, Peterman, & Heise, 2013). Recently, there has been an increasing evidence that economic interventions combined with a gender sensitization component can be more effective than economic interventions alone (Gupta et al., 2013; Kim et al., 2007; Pronyk et al., 2006). Our study aims to expand the body of evidence by testing the effect of an economic empowerment intervention alone and in combination with a gender-sensitive family coaching component, on women's empowerment status within the family and domestic violence among ultra-poor women in rural Burkina Faso.

Introduction

Domestic violence is an issue of a pressing global health concern with significant social, economic, and individual costs contributing to mortality rates and disability-adjusted life years (García-Moreno & Watts, 2011). The global prevalence of women who had ever experienced physical and/or sexual violence from an intimate partner is about 30% (Devries et al., 2013). A systematic review conducted by the World Health Organization (WHO) showed that ever-partnered women in all regions of sub-Saharan Africa report violence above the global average (García-Moreno, 2013). While the causes of domestic violence are complex and can vary at the global (Abramsky et al., 2011; Jewkes, 2002), national (Sambisa, Angeles, Lance, Naved, & Thornton, 2011), and city/village level (Uthman, Moradi, & Lawoko, 2009), poverty and women's economic disempowerment are often

cited among the key factors contributing to IPV in many countries (Hughes et al., 2015; Jewkes, Levin, & Penn-Kekana, 2002; Vyas et al., 2015; Vyas & Watts, 2009). However, few evidence-based culturally tailored interventions are available to strengthen women's status in the family and prevent domestic violence in low-resource settings, especially in Francophone West Africa (Ellsberg et al., 2015).

Women Empowerment, Decision Making, and Domestic Violence

Women's empowerment is defined in terms of processes that lift gender constraints, hence enabling women to be free from discrimination and violence in all spheres of life (UN Women, 2015). Women's empowerment at the household level refers to processes that enable women to have equal decision-making power over the household resources (such as income and assets), and control over their own well-being such as making their own healthcare decisions and meeting with family and friends (Hindin & Adair, 2002; Hindin, Kishor, & Ansara, 2008; Kishor & Johnson, 2004; UN Women, 2015). Lack of or limited decision-making power, where a partner or other family members make decisions, were commonly reported by women experiencing domestic violence (Hindin & Adair, 2002; Kishor & Subaiya, 2008). Inversely, women's contribution to household decision making has been linked with the reduced risk of IPV (Hidrobo et al., 2013; Hindin & Adair, 2002).

Poverty, Violence and Gender Norms

The use of economic interventions to prevent or reduce the rates of IPV is based on propositions put forth in bargaining theory—suggesting that women's increased economic autonomy reduces domestic violence by increasing women's bargaining power (Bourey et al., 2015; Ellsberg et al., 2015; Green et al., 2015; Hughes et al., 2015; Kabeer, 2001; Vyas & Watts, 2009). Bargaining theory, when applied to IPV, posits that women having access to/control over assets and other household resources are able to negotiate better treatment, and leave abusive relationships if needed (Aizer, 2010; Ellsberg et al., 2015; Green et al., 2015; Hughes et al., 2015; Vyas et al., 2015; Vyas & Watts, 2009). However, the evidence supporting bargaining theory in application to IPV is mixed (Hughes et al., 2015; Vyas et al., 2015).

Studies testing the bargaining theory of intra-household decision-making in low-income countries found that the number of assets brought by a woman into a monogamous marriage (e.g. through dowry) shaped decisions with regard to household expenses (e.g., on child welfare and health care (Quisumbing & Maluccio, 2003)). However, woman's contribution to household resources (e.g. dowry) or her access to household resources does not always translate into power to leave a marriage or negotiate better treatment (Fafchamps, Kebede, & Quisumbing, 2009; Hughes et al., 2015; Kabeer, 2001). Additionally, a woman may cede control of financial resources to the husband (Kabeer, 2001)—whether it is her own dowry or resources she gains through economic interventions.

Nevertheless, poverty is not consistently associated with family violence (Uthman et al., 2009; Vyas et al., 2015; Vyas & Watts, 2009). Violence against women can be seen as the ultimate expression of their low status in environments where social norms and gender divisions promote male dominance and entitlement, justifying gender inequality and male

control over women (Heise, 1998; Straus, 1976). Patriarchal gender beliefs, including those justifying the use of violence against women, are found to mediate the relationship between violence and poverty (Cano & Vivian, 2001).

Unlike a traditional resource exchange in a beginning of a marriage such as a dowry, women's increased financial autonomy through economic empowerment programs is an intervention into the marriage. This intervention may challenge societal and household gender norms, create insecurity in a male's household role, and increase conflict over resources (Green et al., 2015; Jewkes, 2002; Vyas et al., 2015). In this context, gender-based violence is often used to 'punish' women who 'violate' societal expectations and norms (Bourgois, 1996; Flake, 2005), reaffirm men's entitlement, or increase man's self-esteem when he is unable to perform the role as a provider (Bourgois, 1996; Uthman et al., 2009). This is particularly pertinent in low-income countries. Analysis of a Demographic and Health Survey data from 23 countries showed that justification of spousal violence (because a woman leaves the home without permission, refuses to have sex, or argues with husband) was highest in several sub-Saharan African countries (Kishor & Subaiya, 2008). This indicates a need to test interventions that address both economic and socio-cultural risk factors for gender inequality and violence to examine whether economic strengthening is *sufficient* for addressing gender inequalities.

Economic Interventions and Women's Empowerment

To increase women's economic status and decrease their financial dependency on men, economic interventions have been introduced in many low-income countries (Bourey et al., 2015; Ellsberg et al., 2015; Kabeer, 2001). However, the effect of these interventions on women's economic status, family dynamics and IPV have been mixed. On one hand, cross-sectional studies in Bangladesh (Naved & Persson, 2005) and India (Koenig, Ahmed, Hossain, & Mozumder, 2003) showed that women participating in micro-credit programs are at a higher risk for domestic violence, as are women earning income when their husbands do not (Bourey et al., 2015; Green et al., 2015; Kabeer, 2001). On the other hand, in randomized controlled trials in Kenya (Haushofer & Shapiro, 2013) and Ecuador (Hidrobo, Peterman, & Heise, 2013), women receiving unconditional cash transfers experienced a decreased risk of domestic violence, mainly associated with reduction in household economic stress. However, significant differences in types of economic interventions used, contextually specific causes of IPV and methodologies of evaluating interventions (Bourey et al., 2015; Kabeer, 2001) hinder ascertainment of the full impact of economic interventions on IPV and women's empowerment.

Meantime, there is an increasing evidence of the effectiveness of combining gender sensitivity trainings with microfinance interventions (Ellsberg et al., 2015). A randomized control trial of the IMAGE (Intervention with Microfinance for AIDS and Gender Equity) program, combining community-based HIV and gender empowerment education with a microfinance program in South Africa, found that rates of IPV decreased among women receiving the intervention (Kim et al., 2007). Additionally, an RCT testing the effects of a group saving program as compared to a group savings program plus a "gender dialogue group" for women and their male partners in Côte d'Ivoire found that physical IPV rates

and economic resource withholding declined in the savings plus gender dialogue group, while sexual IPV remained the same in both groups (Gupta et al., 2013). Further evidence is needed to evaluate the efficacy of integrated economic strengthening and family-focused intervention on women's empowerment and IPV, particularly in the context of West Africa.

Context of Burkina Faso

The Nord Region of Burkina Faso is characterized by extreme poverty and food insecurity, particularly during the dry season (Population Council, 2012; UNICEF, 2012). A qualitative study in Burkina Faso found that food insecurity shifted household dynamics and increased male perpetrated emotional violence (Nanama & Frongillo, 2012). According to the Demographic Health Survey, 20% of women in Burkina Faso have experienced violence since the age of 15; of these, 52% experienced violence from a current partner and 9% from a former partner (INSD & ICF International, 2012). In the Nord Region, about 50% of women felt it was normal for a man to restrict wife's freedom of movement (Kabore ép. Zare, Yaro, & Dan-Koma, 2008).

Despite high prevalence of IPV, existence of gender norms conducive to IPV, and potentially strong correlation between poverty and IPV, very few studies examine effect of economic interventions on women empowerment and domestic violence in the context of Burkina Faso (MkNelly & Kevane, 2002). The majority of studies on the effect of economic interventions have been conducted outside of sub-Saharan and West Africa; and most of these studies demonstrate the lack of inquiry into the effect of economic interventions on gender norms and IPV (MkNelly & Kevane, 2002). Furthermore, very few studies test effect of economic interventions on women's empowerment and IPV in the context of polygamy—despite the existing evidence that decision-making and gender dynamics in polygamous relationships differ from those in monogamous families (Bove, Vala-Haynes, & Vallengia, 2014; Duffy-Tumasz, 2009; Grossbard, 2011; Munro, Kebede, Tarazona-Gomez, & Verschoor, 2011). Given that approximately 40% of married women in Burkina Faso are in polygamous marriages (INSD & ICF International, 2012), testing the intervention in Burkina Faso may give important insight and contribute to the scarce body of knowledge.

Research Aims

The study has two specific aims:

1. To test the effects of an economic strengthening intervention on women's empowerment status within the family (financial autonomy, decision making power, gender norms) and domestic violence as compared to the control group participants at 12-month follow-up;
2. To test the effects of an economic strengthening intervention combined with a gender sensitive family coaching component on women's empowerment status in the family and domestic violence as compared with the control group and an economic intervention alone at 12-month follow-up.

Method

Ethical Approval.—The study protocol was approved by the University of Chicago Internal Review Board (IRB13–1481) and the Burkina Faso Ministry of Scientific Research and Innovation Ethics Committee for Research in Health (ECRH). The study is registered with [ClinicalTrial.gov](https://clinicaltrials.gov) database (ID: [NCT02415933](https://clinicaltrials.gov/ct2/show/study/NCT02415933)) and the study protocol is available online.

Study Design and Randomization.—This study utilized a cluster randomized design with three parallel arms: Trickle Up (an economic empowerment intervention for women), Trickle Up Plus (the economic empowerment intervention with an added family coaching component), and a wait-list arm, which served as the control group. After baseline interviews were completed, a QuickCalcs web-based program randomly allocated 12 villages (each village was assigned a number from 1 to 12) to the three study groups. To minimize cross-arm contamination, randomization was conducted at the village level and eligible women from the same village were assigned to the same study arm (4 villages or 120 women per arm). An important part of the intervention involved integration of participants into savings groups, for which a critical mass of eligible women in each village is required. We also opted for randomization at the village level after extensive consultations with community leaders to avoid any potential conflicts among community members. Within close-knit rural communities, where most families experience extreme poverty, delivering economic interventions with financial benefits (e.g., capital seed grants) to some randomly selected households but not others may create community tension and mistrust. Although located in the same district, villages were geographically separated (distances between 5 km to 40 km) and minimal interaction between intervention and control arm participants was expected. This is an open-label trial where participants were aware of treatment assignment, but data collectors were masked to treatment allocation. In line with ethical research practice, women from the control arm will receive the intervention in 2017 upon completion of 2-year follow-up interviews.

Participants.—Villages were selected in the Nord Region based on the similar socioeconomic status, population size, and ethnic homogeneity using provincial level statistics from the Burkina Faso National Institute of Statistics and Demographics (INSD, 2014). From the selected 12 villages, ultra-poor households with an eligible female caregiver of a 10–15 year old child were identified (N=360). Ultra-poverty (lowest level of poverty or poorest of the poor) was determined based on a Participatory Wealth Ranking (PWR) exercise developed and used by the implementing partner, Trickle Up (TU) organization, for over twelve years to identify and target economic interventions to ultra-poor families first. After securing endorsement from the village chief, the field agents conducted an open space activities with an equitable number of men and women and asked participants to determine different levels of poverty in the village. By asking the group how one category differs from another, the team developed locally defined poverty criteria important to survival (see Appendix A). Field agents then conducted household verification visits using a poverty assessment tool which asked questions on food security, access to water, toilets, medical

care, schooling for children, land to farm, appliances, animals, and other money and tools for agriculture.

All of the households had male head of households and women were married. Out of consideration for the local culture, a short written consent for participation was first taken from the male head of household and then separately from the female caregiver to avoid coercion. For illiterate participants, the consent process involved a witness nominated by the participant (e.g., an educated member of the household or community leader), and a signature in the form of finger paint (ink) was accepted. In the case of multiple wives, the male head-of-household was requested to nominate the poorest wife. While rare, if the poorest wife was not selected (based on the results of PWR exercise), field agents were trained to negotiate with heads of households to have the poorest wife participate.

Intervention Components

Economic Strengthening Component for Women: The package of economic and livelihood interventions engaged female caregivers as the primary beneficiaries and included: 1) savings group formation and training using the Village Savings and Loan Association /VSLA model; 2) livelihood planning and household management training; 3) seed capital grants to jump-start or expand livelihood activities; and 4) one-on-one mentoring and coaching on livelihood development conducted by trained field workers. The methodology is based on the Graduation approach, designed for populations considered too poor to be reached by or sufficiently benefit from micro-finance approaches (Hashemi & Umaira, 2011; Matin, Sulaiman, & Rabbani, 2008). The graduation approach was initially developed by the BRAC (formerly Bangladesh Rural Advancement Committee) and piloted by the Consultative Group to Assist the Poor (CGAP), through a group of 10 organization including Trickle Up lead by the World Bank and Ford Foundation (Ismayilova et al., 2015). The economic activities were delivered over a period of 24 months, with the 0–3 months for participant selection and consumption support, 3–6 months there is a savings group formation, financial management skills training, and finally the asset transfer at around 6 months. Monthly coaching and home visits began following reception of grants.

Two VSLA groups of 15 women per group were formed in each of the treatment villages (16 women's savings groups in total). The livelihood development training was delivered to the savings groups over a period of three weeks, during which participants acquired basic skills in business planning, market analysis, product commercialization, and accounting. Upon the completion of the course, the \$100 seed grants (50,000 West African CFA Francs at the time of distribution) were disbursed to all 240-intervention arm participants. As these were seed grants (and not credit loans), women were no expected to return the funds. Although choices of income generating activities were diverse, nearly 100% of the women used a portion of their seed capital grant to invest in livestock and most also invested in some type of petty commerce.

Family Coaching Component: In addition to the economic intervention, the study tested an added gender sensitive family coaching component, which was primarily intended to raise the awareness of *all members of the household* about the context-specific child

protection issues (e.g., early and forced marriage, girls education, child labor and labor-related child separation) and address normative gender beliefs related to family violence and wives' role in family decision making (e.g., wife's contribution to household economy and decisions affecting child's future). The field agents from a local community-based organization Aide aux Enfants et aux Familles Démunies (ADEFAD) received a 3-day training from the Burkina Faso Ministry of Social Action that designed the curriculum. Sensitization sessions first took place within women's savings group meetings. Following the group level sessions, 35–45 minute family coaching sessions involving all household members, including women, children and male household members (husband, in-laws and family patriarchs), were conducted within each household during mentoring visits. Over the course of 5 months, ADEFAD's field agents conducted monthly family sessions, typically attended by 6–8 family members. Each field agent had a booklet containing records of the visit made, topics discussed, issues raised, and if any referrals had been given. Fidelity to the intervention was monitored by the TU program manager.

Procedures

Mothers participated in 60-minute interviewer-administered surveys that were conducted in a private space at or near participant's home. Questionnaires were translated from English into French and then into the local language, Mòoré. The study procedures and instruments underwent pretesting and several rounds of review for cultural appropriateness and linguistic and conceptual equivalence by the local Community Collaborative Board, which included members from the Ministry of Social Protection, the University of Ouagadougou, and national and regional child welfare experts. Surveys were administered by sociology and psychology graduate students from the University of Ouagadougou, who were blind to the treatment assignment in order to reduce interviewer and social desirability bias. Data collectors were trained by the principal investigators of the study and were fluent in both French (the official language of Burkina Faso) and Mòoré, the native language of participants. Given the sensitive nature of these questions, data collectors were also trained to assess whether participants were in need of immediate support and to contact local authorities within the Ministry of Social Action if cases of severe abuse were discovered. Study participants were also given the contact information of the National Committee of Ethics of Burkina Faso, if participants had any questions or concerns about the study. Baseline data were collected in the fall of 2014 and the 12-month follow-up data were collected in the fall of 2015. The retention rate was 99.7% and only one woman was unable to participate in the 12-month interview (Figure 1).

Measures

All measures of women's empowerment status were adapted from the Demographic Health Survey (DHS), Women's Status Module and Domestic Violence Module, available in French and previously tested in the Burkina Faso context (INSD & ICF International, 2012) and in other countries in sub-Saharan Africa (Antai, 2011; Uthman, Lawoko, & Moradi, 2009).

The questions assessing *domestic violence* asked both about physical and emotional violence from the current husband. Physical violence included seven items (*if a participant's husband had shaken, pushed her or threw an object at her; slapped her or twisted her arm; hit*

her with his fist or with an object that could have hurt her; kicked her or pulled her; tried to strangle her or to burn her; threatened her with a knife, firearm, or any other type of weapon; attacked her with a knife, firearm or another type of weapon). Emotional violence included three items (*whether a participant's husband did or said something to humiliate her in front of others; if he threatened to hurt her or her close family; if he made her feel bad about herself or insulted her*). Lifetime exposure to physical or emotional violence was coded if a woman reported *ever* experiencing any of these acts. If she reported experiencing any of them “sometimes” or “often” within the past year, she was considered to experience current physical or current emotional violence.

Quality of marital relationship scale included four questions (*whether her husband spends free time with her; consults her on household matters; respects her wishes; is affectionate*). Responses were rated on a Likert scale never/rarely (1), sometimes (2) and frequently (3) and the average score was computed. The scale had good internal consistency (Cronbach's $\alpha = 0.821$).

Decision making power was indexed using eight questions asking if a woman was involved in making household and family decisions (*household purchases; her own health care needs; children's schooling; whether her children needed to work to earn money; what to do if one of her children falls sick; how a child needs to be disciplined; her children's marriage; whether to have another child*). Each question asked who made the decision (*herself alone; jointly with her husband; her husband alone; someone else*). If a participant answered either ‘*herself*’ or ‘*jointly with her husband*’, she was considered to have decision-making power for this item and it was coded as 1. The score was computed by summing up all items.

Financial autonomy index was constructed from five questions measuring woman's access and control over financial resources. A score was created by summing up binary items indicating financial autonomy (*a woman has a say--alone or jointly with husband--on how to use her own earnings and her husband's earnings; contributes to the family financially; has partial or full ownership of the house; and has access to money that she alone could decide how to use*).

Gender equality beliefs were measured using five statements about gender roles and gender parity that women could ‘agree’, ‘disagree’ and be ‘unsure’ about: *Important decisions should only be made by men in the family; women who work outside the home should give their earnings to their husband; a married woman should be allowed to work outside the home if she wishes to; a wife is allowed to express her opinion even if it is not the same as her husband's; it is normal for a husband to beat his wife if she disobeys him*. A total score was created by summing up answers supporting gender equality beliefs.

Covariates.—Socio-demographic variables included age, family type (monogamous vs. polygamous) and ownership of household assets. Given the complex nature of multi-generational and polygamous households in Burkina Faso, we used two definitions: *concession* (larger household, including co-wives and their dependents, in-laws, and family patriarchs, who often reside on the premises) and *ménage*, which referred to a smaller

household consisting of the woman, her spouse, and their dependents, excluding the families of co-wives and their children.

Statistical Analysis.—The analysis was performed in Stata 14.0. Table 1 provides descriptive statistics for the sample and compares the baseline characteristics across the study arms. The Stata's survey command (-svy-) calculates 95% confidence intervals (CIs) to obtain estimates accounting for variability in cluster-level means and percentages across villages. With the survey option, Stata converts the uncorrected Pearson's chi-square, used for group comparisons, into design-based F-test statistics. The outcome analysis was intention-to-treat and included all households allocated to study groups. Due to randomization at the village level, participant observations from the same village could be correlated (Intraclass Correlation/ICC), which would violate the assumption of independence of observations (Raudenbush & Bryk, 2002). We used repeated-measures logistic (for domestic violence) and linear (for remaining variables) mixed effects regression models that account for the shared variability of participants nested within the same village and individual observations nested within individuals over time (Murray, Pals, Blitstein, Alfano, & Lehman, 2008; Varnell, Murray, Janega, & Blitstein, 2004). According to the CONSORT guidelines (de Boer, Waterlander, Kuijper, Steenhuis, & Twisk, 2015; Moher et al., 2010), the decision to adjust final regression models should not be based on the significant baseline differences between study arms as they are commonly due to chance. We also conducted moderation analysis testing if there are differences in the intervention effects by family type (monogamous vs. polygamous).

The study's *a priori* power estimates accounted for two design factors: repeated measurement of the outcomes and cluster-randomization of villages. Detectable effect sizes were calculated at two values of autocorrelation (i.e., correlation between measurements; $\rho=0.05$ and $\rho=0.5$) and two values of intra-class correlation (ICC=0.005 and ICC=0.01) due to clustering of participants within villages. The power estimates were calculated for two-tailed Type I error rate=0.05; power=0.80, and a final sample size of 306 participants or approximately 102 subjects per arm, which represents the sample size after 15% attrition from a starting sample size of 360 participants or 120 subjects per arm. The sample size of $n=102$ per arm was adjusted to $n=276$ and $n=252$ to account for the design effects associated with ICCs of 0.005 and 0.01, respectively (Eldridge, Ashby, & Kerry, 2006). Results indicated that 80% power could be achieved for continuous outcome variables for effect sizes F between 0.14 to 0.18 and for binary outcomes for effect sizes with an odds ratio of 1.61. The study is sufficiently powered to detect small to medium effects (Cohen, 1988).

Results

Socio-demographic characteristics of the participants

As presented in Table 1, participants' mean age was 37.21. About 40% of women were in polygamous marriage with, on average, two other wives. The mean age of husbands was 48.73 years. On average, women reported taking care of four children under the age of 15. The majority (98.06%) were Muslim and of Mossi ethnicity (98.61%). Only about 3% of

women were literate and were able to read and write. All women in the sample lived in ultra-poor households; none reported having electricity in the house and about a third of them (35.28%) were experiencing severe hunger (e.g., eating smaller or fewer meals due to lack of food, going to bed hungry, skipping meals for the entire day). About a half of households reported having livestock (45.8%) and a mobile phone (42.5%). Significant socio-demographic differences among the study groups were observed only for women's age and the age of their spouses. There were no significant differences in village-level indicators among the study arms.

Women's Empowerment and Domestic Violence

At baseline, almost a third of women (28%) reported emotional abuse from their spouses in the past year and about 11% reported experiencing any act of physical violence (Table 2). The mean score for the quality of their marital relationships was 2.05, suggesting that husbands expressed positive behaviors such as affection or respect '*sometimes*'. On average, the women reported being involved—alone or jointly with spouse—in three household decisions. Only 17.8% had access to money they could use independently. Almost two thirds of women reported having perceived control over their own earnings—alone (47.8%) or jointly with their husband (20%), while almost a third (32.2%) reported having no control when husband or someone else decided how her earnings could be spent. The majority of women (85.8%) had no control over their husband's earnings and less than 1% had husbands who had no earnings. The women, on average, approved two out of five gender empowerment statements. Except for emotional violence, there were no significant differences in the baseline indicators of women's empowerment. Women in the control arm reported a significantly lower rate of current emotional abuse (design based $F=3.45$, $p=0.05$), compared to the intervention groups.

Intervention Outcomes

As presented in Table 3, results from the repeated-measures mixed effects regression models show that, compared to the control group, women in the TU group demonstrated a statistically significant improvement in financial autonomy (adjusted mean difference 0.46, 95% CI 0.10, 0.81, $p=0.012$), as did the women in the TU Plus group (0.72, 95% CI 0.37, 1.07, $p=0.001$). The effect size for financial autonomy in the TU group was $d=0.21$ (95% CI -0.16 , 0.58) and in the TU+ group $d=0.33$ (95% CI -0.04 , 0.70), which corresponds to the small effect size (Cohen, 1988).

Further, at 12-month follow-up, women reported a significant reduction in emotional violence from their spouses in both the TU arm (OR=0.28, 95% CI 0.10 to 0.82, $p=0.020$, medium effect size) and the TU Plus arm (OR=0.19, 95% CI 0.06 to 0.64, $p=0.007$, large effect size), compared to the control group. Due to baseline imbalance for emotional violence, we rerun the analysis using bootstrapping technique, which confirmed the intervention effects while providing more conservative CIs (TU arm OR=0.28, 95% CI 0.16 to 0.49, $p=0.001$ and the TU+ arm OR=0.19, 95% CI 0.09 to 0.42, $p=0.001$). Women in both intervention arms also showed a statistically significant change over time in the quality of relationships with their husbands (TU 0.18, 95% CI 0.04 to 0.32, $p=0.013$ and TU+ 0.21, 95% CI 0.06 to 0.36, $p=0.005$), compared to the control arm participants. The

effect size in both groups was small, in the TU arm $d=0.12$ (95% CI $-0.16, 0.39$) and in the TU+ arm $d=0.13$ (95% CI $-0.14, 0.42$). For all study arms, from baseline to 12-month follow-up, we observed within-group positive changes for gender norms (0.62, 95% CI 0.29, 0.94, $p=0.001$) and decision-making power (1.79, 95% CI 1.34, 2.24, $p=0.001$). At 12-month follow-up, there were no significant intervention effects on gender equality beliefs, decision-making power, and physical violence.

An interaction analysis by family type detected a significant moderation effect for financial autonomy only. Women in monogamous households demonstrated a significant improvement in financial autonomy (TU arm 0.64, 95% CI 0.19, 1.10, $p=0.006$ and TU+ arm 0.76, 95% CI 0.32, 1.20, $p=0.001$), while the intervention effects were not significant in polygamous households.

Discussion

This is the first experimental study in Burkina Faso testing the effects of economic intervention on women's empowerment status in the family. It has been demonstrated earlier that family economic status and food security improved in both intervention arms, TU and TU Plus. This study shows that women receiving an economic intervention, alone or in combination with the family coaching component, also showed a significant improvement in financial autonomy, quality of marital relationship, and reduction in emotional violence from their spouses. This supports emerging evidence from the randomized trials in Côte d'Ivoire (Gupta et al., 2013), South Africa (Kim et al., 2007; Pronyk et al., 2006), Kenya (Haushofer & Shapiro, 2013) and Ecuador (Hidrobo et al., 2013) that women receiving economic interventions benefit not only financially but also show improvements in their status in the family. When resources are scarce, it puts additional pressure on men to provide for the household and this often increases marital tensions and violence in the family (Green et al., 2015; Hindin et al., 2008; Kabeer, 2001; Nanama & Frongillo, 2012; Uthman et al., 2009; Vyas et al., 2015). Women providing additional income to the household, such as cash or earnings obtained from the economic empowerment programs, may relieve the poverty-related stress, which can reduce marital conflicts (Green et al., 2015; Kabeer, 2001) and improve relationships among spouses (Gupta et al., 2013). In the qualitative interviews, conducted by the local evaluation team in Burkina Faso to further explore the impact of Trickle Up intervention, husbands admitted that they appreciated that after the intervention, their wives could contribute to the household financially and this would relieve the financial burden on men (CERFODES, 2016). In addition, the intervention allowed the participating women greater access to higher quality and more nutritious food, at times earning better treatment from their husbands (CERFODES, 2016). A qualitative study of the Village Savings and Loan program in Rwanda demonstrated that engaging men as women's partners could prepare families for economic transitions, increase cooperation, and change men's attitudes regarding caregiving responsibilities (Slegh et al., 2013).

This study, however, did not demonstrate significant changes in respect to gender equality beliefs, decision-making power, and physical violence. During the qualitative interviews, women shared that sometimes they had to show that money were coming from their husbands, to maintain the husband's status and respect in the family (CERFODES, 2016). In

Burkina Faso, the role of provider is considered a man's principal virtue, while a woman's subservience is considered hers. It would be poorly perceived for a woman to appear within her community, to be overshadowing her husband in this role as the provider. Hence, women who are more economically active than their husbands, own more assets and are able to contribute more to cover the needs of their household, willfully attempt to maintain the perception that their and their children's improved well-being results from their husbands' efforts and ability to provide. Socially, this paints a more respectable picture of their family than would be the case if she were to imply publicly that her increased income and assets are the main contributors to her household's improved status. These cultural nuances of household power dynamics are not captured by existing brief scales measuring gender norms and decisions making power, which could potentially explain the lack of significant changes for these outcomes. Additionally, the family coaching component tested in this study was not specifically designed to address domestic violence. Instead, it primarily targeted issues related to the well-being of children, including equal treatment and opportunities for girl children and a wife's participation in family making since women were the recipients of the economic intervention.

Limitations.

Although more clusters (villages) would have increased the power of this cluster-randomized trial; the number of villages was limited due to the logistical difficulty of setting up and running smaller savings groups in more villages. The incidents of domestic violence could be potentially underreported due to the social desirability bias associated with the use of interviewer-administered surveys. Although self-administered surveys could increase the honesty of reporting of partner violence, this data collection method was not feasible in this study due to low literacy rates among participants. Data collectors did not include the staff implementing the intervention and were unknown to the beneficiary communities, however, as in any context where few social services are available, the investigators acknowledge that some beneficiaries are still likely to over-report positive outcomes. We used the DHS women's empowerment instruments previously tested in Burkina Faso. It was challenging to produce measurement tools that could capture the complexity and nuances of the local cultural context and accurately assess gender norms and decision-making dynamics within Burkinabe families, while keeping instruments appropriate for participants with low literacy.

Research Implications.

There is a lack of research and interventions designed for households with complex structures, such as polygamous and intergenerational households (Hindin et al., 2008). This is particularly important in contexts of polygamous households and the influence of women's bargaining power depends not only on a woman's spouse but also on her place in the hierarchy, roles, and relationship dynamics with other wives (Duffy-Tumas, 2009; Uthman et al., 2009). In this study, the intervention did not have significant effects on financial autonomy of women in polygamous households. This could potentially be due to the intervention targeting only one woman per household. In West Africa, wives in polygamous households often share resources and take turns or rotate cooking and other household responsibilities (Duffy-Tumas, 2009). Although women from polygamous households will make every effort to set aside enough money to prioritize their and their

children's basic needs, they tend to not have as much control over the use of their income particularly if they want to avoid creating tension in their household. In the future, this intervention could target all women in polygamous households or incorporate additional components that address the relationship dynamics and complex household economies of polygamous families.

In this study, the effects on emotional violence were greater in the group receiving the combined intervention involving all household members, including spouses. Despite women's empowerment not being a major focus of the family coaching discussions, it suggests that the increased engagement of men in family-focused interventions does contribute to positive outcomes for women. There is also increasing evidence that women's empowerment interventions that incorporate the participation of multiple stakeholders, including men and boys (Jewkes, Flood, & Lang, 2015) and integrate economic strategies with community-based gender educational interventions are more effective than economic interventions alone in reducing violence (Ellsberg et al., 2015; Gupta et al., 2013). Furthermore, economic empowerment interventions which involved husbands (Gupta et al., 2013; Jewkes et al., 2014; Slegh et al., 2013) and male community members (Jewkes et al., 2014) demonstrated that involving men in women's empowerment interventions improves the quality of relationships (Gupta et al., 2013) and increases women's involvement in household decision making (Slegh et al., 2013).

The study findings, however, differ from cross-sectional and population-based studies in South Asia (Naved & Persson, 2005), where changes in women's economic power were associated with greater risks for IPV. Therefore, giving insight into the effect of an economic intervention on IPV in Burkina Faso that while there were no significant decreases in physical domestic violence, significant increases in physical abuse were not reported. It can be hypothesized that differences in the results could be also attributed to a number factors including, but not limited to, contextual differences in family relationship dynamics, local gender norms about women's status in the family and husbands' reactions to changes in these factors (Bourey et al., 2015; Green et al., 2015; Hughes et al., 2015; Vyas & Watts, 2009), measuring methodology and intervention design (Kabeer, 2001), presence of additional intervention components addressing gender norms (Bourey et al., 2015; Gupta et al., 2013; Kim et al., 2007), and inclusion or lack thereof of men in the intervention (Ellsberg et al., 2015; Kabeer, 2001).

Clinical and Policy Implications.

The study suggests that addressing economic inequalities has a potential for strengthening women's status in the family, particularly in the contexts affected by ultra-level poverty. However, economic strategies alone may not be sufficient to challenge complex family dynamics and change culturally rooted gender norms and beliefs. Although there are additional costs associated with delivering combined interventions, it is recommended that interventions that are intended to prevent domestic violence and strengthen women's status need to combine both economic empowerment strategies with interventions that address the gender norms of that particular area (Vyas et al., 2015). In the wake of conflicting evidence, a 'do-no-harm' approach advocates for engaging men in the economic

empowerment program targeting women to strengthen cooperation and build a favorable social environment for sustainable change in women's empowerment status (Slegh et al., 2013).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Finding

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Ethical Approval

The study protocol was approved by the University of Chicago Internal Review Board (IRB13-1481) and the Burkina Faso Ministry of Scientific Research and Innovation Ethics Committee for Research in Health (ECRH). The study is registered with [ClinicalTrial.gov](https://clinicaltrials.gov) database (ID: [NCT02415933](https://clinicaltrials.gov/ct2/show/study/NCT02415933)).

REFERENCES

- Abramsky T, Watts CH, Garcia-Moreno C, Devries K, Kiss L, Ellsberg M, ... Heise L. (2011). What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health*, 11(1), 109. [PubMed: 21324186]
- Aizer A. (2010). The gender wage gap and domestic violence. *The American Economic Review*, 100(4), 1847. [PubMed: 25110354]
- Antai D. (2011). Controlling behavior, power relations within intimate relationships and intimate partner physical and sexual violence against women in Nigeria. *BMC Public Health*, 11(1), 511. [PubMed: 21714854]
- Bourey C, Williams W, Bernstein EE, & Stephenson R. (2015). Systematic review of structural interventions for intimate partner violence in low-and middle-income countries: organizing evidence for prevention. *BMC Public Health*, 15(1), 1. [PubMed: 25563658]
- Bourgois P. (1996). In search of masculinity violence, respect and sexuality among Puerto Rican crack dealers in East Harlem. *British Journal of Criminology*, 36(3), 412–427.
- Bove RM, Vala-Haynes E, & Valeggia C. (2014). Polygyny and women's health in rural Mali. *Journal of Biosocial Science*, 46(1), 66–89. [PubMed: 23480408]
- Cano A, & Vivian D. (2001). Life stressors and husband-to-wife violence. *Aggression and Violent Behavior*, 6(5), 459–480.
- CERFODES. (2016). Evaluation Qualitative Des Effets Protecteurs Du Programme De Renforcement Economique Et De La Sensibilisation Des Ménages Extrêmement Pauvres Sur La Protection Des Droits De l'Enfant Au Burkina Faso [Qualitative Evaluation of the Protective Effects of the Economic Development Program and Awareness of Extreme Poor Households on the Protection of Children's Rights in Burkina Faso]. Ouagadougou, Burkina Faso: Centre d'Etudes, de Recherches et de Formation pour le Développement Economique et Social (CERFODES).

- Cohen J. (1988). *Statistical power analysis for the behavioural sciences*. Hillside, NJ: Lawrence Erlbaum Associates.
- de Boer MR, Waterlander WE, Kuijper LD, Steenhuis IH, & Twisk JW (2015). Testing for baseline differences in randomized controlled trials: an unhealthy research behavior that is hard to eradicate. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 4.
- Devries KM, Mak JY, García-Moreno C, Petzold M, Child JC, Falder G, ... others. (2013). The global prevalence of intimate partner violence against women. *Science*, 340(6140), 1527–1528. [PubMed: 23788730]
- Duffy-Tumasz A. (2009). Paying back comes first: why repayment means more than business in rural Senegal. *Gender and Development*, 17(2), 243–254.
- Eldridge SM, Ashby D, & Kerry S. (2006). Sample size for cluster randomized trials: effect of coefficient of variation of cluster size and analysis method. *International Journal of Epidemiology*, 35(5), 1292–1300. [PubMed: 16943232]
- Ellsberg M, Arango DJ, Morton M, Gennari F, Kiplesund S, Contreras M, & Watts C. (2015). Prevention of violence against women and girls: what does the evidence say? *The Lancet*, 385(9977), 1555–1566. 10.1016/S0140-6736(14)61703-7
- Fafchamps M, Kebede B, & Quisumbing AR (2009). Intrahousehold welfare in rural Ethiopia. *Oxford Bulletin of Economics and Statistics*, 71(4), 567–599.
- Flake DF (2005). Individual, family, and community risk markers for domestic violence in Peru. *Violence against Women*, 11(3), 353–373. [PubMed: 16043554]
- Fredman S, Kuosmanen J, & Campbell M. (2016). Transformative Equality: Making the Sustainable Development Goals Work for Women. *Ethics & International Affairs*, 30(2), 177–187.
- García-Moreno C. (2013). Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. World Health Organization.
- García-Moreno C, & Watts C. (2011). Violence against women: an urgent public health priority. *Bulletin of the World Health Organization*, 89(1), 2–2. [PubMed: 21346880]
- Green EP, Blattman C, Jamison J, & Annan J. (2015). Women’s entrepreneurship and intimate partner violence: A cluster randomized trial of microenterprise assistance and partner participation in post-conflict Uganda (SSM-D-14-01580R1). *Social Science & Medicine*, 133, 177–188. [PubMed: 25875324]
- Grossbard S. (2011). Independent individual decision-makers in household models and the New Home Economics. In *Household economic behaviors* (pp. 41–56). Springer. Retrieved from http://link.springer.com/chapter/10.1007/978-1-4419-9431-8_2
- Gupta J, Falb KL, Lehmann H, Kpebo D, Xuan Z, Hossain M, ... Annan J. (2013). Gender norms and economic empowerment intervention to reduce intimate partner violence against women in rural Côte d’Ivoire: a randomized controlled pilot study. *BMC International Health and Human Rights*, 13, 46. 10.1186/1472-698X-13-46 [PubMed: 24176132]
- Hashemi SM, & Umaira W. (2011). New pathways for the poorest: the graduation model from BRAC. BRAC Development Institute, Centre for Social Protection (CSP), United Kingdom. Retrieved from <https://www.ids.ac.uk/files/dmfile/ResearchReport10FINAL.pdf>
- Haushofer J, & Shapiro J. (2013). Household response to income changes: Evidence from an unconditional cash transfer program in Kenya. Massachusetts Institute of Technology. Retrieved from www.jeremyshapiro.com/papers/Household%20Response%20to%20Income%20Changes-%20Evidence%20from%20an%20Unconditional%20Cash%20Transfer%20Program%20in%20Kenya%20November%202013.pdf
- Heise LL (1998). Violence against women an integrated, ecological framework. *Violence against Women*, 4(3), 262–290. [PubMed: 12296014]
- Hidrobo M, Peterman A, & Heise L. (2013). The effect of cash, vouchers and food transfers on intimate partner violence: evidence from a randomized experiment in Northern Ecuador. Washington, DC: International Food Policy Research Institute, 84, 1555–1566.
- Hindin MJ, & Adair LS (2002). Who’s at risk? Factors associated with intimate partner violence in the Philippines. *Social Science & Medicine*, 55(8), 1385–1399. [PubMed: 12231016]

- Hindin MJ, Kishor S, & Ansara DL (2008). Intimate partner violence among couples in 10 DHS countries: predictors and health outcomes. Retrieved from <http://www.popline.org/node/204198>
- Hughes C, Bolis M, Fries R, & Finigan S. (2015). Women's economic inequality and domestic violence: exploring the links and empowering women. *Gender & Development*, 23(2), 279–297.
- INSD. (2014). Burkina Faso National Institute of Statistics and Demographics Database. Institut National de la Statistique et de la Démographie (INSD). Retrieved from www.insd.bf
- INSD, & ICF International. (2012). Enquête Démographique et de Santé et à Indicateurs Multiples du Burkina Faso 2010. [Burkina Faso Demographic and Health Survey 2010]. Calverton, Maryland, USA: Institut National de la Statistique et de la Démographie (INSD) et ICF International. Retrieved from <http://dhsprogram.com/pubs/pdf/FR256/FR256.pdf>
- Ismayilova L, Karimli L, Tô A, Nanema R, Sanson J, Gaveras E, ... Hu W. (2015). Child Protective Effects of Economic Strengthening and Child Rights Interventions among Ultra-poor Families in Burkina Faso. Keeping Families Together Through Economic Strengthening. Washington, DC: USAID and FHI360. Retrieved from www.seepnetwork.org/symposium-report-keeping-children-and-families-together-with-economic-strengthening-resources-1491.php
- Jewkes R. (2002). Intimate partner violence: causes and prevention. *The Lancet*, 359(9315), 1423–1429.
- Jewkes R, Flood M, & Lang J. (2015). From work with men and boys to changes of social norms and reduction of inequities in gender relations: a conceptual shift in prevention of violence against women and girls. *The Lancet*, 385(9977), 1580–1589.
- Jewkes R, Gibbs A, Jama-Shai N, Willan S, Misselhorn A, Mushinga M, ... Skiweyiya Y. (2014). Stepping Stones and Creating Futures intervention: shortened interrupted time series evaluation of a behavioural and structural health promotion and violence prevention intervention for young people in informal settlements in Durban, South Africa. *BMC Public Health*, 14(1), 1. [PubMed: 24383435]
- Jewkes R, Levin J, & Penn-Kekana L. (2002). Risk factors for domestic violence: findings from a South African cross-sectional study. *Social Science & Medicine*, 55(9), 1603–1617. [PubMed: 12297246]
- Kabeer N. (2001). Conflicts over credit: re-evaluating the empowerment potential of loans to women in rural Bangladesh. *World Development*, 29(1), 63–84.
- Kabore ép. Zare W, Yaro Y, & Dan-Koma I. (2008). Background Study of the Inter-Agency Joint Programme on Violence against Women: Burkina Faso. Ouagadougou, Burkina Faso: The Inter-Agency Network on Women and Gender Equality Task Force on Violence Against Women. Retrieved from http://www.un.org/womenwatch/ianwge/taskforces/vaw/Version_anglaise_de_l_etude_de_base_VEF_2009-ud.pdf
- Kim JC, Watts CH, Hargreaves JR, Ndhlovu LX, Phetla G, Morison LA, ... Pronyk P. (2007). Understanding the Impact of a Microfinance-Based Intervention on Women's Empowerment and the Reduction of Intimate Partner Violence in South Africa. *American Journal of Public Health*, 97(10), 1794–1802. 10.2105/AJPH.2006.095521 [PubMed: 17761566]
- Kishor S, & Johnson K. (2004). Profiling domestic violence: A multi-country study. Retrieved from <http://www.popline.org/node/628738>
- Kishor S, & Subaiya L. (2008). Understanding women's empowerment: a comparative analysis of Demographic and Health Surveys (DHS) data. Retrieved from <http://www.popline.org/node/203734>
- Koenig MA, Ahmed S, Hossain MB, & Mozumder AKA (2003). Women's status and domestic violence in rural Bangladesh: individual-and community-level effects. *Demography*, 40(2), 269–288. [PubMed: 12846132]
- Matin I, Sulaiman M, & Rabbani M. (2008). Crafting a graduation pathway for the ultra poor: Lessons and evidence from a BRAC programme. RED Working Paper, BRAC. Retrieved from http://www.chronicpoverty.org/uploads/publication_files/WP109_Martin.pdf
- MkNelly B, & Kevane M. (2002). Improving Design and Performance of Group Lending: Suggestions from Burkina Faso. *World Development*, 30(11), 2017–2032. 10.1016/S0305-750X(02)00119-5

- Moher D, Hopewell S, Schulz KF, Montori V, Gøtzsche PC, Devereaux PJ, ... Altman DG (2010). CONSORT 2010 Explanation and Elaboration: updated guidelines for reporting parallel group randomised trials. *BMJ*, 340. 10.1136/bmj.c869
- Munro A, Kebede B, Tarazona-Gomez M, & Verschoor A. (2011). The Lion's Share: An Experimental Analysis of Polygamy in Northern Nigeria. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1821283
- Murray DM, Pals SL, Blitstein JL, Alfano CM, & Lehman J. (2008). Design and analysis of group-randomized trials in cancer: a review of current practices. *Journal of the National Cancer Institute*, 100(7), 483–491. [PubMed: 18364501]
- Nanama S, & Frongillo EA (2012). Altered social cohesion and adverse psychological experiences with chronic food insecurity in the non-market economy and complex households of Burkina Faso. *Social Science & Medicine*, 74(3), 444–451. 10.1016/j.socscimed.2011.11.009 [PubMed: 22197293]
- Naved RT, & Persson L. \AAke. (2005). Factors associated with spousal physical violence against women in Bangladesh. *Studies in Family Planning*, 36(4), 289–300. [PubMed: 16395946]
- Population Council. (2012). Key Data Points on Adolescent Women in Nord and Sahel regions of Burkina Faso. Population Council.
- Pronyk PM, Hargreaves JR, Kim JC, Morison LA, Phetla G, Watts C, ... Porter JDH (2006). Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: a cluster randomised trial. *Lancet (London, England)*, 368(9551), 1973–1983. 10.1016/S0140-6736(06)69744-4
- Quisumbing AR, & Maluccio JA (2003). Resources at marriage and intrahousehold allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa. *Oxford Bulletin of Economics and Statistics*, 65(3), 283–327.
- Raudenbush SW, & Bryk AS (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Sage.
- Sachs JD (2012). From millennium development goals to sustainable development goals. *The Lancet*, 379(9832), 2206–2211.
- Sambisa W, Angeles G, Lance PM, Naved RT, & Thornton J. (2011). Prevalence and correlates of physical spousal violence against women in slum and non-slum areas of urban Bangladesh. *Journal of Interpersonal Violence*, 26(13), 2592–2618. [PubMed: 21831870]
- Slegh H, Barker G, Kimonyo A, Ndolimana P, & Bannerman M. (2013). “I can do women’s work”: reflections on engaging men as allies in women’s economic empowerment in Rwanda. *Gender & Development*, 21(1), 15–30.
- Straus MA (1976). Sexual inequality, cultural norms, and wife-beating. *Victimology*. Retrieved from <http://psycnet.apa.org/psycinfo/1978-21303-001>
- UN Women. (2015). Progress of the World’s Women 2015–2016: Transforming Economies, Realizing Rights. Retrieved from <http://www.unwomen.org/en/digital-library/publications/2015/4/progress-of-the-worlds-women-2015>
- UNICEF. (2012). Child in crisis in the Sahel: Burkina Faso, Cameroon, Chad, Gambia, Mali, Mauritania, Niger, Nigeria, Senegal. UNICEF. Retrieved from http://www.unicef.org/health/files/UNICEF_SAHEL_EmrgRprt_11.12.12.pdf
- Uthman OA, Lawoko S, & Moradi T. (2009). Factors associated with attitudes towards intimate partner violence against women: a comparative analysis of 17 sub-Saharan countries. *BMC International Health and Human Rights*, 9(1), 14. [PubMed: 19619299]
- Uthman OA, Moradi T, & Lawoko S. (2009). The independent contribution of individual-, neighbourhood-, and country-level socioeconomic position on attitudes towards intimate partner violence against women in sub-Saharan Africa: a multilevel model of direct and moderating effects. *Social Science & Medicine*, 68(10), 1801–1809. [PubMed: 19303687]
- Varnell SP, Murray DM, Janega JB, & Blitstein JL (2004). Design and analysis of group-randomized trials: a review of recent practices. *American Journal of Public Health*, 94(3), 393–399. [PubMed: 14998802]

- Vyas S, Jansen HA, Heise L, & Mbwambo J. (2015). Exploring the association between women's access to economic resources and intimate partner violence in Dar es Salaam and Mbeya, Tanzania. *Social Science & Medicine*, 146, 307–315. [PubMed: 26494417]
- Vyas S, & Watts C. (2009). How does economic empowerment affect women's risk of intimate partner violence in low and middle income countries? A systematic review of published evidence. *Journal of International Development*, 21(5), 577–602.

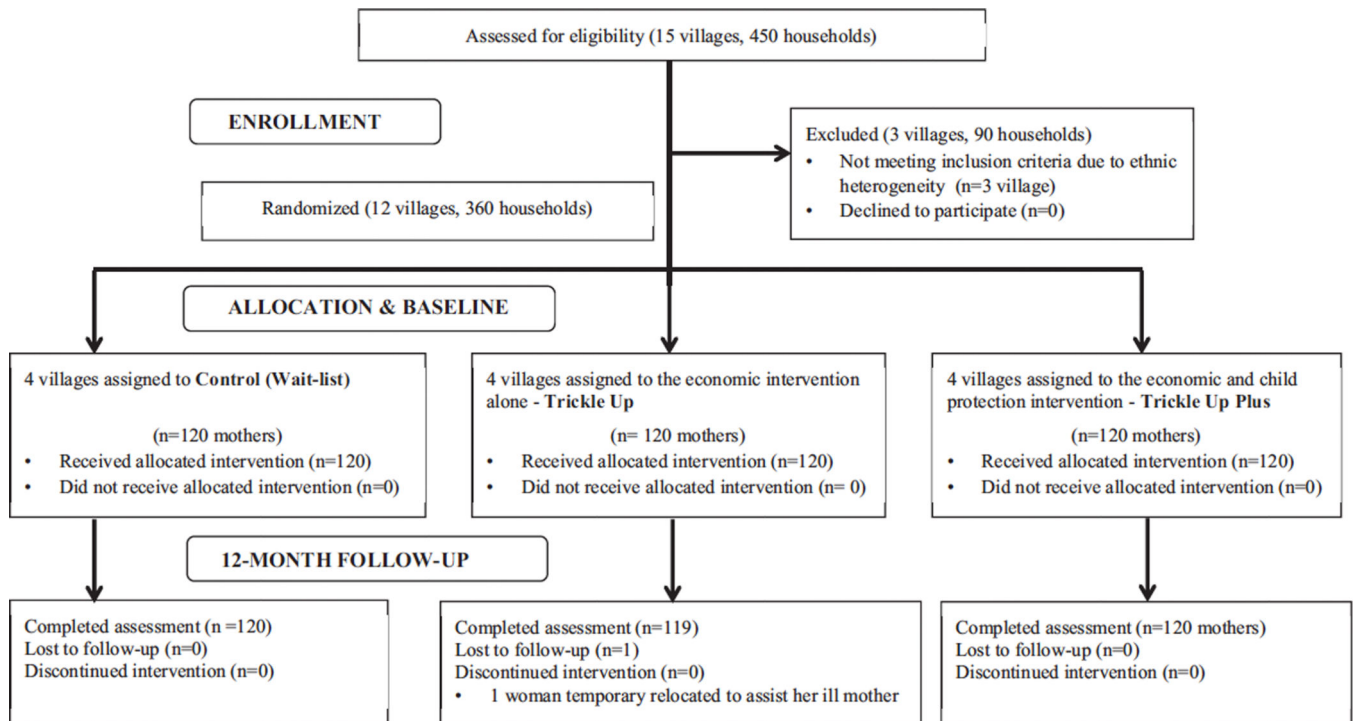


Figure 1.
The CONSORT study flow chart

Table 1:

Socio-demographic characteristics of the sample

<i>Variables</i>	Total (N=360)	Control group (n=120)	Trickle Up (n=120)	Trickle Up + (n=120)	Design- based F
<i>Socio-demographic characteristics</i>		<i>Percentage or Mean [95% Confidence Intervals]</i>			
Mother's age in years, mean	37.21 [35.68, 38.74]	39.32 [36.48,42.15]	36.43 [35.89,36.97]	35.88 [33.96,37.81]	4.59**
Religion					0.78
Christian	1.94 [0.65, 5.66]	0.83 [0.11, 5.89]	3.33 [0.80, 12.89]	1.67 [0.22,11.38]	
Muslim	98.06 [94.34,99.35]	99.17 [94.11,99.89]	96.67 [88.62,99.78]	98.33 [87.11,99.2]	
Ethnicity					0.15
Mossi	98.61 [94.64,99.65]	99.17 [94.11,99.89]	97.5 [83.5,99.67]	99.17 [94.11,99.89]	
Peuhl	1.11 [0.20,5.85]	0.83 [0.11,5.89]	2.5 [0.33,16.5]	0	
other (Gourmantche)	0.28 [0.03,2.47]	0	0	0.83 [0.11,5.89]	
Mother's years of education, mean	0.24 [0.10,0.38]	0.28 [-0.04,0.59]	0.19 [-0.04,0.42]	0.26 [0.11,0.40]	0.21
Literacy (can read and write)	2.78 [1.35,5.62]	3.33 [0.89,12.89]	1.67 [0.52,5.17]	3.33 [1.47,7.40]	0.46
<i>Household characteristics</i>					
Marital status					0.69
Monogamous marriage	60.56 [50.16,70.08]	67.5 [55.38,77.65]	55.83 [31.04,78.03]	58.33 [51.88,64.52]	
Polygamous marriage	39.44 [29.92,49.84]	32.5 [22.35,44.62]	44.17 [21.97,68.96]	41.67 [35.48,48.12]	
Number of other wives in polygamous marriages (n=142), mean	2.13 [2.04, 2.21]	2.13 [1.88,2.38]	2.15 [2.05,2.25]	2.10 [2.01,2.19]	0.21
Age of husband in years, mean	48.73 [46.80,50.67]	51.38 [47.83,54.94]	48.38 [47.69,49.07]	46.33 [44.69,47.97]	5.78**
Number of people in a concession (larger household, including co-wives and their dependents)	10.31 [9.54,11.08]	9.93 [8.56,11.31]	10.73 [9.14,12.33]	10.25 [9.57,10.93]	1.24
Number of people in a 'ménage' (smaller household consisting of the woman, her spouse, and their children)	7.20 [7.00,7.39]	7.26 [6.92,7.60]	7.23 [6.89,7.56]	7.11 [6.80,7.42]	0.21
Number of children (under age of 15) under woman's care, mean	4.28 [4.11,4.45]	4.21 [3.89,4.53]	4.38 [4.07,4.68]	4.26 [4.05,4.47]	0.56
Household assets ownership					
mobile telephone	42.5 [38.92,46.16]	45.83 [38.62,53.23]	42.5 [37.61,47.54]	39.17 [36.04,42.39]	1.84
bicycle	61.67 [51.4,70.99]	70 [52.1,83.35]	61.67 [53.05,69.61]	53.33 [34.44,71.32]	1.41
motorcycle or motor-tricycle	2.5 [1.1,5.6]	5 [2.09,11.48]	1.67 [0.52,5.17]	0.83 [0.11,5.89]	3.22
animal-drawn cart	3.89 [2.32,6.44]	3.33 [1.47,7.40]	4.17 [2.79,6.18]	4.17 [1.24,13.14]	0.10
Plow	2.78 [0.99,7.54]	3.33 [1.79,12.89]	0.83 [0.11,5.89]	4.17 [0.89,17.33]	0.90
assets of a value more than 20,000 West African CFA Franc (~33 USD)	0.28 [0.03,2.47]	0.00	0.00	0.83 [0.11,5.89]	0.06
Livestock	45.83 [36.26,55.72]	48.33 [24.58,72.87]	45.83 [36.56,55.4]	0.11	
Village level Characteristics		N=12	n=4	n=4	F
Distance to the capital of the commune (chef-lieu de commune) (km)	12.83 [7.94; 17.72]	12.50 [7.91, 17.09]	11.00 [-3.35, 25.35]	15.0 [-2.19, 32.19]	0.24

<i>Variables</i>	Total (N=360)	Control group (n=120)	Trickle Up (n=120)	Trickle Up + (n=120)	Design- based F
Total population (estimated from the 2006 general census)	1908 [1242; 2574]	1584 [287; 2881]	2282 [221; 4775]	1858 [651; 3065]	0.40
Child population (under the age of 15)	885 [576; 1194]	735 [133; 1337]	1058 [98; 2215]	862 [302; 1422]	0.40
Distance to the nearest school (km)	8.5 [4.65; 12.35]	8.0 [4.10; 11.90]	8.75 [-4.78; 22.28]	8.75 [-3.11; 20.61]	0.02
Distance to the nearest mining site (km)	15.42 [8.6; 22.24]	12.5 [-5.24; 30.24]	18.0 [-3.27; 39.27]	15.75 [-0.08; 31.58]	0.23
Number of community health centers	0.17 [-0.08; 0.41]	0 [0.00; 0.00]	0.25 [-0.55; 1.05]	0.25 [-0.55; 1.05]	0.50

*
p 0.05

**
p 0.01

p 0.001

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Table 2:

Women's empowerment status among study participants

Variables	Total (N=360)	Control group (n=120)	Trickle Up (n=120)	Trickle Up + (n=120)	Design-based F
<i>Women's Empowerment</i>					
Lifetime Domestic Violence (ever experienced)					
Emotional violence	31.11 [24.51,38.58]	23.33 [14.48,35.37]	39.17 [29.5,49.77]	30.83 [23.2,39.68]	3.05
Physical violence	13.89 [9.42,20.02]	10 [4.77,19.77]	20.83 [17.83,24.19]	10.83 [4.33,24.58]	2.59
Current Domestic Violence (in past year)					
Emotional violence	28.33 [22.21,35.37]	20 [13.08,29.35]	35 [26.8,44.2]	30 [21.21,40.56]	3.45*
Physical violence	10.83 [7.47,15.46]	9.17 [4.86,16.62]	15.83 [14.24,17.56]	7.5 [2.73,18.97]	2.23
Quality of marital relationship, mean (range 0–3)	2.05 [1.99, 2.11]	2.11 [2.06,2.16]	2.01 [1.91,2.10]	2.03 [1.94,2.13]	1.67
Decision-making power, mean (range 0–8)	3.73 [3.51, 3.94]	3.93 [3.48, 4.39]	3.52 [3.23, 3.8]	3.73 [3.62, 3.85]	1.10
Gender equality beliefs, mean (range 0–5)	2.71 [2.55,2.88]	2.66 [2.43,2.89]	2.68 [2.37,2.98]	2.80 [2.51,3.09]	0.42
Financial Autonomy, mean (range 0–5)	2.40 [2.29; 2.50]	2.44 [2.26,2.63]	2.43 [2.19,2.66]	2.33 [2.26,2.39]	0.45

*
p 0.05**
p 0.01***
p 0.001

Table 3: Analysis of women’s empowerment and domestic violence outcomes at 12-month follow-up for Trickle Up and Trickle Up+ interventions.

	Trickle Up + (economic intervention + family coaching)		Adjusted difference (95% CI) at 12-month: TU+ vs Control	Adjusted difference (95% CI) at 12-month: TU+ vs TU		Trickle Up (economic intervention alone)		Adjusted difference (95% CI) at 12-month: TU vs Control	Control (Wait-list)	
	Baseline	12-months		Baseline	12-months	Baseline	12-months		Baseline	12-months
Domestic Violence										
Physical violence (past year) [‡]	7.5%	0.83%	0.29 [0.02, 3.53]	0.38 [0.04, 4.21]	15.83%	5%	0.75 [0.14, 3.92]	9.17%	3.33%	
Emotional violence (past year) [‡]	30%	5.83%	0.19 [0.06, 0.64]	0.69 [0.21, 2.24]	35%	10%	0.28 [0.10, 0.82]	20%	13.33%	
Women’s Empowerment	<i>Mean (SD)</i>				<i>Mean (SD)</i>			<i>Mean (SD)</i>		
Quality of marital relationship, (range 0–3)	2.0 (0.50)	2.30 (0.47)	0.21 [0.06, 0.36]	0.03 [−0.12, 0.18]	2.01 (0.48)	2.25 (0.43)	0.18 [0.04, 0.32]	2.11 (0.42)	2.17 (0.39)	
Decision-making power, (range 0–8)	3.73 (2.3)	5.9 (1.66)	0.38 [−0.29, 1.05]	0.37 [−0.33, 1.07]	3.52 (2.05)	5.31 (1.85)	0.01 [−0.66, 0.67]	3.93 (2.16)	5.73 (1.90)	
Gender equality beliefs, (range 0–5)	2.8 (1.19)	3.71 (1.24)	0.29 [−0.14, 0.73]	0.18 [−0.22, 0.58]	2.68 (1.31)	3.41 (1.19)	0.12 [−0.32, 0.55]	2.66 (1.41)	3.28 (1.32)	
Financial Autonomy, (range 0–5)	2.33 (1.02)	3.43 (0.86)	0.72 [0.37, 1.07]	0.26 [−0.10, 0.62]	2.43 (1.03)	3.27 (1.03)	0.46 [0.10, 0.81]	2.44 (1.03)	2.83 (1.02)	

Notes: Data are mean (SD) and adjusted difference in means with 95% confidence intervals unless otherwise stated.

[‡] For binary outcomes, the adjusted difference is the ratio of odds ratios and the value of 1 indicates no difference in change between group.