

# **Leveraging microfinance networks to scale up HIV and financial education among adolescents and their mothers in West Bengal: a cluster randomized trial and mixed-method evaluation**

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### **ABSTRACT**

Microfinance can be used to reach women and adolescent girls with HIV prevention education. We report findings from a cluster-randomized control trial among 55 villages in West Bengal to determine the impact of non-formal education on knowledge, attitudes and behaviors for HIV prevention and savings. Multilevel regression models were used to evaluate differences between groups for key outcomes while adjusting for cluster correlation and differences in baseline characteristics. Women and girls who received HIV education showed significant gains in HIV knowledge, awareness that condoms can prevent HIV, self-efficacy for HIV prevention, and confirmed use of clean needles, as compared to the control group. Condom use was rare and did not improve for women. While HIV-testing was uncommon, knowledge of HIV-testing resources significantly increased among girls, and trended in the positive direction among women in intervention groups. Conversely, the savings education showed no impact on financial knowledge or behavior change.

## Introduction

Scaling up of HIV-prevention activities in India is necessary to avoid widespread dissemination of HIV. India's national HIV-prevention goals include universal access to HIV-prevention services.<sup>1</sup> Youth comprise one-quarter of the population, but account for almost one-third of the HIV burden, and require increased HIV-prevention attention.<sup>2</sup> Nath's literature review for HIV/AIDS and Indian youth concluded that even though condom awareness is fairly high, condom usage is low, and that Indian youth appear to hold negative attitudes towards HIV testing and people living with HIV/AIDS. Qualitative research has suggested that a family-based HIV-prevention intervention could impact HIV prevention among adolescents if it: (1) provides families with comprehensive HIV-prevention strategies and knowledge; (2) addresses barriers to participation; (3) is adolescent-friendly and convenient; and (4) is developmentally and culturally appropriate for rural Indian families.<sup>3</sup>

There are now estimated to be 5-9 million self-help groups (SHGs) across India, representing approximately 54 million poor women who come together regularly to save as little as US\$.50 per month, borrow, and support each other to solve shared problems.<sup>4</sup> Microfinance networks may provide a unique means to scale up HIV-prevention interventions among adolescents and their families before they unknowingly engage in behaviors that would put them at risk for HIV. Integrated intervention approaches are proving to be effective when financially sustainable platforms such as microfinance are coupled with non-financial services, such as non-formal education, health linkages, and health services.<sup>5</sup>

We hypothesize that SHGs can be used as a platform to provide financial and health education to reach both women SHG members and their adolescent daughters in India.<sup>6</sup> Our evaluation was conducted in the context of a demonstration project that reached approximately 35,000 adolescent girls with a non-formal education methodology called *Learning Games for Girls* on hand-washing, diarrhea, nutrition, sexual and reproductive health, and HIV/AIDS (Table 1). In this manuscript, we focus on HIV prevention because this is a subject for which there is significant community sensitivity, stigma, misconception, and limited education.

## Methods

### Study location and population

Reach India is a network of two-person teams that train local organizations called self-help promoting institutions (SHPIs) to deliver *Learning Games for Girls* (hereafter: "Game(s)") and other non-formal education on health, livelihoods, and family finance to SHGs of poor women and adolescent girls during their regular savings and loan meetings.

Between 2006 and 2009, we conducted a community-based randomized control trial (CBRCT) with a Reach India network member SHPI in Nadia, West Bengal. The SHPI's area covers a population of 60,000 people from 60 villages. Participants in the study were identified by SHPI animators. Eligibility criteria for inclusion in the evaluation were females who were either current SHG members or adolescent daughters or daughters-in-law (10–19 years old) of members, who attended an introductory session. Women and adolescent girls who participated in the baseline survey and in the first Game were included in the intent-to-treat intervention study population. In the control communities, women and adolescent girls who participated in the baseline survey were included in the

study population. In the analysis, we explored the impact of the Games on married women (*hereafter: "women"*) and on unmarried girls (*hereafter: "girls"*).

### **Randomization**

At baseline, 55 villages were randomized to intervention (n=32) or control group (n=23) designation. Among the intervention villages, there were 32 that included girl groups and 29 of those groups included women participants, with 3 of the villages including girls-only groups. Among the control villages, all 23 included joint girls-and-women control groups. Within each village, all members (n=677) of the 133 randomly selected SHGs were asked to participate and to nominate adolescent girls (n=998) to participate in the evaluation. All evaluation participants were administered baseline, 6-, and 12-month interviews.

### **Intervention**

The SHPI received training and guidance to train its animators, who were asked to deliver to each of their SHGs 10 sessions of Games covering financial and health topics (Table 1). For Games that included sensitive subjects, such as "Knowing Our Bodies" and "How to Protect Against HIV/AIDS," animators received extra training prior to their delivery of these Games. Quality of sessions delivered and motivation of SHG animators were assessed through structured observation of the Games by Reach India and evaluation staff.

### **Measures**

The data-collection instrument was adapted from existing validated survey instruments.<sup>7</sup> Demographic questions included measures of household composition, food security and socio-economic indicators, as well as questions assessing age, education level, pregnancy status and history, and religion. The primary indicators for HIV consisted of knowledge, attitude, and behavior measures for HIV prevention. The primary financial indicators included earning capacity, savings knowledge and behavior, how to bargain effectively, and how to prioritize the use of money.

### **Data Management and Analysis**

The Center for Microfinance collected baseline data and GfK Mode collected midline and endpoint data. Reconciliation of error files from double-data entry, frequencies, cross-tabulations, measures of central tendency, and crosschecking with hard-copy questionnaires were used for data-cleaning and validation.

Statistical analyses were conducted using SAS statistical software (version 9·2, Cary, NC, USA) and Stata statistical software (version 10·1, College Station, TX, USA). Pearson chi-square tests were used to compare differences in proportions between groups, while f-tests were used to compare means among groups. Average cluster size was 2·9 SHGs within village and 14 individuals within SHG. For analysis, multilevel regression was used to take into account cluster correlation coefficients.<sup>8</sup> To reflect the characteristics of the outcome variables, generalized multilevel regressions with logit link were used.<sup>9</sup>

### **Qualitative Follow-Up**

A qualitative evaluation was completed to better understand the barriers and facilitators of delivery of the intervention, and to qualitatively explore reasons for the CBRCT outcomes. Overall, 21 individual interviews and 42 follow-up focus groups (n=210) were held among a purposive sample of the 1,675 participants, including community leaders, SHPI staff, and women and girls who received and who were supposed to receive but did not receive the intervention. While we are not presenting the full

qualitative analysis in this manuscript, we will share selected quotes in the discussion to explain our findings.

### **Role of Funding Source**

Nike Foundation funded both the implementation of the CBRCT evaluation and the *Learning Games for Girls* throughout the Reach India network. The Foundation participated in initial discussions for this research design but did not participate in the data collection, data analysis, interpretation, or write-up of the findings.

## **Results**

### **Participation**

The trial profile is shown in Figure 1. At 12-month follow-up, the participation rate for villages in follow-up surveys was 94% for the intervention villages with girls-only groups, 93% for the villages with women and girls, and 91% for the control villages.

Because villages were our unit of randomization, we maintained adequate power to detect significant differences in study outcomes, despite the lower-than-expected delivery rate of the Games to the SHGs, and thus we were able to complete our planned analysis, which adjusted for cluster correlation within villages and SHGs. During routine monitoring, the majority of animators recorded having conducted the scheduled Games. However, separate participant assessments revealed that the Games were actually delivered to girls and women at much lower rates than reported. In addition, for those Games that were conducted, less than one-fourth of the girls and women were able to participate in the HIV session or the savings session because of conflicts with school, work, and other responsibilities. Because standard meeting schedules for providing the education were not always maintained, participants reported not hearing about over a third of the planned sessions.

We compare the characteristics of the intent-to-treat group to the characteristics of the population that actually received the specific intervention sessions, and to the control populations (Table 2). As compared to the control populations, the intervention populations were more likely to be Hindu for women and girls, and the women in the intervention group were more likely to be younger than the control population. The women who participated in the HIV session were also more likely to have attended school before as compared to both the intent-to-treat and the control populations.

### **Impact of Savings Education**

The financial circumstances in the community appeared to worsen over the last six months of the study. This was reflected through qualitative comments and in the decreasing income reported by women, and the SHPI's lower loan repayment rates. Mean monthly income trended down from 2,161 to 1,825 rupees, and the amount of rupees given to women over the last three months decreased ( $p < 0.05$ ) (Table 3).

In this context, the impact of savings education for unmarried girls and married women shown in Table 4 revealed minimal effects at the time of the 12-month evaluation. Although the 6-month assessment (not shown in table) showed that girls had significantly higher motivation to save money (adjusted odds ratio 2.1,  $p = .002$ ) and were more likely to have a plan to save money (adjusted odds ratio 2.2,  $p = .04$ ), in the final adjusted analysis (Table 4) for participants receiving the intervention, as compared to the control population, no significant differences were seen in knowledge (know how to save),

attitudes (motivated to save money, felt comfortable talking to family about savings, believed they are the best person to make decisions about savings), or behaviors (had a plan for savings, had savings).

### **Impact of HIV-Prevention Education**

As families experienced greater financial difficulties and animators were encouraged to spend more of their time on loan collection, delivery of health education became less of a priority for the SHPI.

Nonetheless, HIV education among girls and women who attended had a significant impact for almost all knowledge, attitude, and behavioral measures (Table 5).

For girls (Table 5A), the HIV-education intervention resulted in significant increases in HIV knowledge: heard of HIV (OR=3.6,  $p<0.05$ ), heard of sexually transmitted infections (STIs) (OR=3.6,  $p<0.05$ ), and aware of sexual (OR=3.2,  $p<0.05$ ), parenteral (OR=3.5,  $p<0.05$ ), and perinatal (OR=3.0,  $p<0.05$ ) transmission risks, and aware that condoms can prevent HIV (OR=2.9,  $p<0.05$ ). In addition, significant decreases were observed in incorrect beliefs regarding the ability to transmit HIV through an embrace (OR=2.1,  $p<0.05$ ). Attitudes were also significantly impacted for girls, as a higher percentage of girls felt very confident that they would be able to take steps to prevent HIV in the future (OR=2.4,  $p<0.05$ ). However, there was no impact on girls' comfort level in talking with their families about HIV prevention.

In the analysis of behaviors, significantly more girls confirmed use of a clean needle when they were getting shots (OR=2.0,  $p<0.05$ ), and significantly more girls gave advice to others to use condoms to prevent HIV (OR=2.0,  $p<0.05$ ). With regards to HIV testing, significantly more girls in the intervention group reported knowing where to go to get an HIV test (OR=2.6,  $p<0.05$ ), although none had been tested and none knew anyone else who had been tested.

For women (Table 5B), the intervention had a similar positive impact on HIV knowledge and attitudes: Women in the intervention group were significantly more likely to have heard of HIV (OR=2.5,  $p<0.05$ ) and STIs (OR=2.1,  $p<0.05$ ) and were more likely to be aware of sexual (OR=3.0,  $p<0.05$ ), parenteral (OR=2.2,  $p<0.05$ ), and perinatal (OR=2.0,  $p<0.05$ ) transmission risks. Unlike girls, there was no impact on the incorrect belief that one can get HIV through an embrace. As with girls, significantly more women in the intervention group felt very confident that they would be able to take steps to prevent HIV in the future (OR=2.4,  $p<0.05$ ). After the intervention, women were also significantly more likely to report being comfortable talking to their families about HIV prevention (OR=2.7,  $p=0.05$ ).

In the analysis of HIV prevention behaviors, significantly more women confirmed use of a clean needle when they were getting shots (OR=3.1,  $p<0.05$ ), and gave advice to others to use condoms to prevent HIV (OR=5.3,  $p<0.05$ ). However, only a small percentage of women used condoms in the past three months in the intervention group (10%) and the control group (5%), and this behavior was not significantly impacted by the "Learning Game." With regards to HIV testing, as with the girls, testing and knowledge of others who had tested for HIV was virtually non-existent, despite the fact that 25%–29% had partners that traveled away from home for work and were likely at risk for HIV. More women in the intervention group did report knowing where to go to get an HIV test as compared to the control group (OR=1.8,  $p<0.10$ ) but the difference was not significant.

### **Importance of Motivated Animators**

In an analysis that explored the impact of motivated animators (as categorized by the proportion of required Games that were actually delivered, which matched well the qualitative scoring by the training staff of animator motivation level), girls who had motivated animators were significantly more likely to: 1) have heard of HIV (OR=13.5, p=0.01); 2) know that HIV is transmitted through used needles (OR=6.5, p=0.056); and 3) know that HIV is transmitted from a mother to her unborn baby (OR=12, p=0.015; and less likely to believe that HIV can be transmitted by embracing (OR=0.26, p=0.045). The learning among women, on the other hand, was not influenced by the motivation level of the animators.

### **Intervention Distribution Cost**

While a formal cost analysis was not planned for this evaluation, we estimated cost of dissemination for the Reach program to train 712 SHPIs to deliver the Games to approximately 35,000 adolescent girls and 405,690 women over a 2.5-year period. Our cost estimate was based on total annual Reach India expenses, including training of SHPIs and other follow-up services, divided by total outreach to girls and women.<sup>10</sup> With these assumptions, the actual training cost of the intervention was approximately 78 cents per girl/woman who received services. This does not include the external expenses of delivering the education, which SHPIs choose to bear, given the private-sector franchise approach of Reach India. While in our evaluation we provided a minimal subsidy to the SHPI for the increased reporting required (\$2.55 per client in intervention), in the context of the full Reach India program no subsidies were paid for the estimated 35,000 girls who received the HIV and Savings sessions.

## **Discussion**

In this analysis, we demonstrated that it is possible to leverage SHGs to reach women and adolescent girls with education on sensitive health topics at minimal expense. When scaling up health interventions for SHGs, the delivery rates of interventions will likely be influenced by the financial health and institutional commitment of the SHPI to deliver educational services. The SHPI increased emphasis on debt collection during the evaluation period resulted in a decreased emphasis on education delivery and lower participation rates in the SHGs.

The financial data also suggests that at some point between the 6- and 12-month evaluations, there was a decrease in financial health of the communities, based on the decreased number of times people put savings aside at 12 months and on the qualitative interviews with the community members.

*"The prices of essential commodities have gone up immensely this past year. We used to get potatoes at 8 rupees a kg but now we are paying 20 rupees for the same." (Father)*

Despite this economic trend, we did see a significant increase in savings from baseline to 12-month follow-up for the intent-to-treat group but not for the control group, which may have been due to the intervention. However, the difference in savings at 12-month follow-up was not significantly different between groups. The increase in savings amounts and a reduction in the use of savings suggest that although they were saving less often, the intent-to-treat and control groups were either working to sustain their savings or slowly building their savings. The demonstrated savings behaviors among both the intervention and control groups may have been due to prior learning within their SHG.

It is likely that to further impact poverty among adolescent groups, additional interventions may be necessary beyond savings education. Savings behaviors might have manifested themselves more clearly, at least for the girls, had there been a more formal mechanism for them to save in a secure environment.

The predominant impact demonstrated in this project was observed with the HIV Learning Game, which showed significant improvements in knowledge, attitudes, and in some of the limited behaviors that we were able to measure among women and girls. Because of community-level sensitivities of any questions about sexual behaviors among girls and women, several questions were removed. Consequently, measuring HIV behavior-change—already challenged by the short evaluation period—was reduced to measuring clean-needle use for health care, HIV-testing behaviors, and married women’s behaviors regarding condom use.

We also acknowledge that for married women, it is unlikely that condom use would increase without provision of condoms, or that HIV-testing rates would change in the short term without provision of point-of-care rapid HIV testing. With a longer time frame for follow-up, or provision of these additional services, we may have seen the observed knowledge changes result in additional behavior changes for HIV prevention.

In the qualitative research, we found that women did not like their daughters receiving the intervention if they had not also received it or if they were not aware of the content, because their daughters arrived home asking questions that mothers felt they could not answer. However, some were equally appreciative that a difficult topic was introduced without their initiative.

*“Some of the questions were embarrassing and made the girls ask us embarrassing questions back home. We could not face them, as they know nothing about those things yet.” (Mother)*

*“These topics are important and as mothers I don’t think that we could have ever raised the topic at all with our daughters had the Games not taken place.” (Mother)*

We also found that daughters were more comfortable discussing sexual health when women were not present, because they could speak more freely among their peers.

*“We don’t want elders to attend the Games. We are not able to be free enough in front of them. It is better that we attend these sessions by ourselves.” (Girl)*

Increasing the comfort level of the animators was also important before provision of HIV-prevention education to the girls. Because many of the animators expressed discomfort with the content of the material and with their ability to deliver the information, additional staff training in community preparation and in facilitation and monitoring of the Games on HIV prevention was planned. With this additional support, the Games delivered on HIV/AIDS impacted knowledge, attitudes, and behaviors. Success of the intervention, however, was dependent on the motivation level of the animator. How one identifies and creates effective animators to deliver combined financial and health interventions is a topic for future exploration.

Not surprisingly, our study showed that context had a critical influence on success of the dissemination of the intervention. However, the CBRCT design allowed us to detect significant impact, even when the delivery rate of the intervention was relatively low. We believe that the data gathered in our

evaluation is generalizable to the rest of the Reach program. The generalizability of our findings is also strengthened by findings from a recent Freedom from Hunger evaluation of the HIV module in Benin where similar outcomes were noted.<sup>11</sup>

For HIV prevention in the general population of women, the areas of behavior change that are most important to impact are arguably condom use by women whose partners are truck drivers or migrant workers and are more likely to visit sex workers in high-prevalence networks, and HIV testing among these women and their partners.<sup>12</sup> Given that women now account for approximately 39% of adult infections, and that the overwhelming majority of infections in India occur through heterosexual sex, women who believe they are in monogamous relationships are becoming infected because their husbands have had multiple sexual partners.<sup>12</sup> In our study population, over 25% of married women had husbands who traveled away from home for work; thus these women may be at high risk for HIV and could be targeted for additional HIV-prevention services. Given that couples who know they are discordant for HIV are significantly more likely to use condoms to prevent further transmission,<sup>13</sup> educating adolescents and women who are married to migrant workers and truck drivers about HIV prevention and the importance of HIV testing, is critical. In this study, the Learning Game model of education was shown to be low-cost, scalable, and effective. Content of the HIV/AIDS Learning Game should evolve to address key messaging as knowledge of the changing epidemic evolves.

The HIV Game reached approximately 35,000 girls and women through SHGs supported by the broader Reach India program. This approach to education is low-cost, scalable, and sustainable. The next frontier will be to determine effective implementation strategies to further strengthen the impact on HIV prevention by combining HIV education with HIV testing and dissemination of HIV-prevention products, to test the relative cost and impact of SHG-delivered services as compared to linkages to other organizations for more comprehensive care, and to determine the relative cost and benefit that mobile technologies may have on the acceptability, quality, and effectiveness of the Learning Games.

When scaling up a combined financial and health intervention, embedding a CBRCT and a mixed-method evaluation provided critical insight to allow program design optimization and to measure actual impact. Complementing the evaluation plan with a formal cost-effectiveness and financial sustainability analysis will be important additional methodologies to understand how best to take new global health interventions to scale.

### **Contributors**

All authors edited drafts of the report. FS, BC, SC, SK, and BG were responsible for the conception and design of the study. SK, SC, and BG managed overall supervision of the trial. SC and BG managed the project and the relationships with local research firms. FS, BC, and JK were responsible for data analysis and interpretation. FS, BC, SC, and BG wrote the first draft of the report. BG and SK are guarantors for the report.

### **Conflict of Interest Statement**

We declare that we have no conflicts of interest.

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## REFERENCES

- 1 Rao KS. Towards containing HIV/AIDS epidemic in India: policies and priorities under National AIDS Control Programme Phase-III (2007-12). *J Indian Med Assoc* 2009; 107:274–75.
- 2 Nath A. HIV/AIDS and Indian youth—a review of the literature (1980-2008). *SAHARA J.* 2009; 6:2–8. Review.
- 3 Soletti AB, Guilamo-Ramos V, Burnette D, Sharma S, Bouris A. India–US collaboration to prevent adolescent HIV infection: the feasibility of a family-based HIV-prevention intervention for rural Indian youth. [Online] 2009; [cited 2010 Aug 19]; Available from: URL: <http://www.jiasociety.org/content/12/1/>
- 4 Srinivasan N. *Microfinance India: State of the Sector Report 2009*. New Delhi (India): Sage Publications Pvt. Ltd.; 2009.
- 5 Tripathy P, Nair N, Barnett S, Mahapatra R, Borghi J, Rath S et al. Effect of a participatory intervention with women’s groups on birth outcomes and maternal depression in Jharkhand and Orissa, India: a cluster-randomized controlled trial. *Lancet* 2010;375:1182–92 | Manandhar DS, Osrin D, Shrestha BP, Mesko N, Morrison J, Tumbahangphe KM, et al. Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *Lancet* 2004;364:970–79 | Sherer RD Jr, Bronson JD, Teter CJ, Wykoff RF. Microeconomic loans and health education to families in impoverished communities: implications for the HIV pandemic. *J Int Assoc Physicians AIDS Care* 2004; 3:110–14 | Kim J, Ferrari G, Abramsky T, Watts C, Hargreaves J, Morison L, et al. Assessing the incremental effects of combining economic and health interventions: the IMAGE study in South Africa. *Bull World Health Organ* 2009; 87:824–32.
- 6 From microfinance to macro change: integrating health education and microfinance to empower women and reduce poverty. [Online] 2006; [cited 2010 Aug 19]; Available from: URL: [http://www.unfpa.org/upload/lib\\_pub\\_file/530\\_filename\\_advocacy](http://www.unfpa.org/upload/lib_pub_file/530_filename_advocacy)
- 7 National Family and Health Survey, India 2006. Mumbai (India): International Institute for Population Sciences | Development initiative on supporting healthy adolescents. Washington, D.C.: International Center for Research on Women; 2004 | Melgar-Quiñonez HR, Zubieta AC, MKNelly B, Nteziyaremye A, Gerardo MFD, Dunford C. Household food insecurity and food expenditure in Bolivia, Burkina Faso, and the Philippines. *J Nutr* 2006; 136:1431S-1437S | Shreiner, M. A simple poverty scorecard for India. [Online] [2008?]; [cited 2010 Aug 19]; Available from: URL: [http://www.microfinance.com/English/Papers/Scoring\\_Poverty\\_India.pdf](http://www.microfinance.com/English/Papers/Scoring_Poverty_India.pdf)
- 8 Raudenbush SW, Bryk AS. *Hierarchical linear models: applications and data analysis methods*. 2<sup>nd</sup> ed. Newbury Park (CA): Sage Publications; 2002.
- 9 Snijders T, Bosker R. *Multilevel analysis: an introduction to basic and advanced multilevel modeling*. Thousand Oakes (CA): Sage Publications; 1999.
- 10 Chanani S, Gray, B. *Reach India cascading report: outcomes of the post mini-survey on learning games for adolescent girls and their mothers administered by self-help promoting institutions (SHPIs)*. Davis (CA): Freedom from Hunger; 2010.

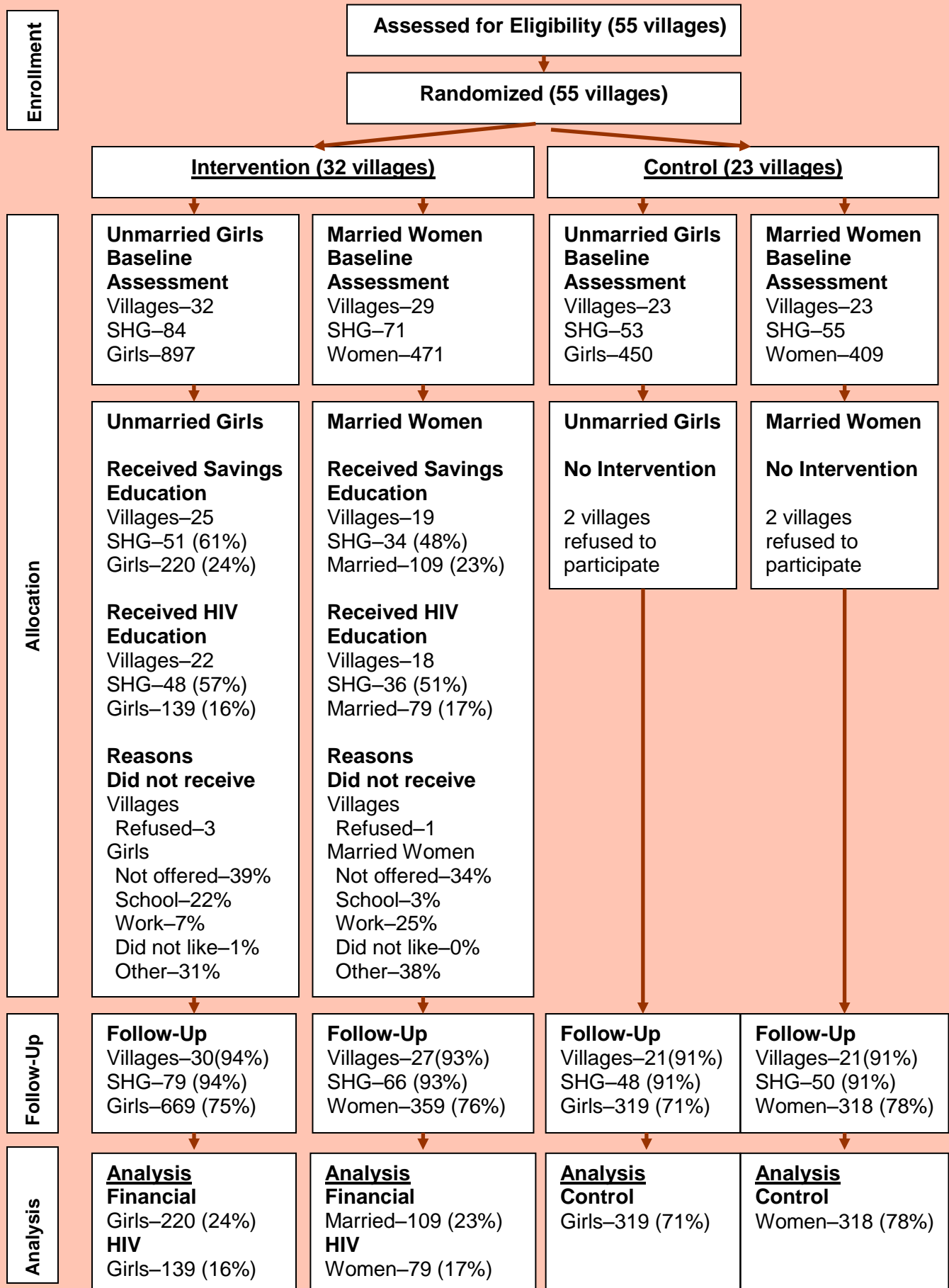
- 11 Gray, B. with T. Ekoue-Kouvahey. Microfinance and Health Protection Initiative Research Summary Report: PADME. Freedom from Hunger Research Paper No. 9d. Davis (CA): Freedom from Hunger; 2010.
- 12 UNGASS Country Progress Report 2008: India. National AIDS Control Organisation. Ministry of Health and Family Welfare. New Delhi, India. [Online] 2008; [cited 2010 March 31]; Available from: URL: [http://data.unaids.org/pub/Report/2008/india\\_2008\\_country\\_progress\\_report\\_en.pdf](http://data.unaids.org/pub/Report/2008/india_2008_country_progress_report_en.pdf).
- 13 Kumarasamy N, Venkatesh KK, Srikrishnan AK, Prasad L, Balakrishnan P, Murugavel KG et al. Couples at risk for HIV infection in Southern India: characteristics of HIV-infected patients in concordant and discordant heterosexual relationships. Int J STD AIDS. 2010; 21:96–100.

**TABLE 1. “Learning Games for Girls” Content**

<b>Learning Games for Adolescent Girls and Their Mothers</b>	
<b>Number and Title</b>	<b>Objectives</b>
1. Getting to Know Each Other	<ul style="list-style-type: none"> <li>▪ Identified themselves as thinkers, feelers, or doers</li> <li>▪ Reviewed how thinkers, feelers, and doers contribute to a group</li> <li>▪ Determine intervention participation</li> </ul>
2. Ways to Save Money*	<ul style="list-style-type: none"> <li>▪ Determined the easiest ways for them to try to save money</li> </ul>
3. Steps of Bargaining	<ul style="list-style-type: none"> <li>▪ Named items they can try to get a lower price for by bargaining</li> <li>▪ Practiced, or observed others practicing, using the steps of bargaining</li> </ul>
4. What to Spend Money On	<ul style="list-style-type: none"> <li>▪ Prioritised what they spend money on</li> </ul>
5. Making a Savings Plan*	<ul style="list-style-type: none"> <li>▪ Practiced making a savings plan</li> </ul>
6. How to Prevent and Treat Diarrhoea	<ul style="list-style-type: none"> <li>▪ Discussed ways to prevent and treat diarrhoea</li> </ul>
7. Practicing Hand-Washing	<ul style="list-style-type: none"> <li>▪ Analyzed why hand-washing is important and when to wash hands</li> <li>▪ Practiced the steps of hand-washing</li> </ul>
8. Knowing Our Bodies	<ul style="list-style-type: none"> <li>▪ Discussed the female and male reproductive systems and pregnancy</li> </ul>
9. Food and the Flag	<ul style="list-style-type: none"> <li>▪ Practiced how to use the colours of the flag to make healthy meals</li> </ul>
10. How to Protect Against HIV/AIDS*	<ul style="list-style-type: none"> <li>▪ Discussed ways that HIV is and is not spread</li> <li>▪ Identified ways to protect against HIV/AIDS</li> </ul>

\* Impact analysis presented in this manuscript

**Figure 1: Trial Profile**



**TABLE 2. Population characteristics**  
**Unmarried girl participants: Comparing groups**

Characteristic	Intent-to-treat	Attended HIV	Attended Savings	Control
No. of villages	30	22	25	21
Ave # SHGs	2.6	2.2	2.0	2.3
Range	(1, 6)	(1, 4)	(1, 3)	(1, 3)
No. of SHGs	79	48	51	48
Ave # Girls	8.5	2.9	4.3	6.6
Range	(1, 20)	(1, 8)	(1, 10)	(1, 25)
No. of Girls	669	139	220	319
Religion				
No. (%) of Hindus	497/669 (74) <sup>+++</sup>	101/139 (73) <sup>++</sup>	167/220 (76) <sup>+++</sup>	189/319 (59)
No. (%) of Muslims	172/669 (26)	38/139 (27)	53/220 (24)	130/319 (41)
Mean age (years)	15.1	15.0	14.7 <sup>++</sup>	15.5
No. (%) ever attended school	655/669 (98)	139/139 (100)	216/220 (98)	312/319 (98)
Mean poverty index score	36.7	34.5	36.4	35.0
No. (%) of food-insecure	166/668 (25)	36/139 (26)	46/220 (21)	78/318 (25)

**Married women participants: Comparing groups**

Characteristic	Intent-to-treat	Attended HIV	Attended Savings	Control
No. of villages	27	18	19	21
Ave # SHGs	2.4	2.0	1.8	2.4
Range	(1, 6)	(1, 6)	(1, 3)	(1, 3)
No. of SHGs	66	36	34	50
Ave # Women	5.4	2.2	3.2	6.4
Range	(1, 14)	(1, 8)	(1, 11)	(1, 19)
No. of women	359	79	109	318
Religion				
No. (%) of Hindus	225/359 (63) <sup>++</sup>	59/79 (75) <sup>+++</sup>	80/109 (73) <sup>+++</sup>	162/318 (51)
No. (%) of Muslims	134/359 (37)	20/79 (25)	29/109 (27)	156/318 (49)
Mean age (years)	31.3 <sup>+++</sup>	30.6 <sup>+++</sup>	32.0 <sup>++</sup>	35.0
No. (%) ever attended school	233/359 (65)	61/79 (77) <sup>++</sup>	71/109 (65)	184/318 (58)
Mean age when married (years)	16.2	16.5	16.5	16.0
Mean poverty index score	35.9	39.5	35.5	36.4
No. (%) of food-insecure	113/358 (32)	20/79 (25)	40/109 (37)	109/318 (34)
No. (%) of husbands who travel away for work	96/336 (29)	19/76 (25)	28/101(28)	76/291 (26)

Significant difference between each group and control: <sup>+</sup> p ≤ 0.05, <sup>++</sup> p ≤ 0.01, <sup>+++</sup> p ≤ 0.001

**TABLE 3. Financial Characteristics of Study Participants Over Time**

Characteristics	<u>Intent to Treat</u>			<u>Control</u>			<u>All</u>		
	Baseline	Midline	Endline	Baseline	Midline	Endline	Baseline	Midline	Endline
<b>Women Characteristics</b>									
Mean rupees earned in last year	1959	2161	1825	2038	2154	1925	1996	2158	1872
Mean rupees owed	32	121	114	92	30	23	60	78	71
Mean rupees given in last 3 months	280	478*	314	275	635	393	278	548	343
Mean savings	1416	1364	2389**	1710	1946	2143	1560	1650	2270
Mean # of times saved money	2.6	7.6*	2.3**	2.8	5.5*	3.3**	2.7	6.6*	2.7**
Food-insecure (%)	29.5	--	31.6	31.1	--	34.3	30.3	--	32.8
Used savings in past 6 months (%)	26.2	52.1*	33.4**	28.6	46.9*	34.6**	27.3	49.6*	34.0**
Have current plan to save for something (%)	84.4	95.8*	87.7**	87.1	93.1*	86.8**	85.7	94.5*	87.3**
Highly satisfied with current savings (%)	--	16.8	19.1	--	17.6	24.0**	--	17.3	21.4**
Highly motivated to put money into savings (%)	--	54.6	42.1**	--	51.3	44.3	--	53.0	43.1**
<b>Girl Characteristics</b>									
Mean rupees earned in last year	801	926	864	802	1110*	889	802	985*	872
Mean rupees owed	26	18	9**	12	32	41	21	23	19
Mean rupees given in last 3 months	128	141	103	160	100	186	138	128	129
Mean savings	430	306	620	267	459*	616	374	354	619
Mean # of times saved money	2.1	6.9*	2.2**	1.4	5.9*	2.5**	1.9	6.6*	2.3**
Food-insecure (%)	20.6	--	24.9	22.6	--	24.5	21.3	--	24.8
Used savings in past 6 months (%)	25.7	50.4*	28.3**	19.4	48.0*	25.7**	23.7	49.7*	27.4**
Have current plan to save for something (%)	78.2	90.4*	84.3**	77.4	88.1*	84.3	77.9	89.7*	84.3**
Highly satisfied with current savings (%)	--	17.8	16.9	--	11.3	13.6	--	15.7	15.9
Highly motivated to put money into savings (%)	--	46.2	37.5**	--	37.6	31.1	--	43.2	35.5**

\*Paired t-test or McNemar's Test p-value &lt;.05 for baseline to midline comparison

\*\*Paired t-test or McNemar's Test p-value &lt;.05 for midline to endline comparison

**TABLE 4. Cluster Randomized Trial Analysis at Follow-Up–Savings Education**

<u>Unmarried Girls Results</u>	Intervention	Control	Intracluster	Adjusted Odds	Adjusted $\chi^2$	
Variable	No (%)	No (%)	correlation	Ratio (95% CI)	Statistic	p Value
Number of Villages	25	21				
Ave # SHGs	2.0	2.3				
Range	(1, 3)	(1, 3)				
Number of SHGs	51	48				
Ave # participants	4.3	6.6				
Range	(1, 10)	(1, 25)				
Number of participants	220	319				
Know can save by setting money aside	185/220 (84)	260/319 (82)	0.170	1.3 (0.6 to 2.8)	0.6	0.52
Have a plan for savings	190/220 (86)	269/319 (84)	0.081	1.3 (0.7 to 2.7)	0.4	0.42
Very motivated to save money over next 3 months	75/220 (34)	99/318 (31)	0.092	1.3 (0.8 to 2.2)	0.5	0.24
Have savings	85/220 (39)	126/319 (40)	0.056	1.0 (0.7 to 1.5)	0.1	0.10
Feel comfortable talking to family about income	169/214 (79)	229/309 (74)	0.077	0.6 (0.3 to 1.2)	1.6	0.19
Believe they are the best person to make decisions about their money	52/162 (32)	110/319 (35)	0.018	1.1 (0.7 to 1.7)	0.2	0.77
<u>Married Women Results</u>	Intervention	Control	Intracluster	Adjusted Odds	Adjusted $\chi^2$	p Value
Variable	No (%)	No (%)	correlation	Ratio (95% CI)	Statistic*	
Number of Villages	19	21				
Ave # SHGs	1.8	2.4				
Range	(1, 3)	(1, 3)				
Number of SHGs	34	50				
Ave # SHGs	3.2	6.4				
Range	(1, 11)	(1, 19)				
Number of participants	109	318				
Know can save by setting money aside	102/109 (94)	287/318 (90)	0.130	1.5 (0.4 to 5.7)	1.1	0.54
Have a plan for savings	99/109 (91)	276/318 (87)	0.076	1.4 (0.6 to 3.7)	1.2	0.45
Very motivated to save money over next 3 months	52/109 (48)	141/318 (44)	0.169	1.2 (0.6 to 2.5)	0.4	0.63
Have savings	85/109 (78)	243/318 (76)	0.128	1.0 (0.5 to 2.1)	0.1	0.97
Feel comfortable talking to family about income	95/107 (89)	277/306 (91)	0.156	1.3 (0.5 to 3.6)	0.3	0.61
Believe they are the best person to make decisions about their money	49/85 (58)	184/318 (58)	0.157	0.9 (0.5 to 1.8)	1.4	0.78

\*Adjustments made for village and SHG clusters, and for religion, age, and ever been to school



**TABLE 5A. Cluster Randomized Trial Analysis at Follow-Up—HIV Education Unmarried Girls**

<u>Unmarried Girls Results</u> Variable	Intervention No (%)	Control No (%)	Intracluster correlation coefficient	Adjusted Odds Ratio (95% CI)	Adjusted $\chi^2$ Statistic	p Value
Number of Villages	22	21				
Ave # SHGs	2.2	2.3				
Range	(1, 4)	(1, 3)				
Number of SHGs	48	48				
Ave # participants	2.9	6.6				
Range	(1, 8)	(1, 25)				
Number of participants	139	319				
Heard of HIV	91/139 (66)	147/318 (46)	0.206	3.6 (1.6 to 8.0)	14.4	<0.05
Heard of Sexually Transmitted Infections	69/139 (50)	106/318 (33)	0.172	2.8 (1.4 to 5.9)	10.9	<0.05
Know that HIV can be transmitted through vaginal sex	70/139 (50)	106/318 (33)	0.176	3.2 (1.6 to 6.5)	11.8	<0.05
Know that HIV can be transmitted through used needles	82/139 (59)	125/318 (39)	0.204	3.5 (1.6 to 7.6)	15.1	<0.05
Know that HIV can be transmitted from a mother to a baby	75/139 (54)	105/318 (36)	0.191	3.0 (1.5 to 6.4)	13.1	<0.05
Wrongly believe that HIV can be transmitted through embracing	27/91 (30)	69/147 (47)	0.087	2.1 (1.0 to 4.3)	7.0	<0.05
Know that condoms can prevent HIV	49/139 (35)	71/318 (22)	0.111	2.9 (1.5 to 5.7)	8.3	<0.05
Sexually active past three months	N/A	N/A	--	--	--	--
Used condoms ever when having sex past three months	N/A	N/A	--	--	--	--
Confirmed clean needle with shot or immunization past three months	14/109 (13)	13/259 (5)	0.150	2.0 (1.1 to 3.8)	6.9	<0.05
Had an HIV test	0/137 (0)	1/318 (0)	--	--	--	--
Know someone who has had an HIV test	0/135 (0)	1/299 (0)	--	--	--	--
Know where to go to get an HIV test	27/137 (20)	38/317 (12)	0.131	2.6 (1.1 to 6.3)	4.7	<0.05
Feel comfortable talking to family about preventing HIV	44/112 (39)	74/218 (34)	0.147	1.6 (0.7 to 3.3)	0.9	0.26
Gave advice to use condoms to prevent HIV past three months	5/58 (9)	5/180 (3)	0.386	14.2 (2.2 to 90.8)	3.7	<0.05
Feel very confident in ability to take steps to prevent getting HIV in the future	41/139 (30)	56/317 (18)	0.114	2.4 (1.3 to 4.5)	8.1	<0.05

**TABLE 5B. Cluster Randomized Trial Analysis at Follow Up—HIV Education Married Women**

<u>Married Women Results</u> Variable	Intervention No (%)	Control No (%)	Intracluster correlation coefficient	Adjusted Odds Ratio (95% CI)	Adjusted $\chi^2$ Statistic*	p Value
Number of Villages	18	21				
Ave # SHGs	2.0	2.4				
Range	(1, 6)	(1, 3)				
Number of SHGs	36	50				
Ave # SHGs	2.2	6.4				
Range	(1, 8)	(1, 19)				
Number of participants	79	318				
Husband who travels for work	19/76 (25)	76/291 (26)				
Heard of HIV	50/79 (79)	165/318 (52)	0.183	2.5 (1.2 to 5.1)	18.3	<0.05
Heard of Sexually Transmitted Infections	62/79 (63)	121/318 (38)	0.171	2.1 (1.1 to 4.3)	16.4	<0.05
Know that HIV can be transmitted through vaginal sex	55/79 (70)	125/318 (39)	0.200	3.0 (1.4 to 6.3)	23.5	<0.05
Know that HIV can be transmitted through used needles	52/79 (66)	128/318 (40)	0.170	2.2 (1.1 to 4.3)	16.7	<0.05
Know that HIV can be transmitted from a mother to a baby	49/79 (62)	124/318 (39)	0.117	2.0 (1.0 to 3.8)	13.7	0.05
Wrongly believe that HIV can be transmitted through embracing	28/63 (44)	80/165 (49)	0.066	1.0 (0.5 to 1.9)	0.3	0.97
Know that condoms can prevent HIV	45/79 (57)	114/318 (36)	0.093	1.7 (0.9 to 3.2)	0.8	0.08
Sexually active past three months	79/79 (100)	248/304 (82)	--	--	--	--
Used condoms ever when having sex past three months	7/73 (10)	13/251 (5)	--	--	--	--
Confirmed clean needle with shot or immunization past three months	14/56 (25)	23/258 (9)	0.201	3.1 (1.1 to 9.0)	11.5	<0.05
Had an HIV test	1/78 (1)	1/316 (0)	--	--	--	--
Know someone who has had an HIV test	0/79 (0)	1/295 (0)	--	--	--	--
Know where to go to get an HIV test	23/79 (29)	47/318 (15)	0.077	1.8 (0.9 to 3.4)	0.9	0.10
Feel comfortable talking to family about preventing HIV	43/62 (69)	107/228 (47)	0.240	2.7 (1.1 to 6.4)	9.8	<0.05
Gave advice to use condoms to prevent HIV past three months	7/27 (26)	7/167 (4)	0.192	5.3 (1.5 to 19.1)	16.4	<0.05
Feel very confident in ability to take steps to prevent getting HIV in the future	33/79 (42)	63/318 (20)	0.210	2.6 (1.1 to 6.2)	16.7	<0.05

\*Adjustments made for village and SHG clusters, and for religion, age, and ever been to school