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Assessing the incremental effects of combining economic and health interventions: the IMAGE study in South Africa

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. المقالة لهذه الكامل النص نهاية في الخلاصة لهذه العربية الترجمة.

Abstract

Objective To explore whether adding a gender and HIV training programme to microfinance initiatives can lead to health and social benefits beyond those achieved by microfinance alone.

Methods Cross-sectional data were derived from three randomly selected matched clusters in rural South Africa: (i) 4 villages with 2-year exposure to the Intervention with Microfinance for AIDS and Gender Equity (IMAGE), a combined microfinance–health training intervention; (ii) 4 villages with 2-year exposure to microfinance services alone; (iii) and 4 control villages not targeted by any intervention. Adjusted risk ratios (aRRs) employing village-level summaries compared associations between groups in relation to indicators of economic well-being, empowerment, intimate partner violence (IPV) and HIV risk behaviour. The magnitude and consistency of aRRs allowed for an estimate of incremental effects.

Findings A total of 1409 participants were enrolled, all female, with a median age of 45. After 2 years, both the microfinance-only group and the IMAGE group showed economic improvements relative to the control group. However, only the IMAGE group

demonstrated consistent associations across all domains with regard to women's empowerment, intimate-partner violence and HIV risk behaviour.

Conclusion The addition of a training component to group-based microfinance programmes may be critical for achieving broader health benefits. Donor agencies should encourage intersectoral partnerships that can foster synergy and broaden the health and social effects of economic interventions such as microfinance.

Introduction

The United Nations Millennium Development Goals have articulated a global agenda that explicitly recognizes the importance of addressing the intersections between poverty, gender inequalities and health.[1] Microfinance programmes expand access to credit and savings services. Globally they reach over 100 million poor clients, most of them women.[2] In addition to the economic benefits of microfinance, there is some evidence to suggest that it may be an effective vehicle for empowering women. Acquiring new business skills may enhance their self-esteem, self-confidence, conflict-resolution ability and household decision-making power and expand their social networks.[3–5] Reductions in child mortality and improvements in nutrition, immunization coverage and contraceptive use have also been demonstrated,[3,6–8] which has sparked interest in the potential of microfinance to bring about improvements in connection with other health-related issues, such as HIV/AIDS and gender-based violence.[9–12]

Both HIV/AIDS and intimate-partner violence (IPV) are major public health challenges in sub-Saharan Africa. In South Africa alone, 29.1% of women visiting public antenatal clinics in 2006 were HIV-positive,[13] and national prevalence surveys suggest that women and girls make up 55% of the HIV-infected population.[14] In addition, 1 in 4 South African women reports having experienced IPV,[15] which has been identified as an independent risk factor for HIV infection.[16]

We conducted the Intervention with Microfinance for AIDS and Gender Equity (IMAGE) study, a cluster randomized trial, to evaluate the effect of a combined microfinance and training intervention on poverty, gender inequalities, intimate-partner violence and HIV/AIDS. Carried out in rural South Africa, IMAGE combined group-based microfinance with a 12-month gender and HIV training curriculum. Women received the training at loan meetings held every two weeks. After 2 years, IMAGE participants showed improvements in economic well-being and multiple dimensions of empowerment.[17] Furthermore, levels of physical and sexual IPV were 55% lower among IMAGE participants compared with controls,[18] and young

programme participants reported higher levels of HIV-related communication and HIV testing and greater condom use with non-spousal partners.[19]

These findings highlight the potential synergy that can be generated by integrating targeted public health interventions into development initiatives such as microfinance. By addressing the immediate economic priorities of participants, IMAGE was able to gain access to a particularly vulnerable target group and to maintain sustained contact for over one year – a critical opportunity rarely afforded to stand-alone health interventions.

Because the IMAGE study tested a combined microfinance–training model, the findings raise additional policy- and programme-related questions. For example, how much of the observed effect is attributable to the microfinance component of the intervention and how much to the training programme? In a donor climate where microfinance institutions are under growing pressure to recover their operational costs and achieve financial sustainability, what added value does health training contribute? Is it possible that the provision of microfinance services alone would produce a similar range of economic, social and health benefits?

To address these questions, we analysed data from villages participating in IMAGE, matched villages receiving microfinance alone and a control group. Our analysis compared indicators of economic well-being, empowerment, IPV and HIV-risk behaviour in these three groups after similar duration of exposure.

Methods

The study was conducted between June 2001 and March 2005 in rural Limpopo province, an area where, despite South Africa's status as a middle-income country, poverty remains widespread and more than 60% of adults are unemployed.[20,21]

Study design

Data on IMAGE participants and controls were derived from a cluster randomized trial and are presented in detail elsewhere.[18] Briefly, the socioeconomic characteristics of villages in the study site were assessed through field reconnaissance surveys and interviews with village leaders and community members. Eight villages were then pair-matched according to size and accessibility, and one village from each pair was randomly allocated to receive the intervention at study onset; the other received the intervention on study completion. In both sets of villages, eligible

intervention participants were recruited on the basis of participatory wealth ranking criteria, which were used to identify women aged 18 years and over from the poorest households in each village.[22] Women from control villages were matched by age and poverty status and were recruited contemporaneously. Surveys were conducted in October 2004 and were scheduled such that all participants were evaluated at a uniform point in time: 24 months following the introduction of IMAGE.[18]

Surveys were conducted by a team of female researchers who had received 4 weeks of intensive training that included technical, ethical and safety considerations in conducting research on HIV and IPV.[23] The construction of outcome indicators has been described in detail elsewhere.[17,18] Indicators measuring economic well-being and empowerment were drawn from the development and microfinance literature, piloted and then adapted to the local South African context. Quantitative indicators of empowerment included measures of self-confidence, financial confidence, challenging of gender norms, relationship with partner, autonomy in decision-making, perceived contribution to the household and social group membership. Measures of IPV assessed participants' attitudes towards and experiences of physical and sexual violence by an intimate partner, and were drawn from the WHO Violence Against Women Instrument.[24] In each interview women were asked directly about their experience of different acts of physical or sexual violence by male partners, ever and in the past year. They were also asked about their experience of controlling behaviour by an intimate partner in the past year and about their attitudes towards the acceptability of IPV in different circumstances. HIV-related indicators captured information about sexual behaviour, household communication and collective action against HIV/AIDS.

To identify a comparable group of villages receiving microfinance alone (MF-only), a stratified random sample was generated from villages where microfinance projects were being implemented without the training component. As before, individual participants were recruited on the basis of participatory wealth ranking. Villages were eligible for inclusion in the sampling frame if they met three criteria: (i) no prior exposure to microfinance; (ii) 2-year exposure to MF-only; (iii) a socioeconomic and cultural context similar to that of the IMAGE and control villages (assessed through field reconnaissance surveys and interviews with community members). Eleven villages meeting those criteria were identified and were grouped according to

size and accessibility. Villages were then randomly selected to generate 4 villages matching the characteristics of the IMAGE and control groups.

A survey of MF-only participants was undertaken in these villages in February 2006, 24 months following the introduction of the MF-only intervention. A list of all women who had received a loan during the previous 2 years was generated. Data were collected from all individuals who had joined the programme, regardless of whether they were still participating 2 years later. Data were thus collected on both current participants and drop-outs. Outcome data were collected in face-to-face interviews by members of the same research team with survey tools from the original trial.

Microfinance-only intervention

The microfinance component was implemented by the Small Enterprise Foundation, a South African nongovernmental organization (NGO) with over 60 000 active clients. The Grameen Bank model[25] was applied, with groups of five women serving as guarantors for one another's loans and all five having to repay before any member of the group was eligible for more credit. Loans were used to support a range of small businesses (e.g. selling fruit and vegetables, second-hand clothes and other products). Loan centres consisting of approximately 40 women (8 groups of 5) met fortnightly to make loan payments, apply for additional credit and discuss business plans.

IMAGE

In addition to the microfinance component described above, IMAGE included a participatory learning programme called "Sisters for Life", which was integrated into the fortnightly loan centre meetings. The programme comprised two phases, delivered over 12–15 months. Phase 1 (first 6 months) consisted of ten 1-hour training sessions and covered topics including gender roles, cultural beliefs, power relations, self-esteem, communication, domestic violence and HIV. Participatory methods were used with a view to increasing confidence, communication skills and critical thinking. Phase 2 encouraged wider community mobilization to engage youth and men in the intervention villages. Women deemed "natural leaders" by their peers were elected by loan centres to undertake a further week of training and subsequently worked with their centres to address priority issues, including HIV and IPV. The Sisters for Life programme was developed and piloted in conjunction with a South African NGO and was delivered alongside microfinance

services by a separate team of trainers. Further details about the intervention have been published elsewhere.[26]

Control group

Women in the control group received neither IMAGE nor microfinance-only interventions during the study period; however, IMAGE was implemented in control villages at study conclusion.

Data analysis

Our analysis first compared baseline sociodemographic data from the 2001 South African census[27] for the three study groups. Analysis of outcome data involved three two-way comparisons: MF-only versus control, IMAGE versus control and IMAGE versus MF-only. Since the interventions were administered at the village level, cluster analysis was performed. For each comparison, crude measures of effect (prevalence or risk ratios, identified as RRs) with 95% confidence intervals (CIs) were calculated by entering the log of village-level summaries, weighted by village denominator, into an analysis of variance model that included terms for intervention and village triplet.

To control for possible baseline imbalances between women in intervention and control groups, we calculated adjusted measures of effect (aRRs) by means of a 2-stage process. First, using a logistic regression model fitted to individual-level data from control villages, we derived expected outcomes for each village on the basis of age, marital status, education, parity and sex of the household head for each respondent. We then entered standardized village-level summaries of the ratio of observed to expected outcomes into an analysis of variance model as described above. Stata version 9.0 (StataCorp, College Station, Texas, USA) was used to perform all statistical analyses. In addition to recording results for individual indicators, we assessed the consistency of patterns (direction and magnitude of effect) for all indicators within each of the four outcome domains: economic well-being, empowerment, IPV and HIV risk behaviour.

Informed consent was obtained from all participants. The study was approved by institutional review boards at the University of the Witwatersrand (South Africa) and the London School of Hygiene and Tropical Medicine (United Kingdom).

Results

Study enrolment and baseline characteristics

A total of 1409 participants were enrolled into the interventions or recruited as controls. Of these, 363 of 430 (84%) in the control group, 480 of 549 (87%) in the MF-only group and 387 of 430 (90%) in the IMAGE group were successfully interviewed at 2 years post-intervention. In all groups the median age was similar (43–49 years) and married women outnumbered single, divorced, separated or widowed women (Table 1). At the village level, the three groups were broadly similar in terms of pre-intervention sociodemographic characteristics, including household size, age, sex, income, employment and education.

Comparative analysis

Table 2 shows the results of the analysis comparing intervention effects among the three study groups. These results are summarized graphically in Fig. 1.

Microfinance only versus control

Evaluation of the effects of MF-only intervention against the control group revealed a clear pattern of improvement across all nine indicators of economic well-being, including household asset value, ability to repay debts and ability to meet basic household needs. For all economic variables, intervention effects were in the same direction, with aRRs ranging from 1.22 to 3.38 and CIs excluding 1 for most indicators. However, this same degree of consistency was not observed across the empowerment, IPV or HIV-related variables, where the direction of intervention effects varied among the indicators in each domain.

IMAGE versus control

Comparison of the effects of IMAGE against the control group showed a clear and consistent pattern of improvement in all 24 indicators across all domains. These included all indicators of economic well-being, empowerment (e.g. greater self-confidence, autonomy in decision-making, and larger social networks), intimate-partner violence (including reduction in past-year experience of physical or sexual IPV) and HIV risk behaviour (including increased condom use at last sex with a non-spousal partner). For all these variables, aRRs indicated a positive intervention effect, with many attaining statistical significance.

Microfinance only versus IMAGE

When the effects of MF-only intervention were compared with those of IMAGE, there was no clear pattern to suggest that one of the two types of intervention had produced greater improvements in economic well-being. However, IMAGE consistently showed greater effect on all variables relating to empowerment, IPV and HIV risk behaviour, and in many cases the change was statistically significant.

Discussion

This study set out to explore whether a complex intervention that combines a gender and HIV training programme with group-based microfinance can lead to health and social benefits beyond those achieved through microfinance alone. After two years, both the villages that received microfinance-only interventions and those that received the combined microfinance–training intervention (IMAGE) were found to have higher levels of economic well-being than matched control villages. However, only the combined intervention was associated with a wider range of effects in relation to women's empowerment, reduced risk of intimate-partner violence and HIV protective behaviour. These findings lend support to the hypothesis that adding a health component to a conventional poverty reduction programme can create synergies that may be critical for achieving broader health and social benefits.

The study had several strengths, including efforts to ensure comparability between villages within the three study groups, age- and poverty-matching among participants and cluster-level analysis of outcomes. Outcome indicators were defined before analysis, and the analysis controlled for potential confounding factors. Despite the small number of villages and limited study power to detect cluster-level differences, statistically significant associations were evident for many indicators. What was, however, more striking was the consistent pattern of associations that emerged across all predefined health and social domains when the incremental effects of the combined intervention versus microfinance alone were examined.

We presented measures of effect and confidence intervals for all findings (Table 2), thereby allowing readers to judge the strength of the evidence for themselves. Many of these results were not "significant" in that they did not allow us to reject the null hypothesis of no effect at the 5% significance level. However, researchers recognize that, in addition to significance tests, the directionality, consistency and congruency of observed outcomes are important in evaluating complex interventions with multiple outcomes.[28] Taken together, we feel

that the data we present in Table 2 and Fig. 1 help to paint a picture of the relative contribution of the intervention components and also illustrate the remarkable consistency of observed changes in predefined indicators and the congruency between pathway variables and health outcomes.

The study also had several limitations. The data employed in the analysis were essentially cross-sectional and were collected after two years of exposure to the interventions. Consequently, it is difficult to make definitive statements about causality. However, villages were randomly selected after careful matching, and national census data suggest that the three study groups had similar baseline characteristics. As participants self-selected to join the MF-only or IMAGE interventions, there may have been unmeasured differences between the intervention groups and the control group. However, it is unlikely that this selection bias would influence comparisons between the IMAGE and MF-only groups, since both types of intervention required a similar time commitment – a factor that minimizes a form of bias common to evaluations of microfinance programmes.[30] Finally, self-reported outcomes may be subject to bias, although the direction of such bias is difficult to predict. It has been noted that heightened sensitization to issues relating to gender-based violence can lead to increased reporting of IPV,[23] a bias that would tend to underestimate the added value of IMAGE over the MF-only intervention.

Why might additional inputs, such as the IMAGE training programme, be important for achieving wider health and social effects? Critics of microfinance have long questioned whether, in the absence of efforts to address broader gender inequalities, simply providing financial services to women can be truly empowering. They note that offering credit to women does not necessarily guarantee their control over its use, and that the pressure to pay back loans can add to the already heavy burden of responsibilities borne by poor women.[30–32] Moreover, while some studies have suggested that participation in microfinance can reduce the risk of IPV,[32–34] others have noted that attempting to empower women may exacerbate this risk by challenging established gender norms, and provoking conflict within the household.[4,35–37] Our study found that provision of the microfinance-only intervention did not exacerbate the risk of past-year IPV, as compared with a matched control group; however, neither did it reduce this risk. Lower IPV risk was observed only in the IMAGE group. Qualitative data from that group suggest that reductions in violence resulted from a range of responses to the intervention that enabled women

to challenge the acceptability of violence, expect and receive better treatment from partners, leave violent relationships, give material and moral support to those experiencing abuse, mobilize new and existing community groups and raise public awareness about the need to address domestic violence.[17]

This study and others suggest several potential strategies for maximizing the health and social benefits of development programmes such as microfinance. Many authors have pointed out that training content is critical in catalysing health gains, noting that it should include an explicit gender focus, raise awareness about gender roles and cultural beliefs and provide an opportunity for women to discuss often stigmatized subjects such as sexuality, HIV/AIDS and gender-based violence in a safe environment.[5,37–40] Others have stressed the importance of the training process, in particular the value of participatory, group-based learning. In HIV/AIDS education, group-based interventions have been found to foster critical analysis, collaborative learning, communication skills, problem-solving and peer support, which, in turn, have been regarded as crucial to changing social norms and increasing knowledge, skills and solidarity among women – all important aspects of empowerment.[39–43] Recognizing the broader social and political context in which women's lives are situated, many authors have also highlighted the importance of engaging the broader community, including men and boys.[5,38,42–45]

IMAGE participants were able to communicate more openly with partners and family members about sexuality, HIV and domestic violence, and to share this knowledge with others in their communities.[17,46] Many entered traditionally male-dominated domains, such as police stations, schools and football clubs, engaging with traditional leaders and also organizing numerous village meetings and marches.[17,47] In similar programmes in India, women's participation in microfinance initiatives has formed the basis for organizing around issues such as dowry, domestic violence and alcohol abuse, and in Bangladesh, microfinance programmes have mobilized members to vote for the first time in elections.[38,48] In general, however, there has been little attempt to link microfinance to wider social and political activity.

The success of the microfinance sector to date has been impressive. Across a wide range of models, reported loan repayment rates, even among the poorest clients, often exceed 95%.[29,49] Global experience has demonstrated that microfinance institutions can recover all or most of their administrative costs through interest rates and user fees. Rapid growth and scaling-up are

thus possible, even when donor funds are limited.[49] Opportunities are now emerging for microfinance institutions to broaden their scope and benefits by more directly addressing health-related concerns, including reproductive health, HIV/AIDS and gender-based violence.[9,11,12] Doing so will not make sense for every programme and population, of course, and microfinance leaders are justifiably wary of weighing down their institutions with added responsibilities. But evidence is mounting to suggest that combining economic and health interventions can create powerful synergies and broaden effects in measurable ways. In Africa, Asia and Latin America, a growing number of programmes have successfully integrated health education, without compromising core financial services or sustainability.[9, 10,12,50] The time may be right for donor agencies to move beyond financial sustainability targets to encourage the kind of intersectoral partnerships that can broaden the health and social effects of microfinance and other poverty reduction programmes. Innovative and sustainable partnership models are already evolving, but further evaluation and scale-up will be vital.

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Competing interests

None declared.

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Table 1. **Village and individual characteristics of the IMAGE study population, Limpopo province, South Africa, 2001–2005**

Study population	Control	MF only	IMAGE
Villages			
No. enrolled	4	4	4
Households (no., range)	1647 (817–3334)	1489 (212–3099)	1129 (225–1918)
Average household size (mean no. of dwellers, range)	4.9 (4.5–5.0)	4.5 (4.3–4.9)	5.1 (5.0–5.1)
Female (%, range)	55 (54–56)	56 (55–60)	55 (54–57)
Aged under 15 years (%, range)	42 (40–44)	43 (40–44)	40 (39–44)
No income (%, range)	48 (36–56)	34 (25–47)	45 (42–48)
Unemployed (% of those of working age, range)	65 (60–79)	60 (52–80)	70 (68–73)
Completed primary education or higher (% of those of school age, range)	45 (40–55)	48 (41–52)	49 (39–52)
Individuals			
No. surveyed 2 years post-intervention	363	480	387
Age (median no., IQR)	44 (35–52)	49 (40–59)	43 (36–51)
Female-headed household (no., %)	232 (55)	225 (47)	206 (50)
Marital status			
Never married (no., %)	99 (27)	84 (18)	74 (19)
Currently married (no., %)	146 (40)	221 (46)	172 (45)
Divorced, separated, or widowed (no., %)	118 (33)	175 (36)	140 (36)
Microfinance indicators			
Loans taken (median no., IQR)	-	3 (2–4)	4 (3–4)
Largest loan (median no., IQR)	-	US$ 195 (150–240)[a]	US$ 150 (905–226)[b]

IMAGE, Intervention with Microfinance for AIDS and Gender Equity; IQR, interquartile range; MF, microfinance; R, South African rand.

[a] Equivalent to R1300 (1000–1600) as per exchange rate on 1 January 2004: R1 = US$ 0.15.

[b] Equivalent to R1000 (600–1500) as per exchange rate on 1 January 2004: R1 = US$ 0.15.

Data obtained from Statistics South Africa.[27]

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Table 2. **Comparison of intervention effects on economic well-being, empowerment, IPV and HIV risk behaviour among women participating in IMAGE, women receiving microfinancing only and a control group, Limpopo province, South Africa, 2001–2005**

Outcome	Control		MF		IMAGE		MF vs control				IMAGE vs control				IMAGE vs MF			
	No. */n*	%	No */n*	%	No */n*	%	RR	95% CI	aRRa	95% CI	RR	95% CI	aRR[a]	95% CI	RR	95% CI	aRR[a]	95% CI
Economic well-being																		
Greater food security	129/361	36	350/480	73	177/371	48	2.58	0.83–8.01	2.33	0.73–7.42	1.34	0.22–8.21	1.28	0.20–8.31	0.59	0.19–1.85	0.63	0.22–1.85
Estimated household asset value > USD 300	182/361	50	313/480	65	207/370	56	1.29	1.20–1.38	1.22	1.15–1.30	1.10	0.79–1.54	1.08	0.81–1.45	0.84	0.57–1.25	0.88	0.64–1.20
Greater expenditure on home improvements	70/361	19	147/474	31	129/370	35	1.57	0.78–3.17	1.46	0.71–2.97	1.82	1.25–2.64	1.68	1.22–2.32	1.14	0.64–0.03	1.14	0.62–2.08
Better able to pay back debt	86/360	24	340/480	71	194/371	52	3.71	1.16–11.80	3.38	1.09–10.50	2.41	0.55–10.56	2.34	0.50–11.01	0.72	0.37–1.40	0.77	0.38–1.56
Membership in *stokvel* (savings group)	55/363	15	98/480	20	140/387	36	1.32	1.22–1.43	1.38	1.03–1.85	2.13	0.92–4.94	2.06	0.84–5.08	1.64	0.74–3.66	1.53	0.64–3.64
Able to meet basic needs in past year	39/316	12	167/434	38	94/350	27	3.65	1.77–7.49	3.17	1.69–5.94	1.86	0.26–13.10	1.71	0.21–14.25	0.58	0.11–3.10	0.63	0.12–3.40

Possesses bank account	111/360	31	210/474	44	147/371	40	1.42	1.02–1.98	1.29	0.99–1.68	1.25	0.91–1.71	1.21	0.87–1.66	0.87	0.56–1.36	0.94	0.72–1.24
Better perception of household economic well-being	186/361	52	347/474	73	277/371	75	1.43	0.87–2.42	1.40	0.86–2.28	1.48	0.80–2.75	1.43	0.75–2.71	1.03	0.78–1.36	1.03	0.75–1.42
Has not had to beg in past month	120/362	33	346/480	72	201/387	52	2.31	1.29–4.14	2.22	1.32–3.73	1.45	0.56–3.73	1.36	0.47–3.94	0.67	0.25–1.80	0.66	0.24–1.81
Empowerment																		
Individual level																		
Greater self-confidence	227/358	63	235/480	49	278/383	73	0.76	0.71–0.82	0.76	0.71–0.82	1.16	0.83–1.61	1.12	0.82–1.53	1.49	1.05–2.13	1.44	1.00–2.06
Greater financial confidence	140/360	39	219/480	46	278/386	72	1.50	0.32–7.07	1.48	0.33–6.55	2.26	0.43–1.91	2.13	0.42–10.82	1.51	0.84–2.68	1.44	0.77–2.69
Challenges gender norms	154/361	43	248/478	52	233/381	61	1.26	0.62–2.58	1.30	0.68–2.50	1.54	0.84–2.79	1.53	0.86–2.71	1.19	0.99–1.43	1.16	0.97–1.38
Household level																		
Supportive partner relationship[b]	151/248	61	189/338	56	212/290	73	0.93	0.65–1.3	0.85	0.61–1.1	1.21	0.81–1.80	1.18	0.84–1.6	1.28	1.02–1.62	1.37	1.09–1.7

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Autonomy in decision-making[b]	55/149	37	84/220	38	105/184	57	1.21	0.39–3.75	1.35	0.42–4.30	1.70	0.72–4.01	1.67	0.92–3.03	1.41	0.66–3.02	1.27	0.62–2.59
Perceived contribution to household[b]	56/146	38	148/206	72	121/185	65	1.89	1.36–2.63	0.92	0.84–1.02	1.70	1.12–2.58	1.73	1.19–2.53	0.88	0.59–1.30	1.84	1.35–2.51
Community level																		
Larger social network	134/363	37	267/480	56	275/386	71	1.57	0.74–3.32	1.37	0.67–2.77	1.95	1.00–3.80	1.81	0.92–3.56	1.29	0.85–1.96	1.38	0.94–2.01
Greater sense of community support	184/362	51	204/480	43	232/387	60	0.86	0.54–1.33	0.82	0.50–1.33	1.14	0.39–3.36	1.10	0.38–3.17	1.33	0.57–3.13	1.33	0.59–3.01
Greater solidarity in a crisis	179/363	49	253/479	53	306/387	79	1.12	0.56–2.23	1.12	0.59–2.12	1.68	0.83–3.39	1.60	0.81–3.13	1.49	1.20–1.85	1.43	1.11–1.83
Intimate partner violence																		
Attitudes condoning IPV	233/361	65	326/472	69	182/382	48	1.07	0.84–1.37	1.05	0.81–1.36	0.73	0.44–0.23	0.73	0.42–1.27	0.66	0.48–0.90	0.67	0.50–0.90
Past year experience of controlling behaviour[b]	101/242	42	158/337	47	95/282	34	1.12	0.74–1.70	1.18	0.77–1.80	0.78	0.34–1.82	0.84	0.38–1.87	0.68	0.35–1.33	0.69	0.35–1.36
Past year experience of	30/	12	39/	12	17/	6	0.7	0.2	0.8	0.2	0.50	0.28	0.5	0.2	0.63	0.11	0.5	0.0

physical and/or sexual IPV[b]	248		337		290		9	2–2.93	6	2–3.36		– 0.89	1	8–0.93		– 3.61	9	9–3.66
HIV-related risk behaviour																		
Household communication about sex and HIV	197/361	55	308/480	64	331/383	86	1.15	0.76–1.72	1.17	0.76–1.80	1.60	1.25 – 2.05	1.57	1.20–2.05	1.37	0.98 – 1.93	1.32	0.90–1.93
Participation in HIV march or rally	124/361	34	151/480	31	290/383	76	0.92	0.57–1.49	0.91	0.58–1.41	2.21	1.03 – 4.76	2.14	1.00–4.54	2.37	1.32 – 4.25	2.32	1.33–4.03
Condom use at last sex with all non-spousal partners[c]	10/45	22	17/52	33	23/51	45	1.74	0.37–8.21	1.17	0.32–4.29	2.41	0.77 – 7.54	1.83	0.94–3.57	1.41	0.97 – 2.04	1.41	0.97–2.04

aRR, adjusted risk ratio; IMAGE, Intervention with Microfinance for AIDS and Gender Equity; IPV, intimate-partner violence; MF, microfinance; R, South African rand; RR, risk ratio.

[a] aRRs adjusted for village triplet, age group, marital status, education, parity and sex of household head.

[b] Among currently partnered women (aRRs do not control for marital status).

[c] Among women aged < 35 years old reporting at least one non-spousal partner.

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Fig. 1. **Consistency of intervention effects among IMAGE study groups,[a] Limpopo province, South Africa, 2001-2005**

IMAGE, Intervention with Microfinance for AIDS and Gender Equity; IPV, intimate-partner violence; MF, microfinance.

[a] All adjusted risk ratios for indicators represented as bar graphs on a logarithmic scale.