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Lois Orton et al.

## Health impacts of group-based microfinance

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# Group-based microfinance for collective empowerment: systematic review of health impacts

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### Abstract

**Objective** To assess the impact, on health-related outcomes, of group microfinance schemes based on collective empowerment.

**Methods** We searched the databases Social Sciences Citation Index, Embase, MEDLINE, MEDLINE In-Process, PsycINFO, Social Policy & Practice and Conference Proceedings Citation Index for articles published between 1 January 1980 and 29 February 2016. Articles reporting on health impacts associated with group-based microfinance were included in a narrative synthesis.

**Findings** We identified one cluster-randomized control trial and 22 quasi-experimental studies. All of the included interventions targeted poor women living in low- or middle-income countries. Some included a health-promotion component. The results of the higher quality studies indicated an association between membership of a microfinance scheme and improvements in the health of women and their children. The observed improvements included reduced maternal and infant mortality, better sexual health and, in some cases, lower levels of interpersonal violence. According to the results of the few studies in which changes in empowerment were measured, membership of the relatively large and well-established microfinance schemes generally led to increased empowerment but this did not necessarily translate into improved health outcomes. Qualitative evidence suggested that increased empowerment may have contributed to observed improvements in contraceptive use and mental well-being and reductions in the risk of violence from an intimate partner.

**Conclusion** Membership of the larger, well-established group-based microfinance schemes is associated with improvements in some health outcomes. Future studies need to be designed to cope better with bias and to assess negative as well as positive social and health impacts.

## Introduction

Microfinance initiatives have become popular, particularly in low- and middle-income settings, as a means of promoting rural development,<sup>1</sup> increasing the bargaining power of women and improving household welfare.<sup>2</sup> Such has been the enthusiasm for these schemes that, in 2006, the Nobel Peace Prize was awarded jointly to Muhammed Yunus and Grameen Bank – a microfinance scheme in Bangladesh.

The potential of microfinance to improve health is now being recognized.<sup>3–5</sup> The impacts of microfinance initiatives need to be considered in current theory debates about the role that control over destiny plays as a fundamental social determinant of health.<sup>6</sup> Poor control over destiny, which is a characteristic of women in some societies, can be damaging to population health. In general, population and child health improve and the life expectancies of both men and women increase as the participation of women in decision-making increases.<sup>6</sup>

Group-based microfinance schemes attempt to harness the collective power of mutual support – with members pooling their savings and making small loans to each other so that they can set up small businesses. Most aim to improve the economic power of – and employment opportunities for – women in their immediate community, and many aim to confront engrained discriminatory attitudes to women.<sup>2</sup> Some aim to facilitate the attendance of girls at school and change attitudes to the paid employment of women outside their homes. The members – who are mostly women – form groups for saving and credit, and are offered literacy classes, legal, social and empowerment training and technical and marketing support (Box 1).

It has been argued that the enthusiasm for microfinance has outstripped the evidence of its effectiveness<sup>7</sup> and that microfinance schemes have the potential to do harm. Schemes can suffer from so-called mission drift and end up favouring those who are more credit-worthy while excluding the ultra-poor.<sup>8–12</sup> In some settings, the imposition of a business model on poor female members of a microfinance scheme may lead to increased debt, repayment stress and exploitation.<sup>13,14</sup> The result may be an exacerbation of inequalities rather than a reduction.

We conducted a systematic review of group-based microfinance based on collective empowerment that covered all health conditions and all countries and assessed the impact on health. We addressed three questions: (i) what impact do group-based microfinance schemes

based on collective empowerment have on health; (ii) what role does empowerment play in the pathways from microfinance to health benefits; and (iii) do the impacts of the schemes differ based on the ethnicity, sex and/or socioeconomic status of the members?

## Methods

We reviewed evaluations of group-based microfinance in any country, using published systematic review methods,<sup>15</sup> and assessed the quality of each relevant study using procedures tailored to social interventions in community contexts.<sup>16</sup>

### Search strategy

We searched the databases, Embase, MEDLINE, MEDLINE In-Process, PsycINFO, Social Policy & Practice (Box 2), Social Sciences Citation Index and Conference Proceedings Citation Index (Box 3) for articles published between 1 January 1980 and 29 February 2016. We checked the reference lists of relevant articles and contacted policy-makers and academics for publications in press and in the grey literature.

### Inclusion and exclusion criteria

A report was only included if it described an experimental or quasi-experimental evaluation of a group-based microfinance scheme that: (i) employed collective empowerment strategies; (ii) was targeted at a group with some form of disadvantage; and (iii) was delivered among a free-living population in a community setting. To be included, a report also had to disaggregate data by some measure of socioeconomic status and describe at least one health-related outcome. We also included qualitative reports that related to an included study. No country or language restrictions were applied.

We excluded reports of individual loan schemes that focused solely on poverty alleviation but did not promote group solidarity and empowerment, and reports on schemes that included restrictions on how loans could be used.

### Screening and selection

Titles and abstracts were screened before potentially eligible reports were retrieved in full text and assessed, independently, by two reviewers. Reasons for exclusion were recorded. Disagreements were resolved by discussion or by recourse to a third reviewer.

## **Study data**

A single reviewer extracted data from each included report and applied a modified version of the quality assessment tool developed by Lorenc et al.<sup>16</sup> Qualitative studies were assessed using the criteria of Mays and Pope.<sup>17</sup> A second reviewer checked extractions and appraisals for accuracy and completeness. A narrative synthesis was performed.<sup>18,19</sup> Differential impacts were identified – particularly in relation to ethnicity, sex and socioeconomic status. Reporting was based on the PRISMA-Equity 2012 extension guidelines.<sup>20</sup>

## **Results**

From 4050 articles, only 31 reports – covering 23 studies (Table 1) – met our inclusion criteria (Fig. 1). The included studies comprised one cluster-randomized controlled trial and 22 quasi-experimental studies that took advantage of naturally occurring comparisons and pre-existing data – e.g. from demographic surveillance systems and health surveys. All of the interventions targeted poor women living in low- or middle-income countries. Most were based in Bangladesh and many focused on women in rural communities. Although we identified some studies of microfinance schemes in central and south America, all but one were excluded because they did not meet the inclusion criteria.

Assessment of the included studies revealed that even the higher quality studies were potentially at risk from several forms of selection bias.

## **Impacts**

### ***Mortality and morbidity***

Two higher quality longitudinal studies revealed that membership of the BRAC initiative, in Bangladesh, was associated with relatively low infant and child mortality compared with non-membership.<sup>21,22</sup> The decline observed in the risk of infant death over a period of 10 years was greatest (53%) for infants of mothers who joined the BRAC scheme, followed by the infants of rich non-members (41%) and then the infants of poor non-members (31%).<sup>21</sup> The risk of death for the infants of poor BRAC members declined to the level recorded for the infants of rich non-members. There was no association between BRAC membership and survival of children aged 1–5 years. In a further study by the same authors, however, the survival of children aged 1–5 years from poor households was found to be significantly improved if their mothers were BRAC members.<sup>22</sup>

Two lower quality studies found that BRAC membership was associated with lower child mortality<sup>23</sup> or lower maternal morbidity.<sup>24</sup> A third study, based in Peru, found no association between length of membership in a group-based microfinance scheme and maternal depression<sup>25</sup> or child illness.<sup>26</sup>

### **Women's sexual health**

Impacts on sexual health and violence against women were reported in five evaluations, in Bangladesh, Ethiopia, India and South Africa. Of these evaluations, a study of the highest quality assessed the impacts of scheme membership on women's sexual health and risk of interpersonal violence in South Africa.<sup>28–30</sup> This was a prospective, matched, cluster-randomized controlled trial – with a strong qualitative component – of the South African Microfinance for AIDS and Gender Equity intervention. This intervention included a large human immunodeficiency virus (HIV) health-promotion element, a microfinance component based on the Grameen Bank model and a so-called Sisters-for-Life gender-focused training component. The microfinance intervention was not associated with any significant changes in rate of unprotected sexual intercourse with a non-spousal partner (relative risk, RR: 1.02; 95% confidence interval, CI: 0.85–1.23) or HIV incidence (RR: 1.06; 95% CI: 0.66–1.69).<sup>28</sup> Stratifying by age, there was evidence of several beneficial effects on younger participants after two years of involvement with the programme. For example, when compared with women of the same age and poverty from control villages, female participants aged 14–35 years exhibited higher levels of HIV-related communication (adjusted risk ratio, aRR: 1.46; 95% CI: 1.01–2.12), were more likely to have accessed voluntary counselling and testing (aRR: 1.64; 95% CI: 1.06–2.56) and were less likely to have had unprotected sex at last intercourse with a non-spousal partner (aRR: 0.76; 95% CI: 0.60–0.96).<sup>29</sup> Qualitative data indicated that the intervention had led to a greater acceptance of intra-household communication about HIV and sexuality and increased confidence and skills that, in turn, appeared to have supported the introduction of condoms in sexual relationships.<sup>29</sup>

Findings on the impacts on women's sexual health assessed in two other higher quality studies were equivocal. In Bangladesh, women in villages participating in the Grameen Bank scheme were more empowered ( $P < 0.01$ ) and more likely to use contraceptives than women in villages without the microfinance scheme (59% versus 43%;  $P < 0.01$ ).<sup>31</sup> In contrast, no significant association was found between BRAC membership and contraceptive use. Ethnographic data indicated that the Grameen Bank scheme may have increased contraceptive use partly by strengthening women's economic roles and

empowerment and partly by directly promoting family planning and influencing community norms.<sup>32</sup> Members of microfinance schemes showed relatively high scores for economic security, contribution to family support, freedom and mobility and freedom from domination.<sup>32</sup> A further longitudinal controlled study in India, evaluated the three-year impact of Pragati – a multicomponent microfinance and health-promotion intervention for female sex workers. In this study, the incidence of sexually transmitted infections decreased and the frequency of condom use at last paid sex increased as microfinance exposure increased over time.<sup>33</sup>

Three lower quality studies also assessed women's sexual health. One showed associations between microfinance membership in Bangladesh and higher contraceptive use.<sup>34,35</sup> The other two, in Ethiopia and Peru, found no association between membership and women's health.<sup>25,36</sup>

### ***Violence against women***

Impacts on interpersonal violence against Bangladeshi or South African women were reported in seven evaluations. The highest quality study found that, after two years, levels of such violence decreased in all four study villages covered by the South African Microfinance for AIDS and Gender Equity intervention but stayed the same or increased in the four control villages.<sup>30</sup> Women's membership in the intervention was associated with a reduced risk of exposure to interpersonal violence (aRR: 0.45; 95% CI: 0.23–0.91).<sup>30</sup> Improvements in all nine of the investigated indicators of women's empowerment were observed.<sup>30</sup> Women members had a greater say over household decision-making and felt more able to challenge the acceptability of violence, to expect and receive better treatment from their partners, to leave abusive relationships and to raise public awareness of interpersonal violence in their village.<sup>30</sup>

Another study, also assessed as higher quality, measured violence within spousal relationships in Bangladesh. In this study, women who participated in the BRAC or Grameen Bank schemes – and women who were non-members but lived in Grameen Bank villages – were found to be less likely to be beaten by their husbands than women in control villages.<sup>37</sup> In this study, the role of empowerment was not clear and the effect of women's contribution to family support on violence was not significant.<sup>37</sup> Ethnographic data indicated that, in relatively rich households, women's membership of a microfinance scheme may have led to an initial increase in violence as the women's roles and status were redefined and they had

increased involvement in the cash economy – leading to a struggle for control over household finances. However, this effect dissipated over time.<sup>37</sup>

Five lower quality studies, all in Bangladesh, gave mixed results. One study found that microfinance participation was associated with a reduction in the likelihood of interpersonal violence against women of 6.8%.<sup>38</sup> In contrast, after controlling for confounders, two studies found no statistically significant association between microcredit participation and current experience of such violence.<sup>24,39</sup> A further lower quality study in Bangladesh found that the better educated women experienced increased exposure to interpersonal violence following membership of a microfinance scheme. This study was poorly adjusted for bias, however.<sup>40</sup> Another study in Bangladesh, that used propensity score matching to construct an appropriate comparison group of non-members, revealed that levels of interpersonal violence did not differ significantly between members and non-members.<sup>42</sup>

### **Nutrition**

Impacts on nutrition were reported in seven evaluations, in Bangladesh, Ethiopia, Ghana, India and Peru. The findings were inconclusive. Some studies showed that scheme membership brought nutritional benefits – mainly for the infants and children of members – and others revealed no significant effects.

Of the three higher quality studies, all from Bangladesh, one found that women from villages with any microfinance scheme showed similar increases in their body mass index to women from neighbouring villages without microfinance.<sup>43</sup> In another study, the prevalence of stunting was found to be higher (84.6%) among children of poor non-members than among the children of BRAC members (67.3%) or rich non-members (69.4%).<sup>44</sup> Weight-for-height *z*-scores of children aged 24–35 months from BRAC households were significantly higher ( $P < 0.05$ ) than those of their counterparts from control households.<sup>44</sup> The final higher quality study found no significant differences between BRAC households and non-member households in terms of three other indicators of nutritional status in children and women.<sup>45</sup>

We included four lower quality studies relating to nutrition in our systematic review: one each from Ethiopia, Ghana, India and Peru. Various outcomes were measured, including: women's and children's body mass indexes, anthropometry, food security, food consumption and haemoglobin. Findings were mixed, with some schemes showing benefits for microfinance members and others showing no effects.<sup>26,27,46–48</sup> Two studies – one with



unadjusted selection bias – found that improvements in several empowerment variables were associated with microfinance membership.<sup>46,48</sup>

### ***Well-being and health-care use***

One higher quality study evaluated the Indian Self Help Groups scheme and found that membership was associated with significant reductions in emotional stress and significant increases in the use of health care.<sup>49</sup> A beneficial spillover effect was also noted for non-participants who lived in a household with a member. No associations were found between participation and self-assessed health or exposure to health risks. This study excluded a socially marginalized group of women – i.e. Paniya women – because they were considered “prone to underestimate their health”. Women members used loans to help cover their health expenditures.<sup>50</sup>

Two lower quality studies in Bangladesh revealed associations between microfinance membership and increases in emotional stress – but only for non-members in households that received loans<sup>51</sup> – and use of maternal delivery care.<sup>41</sup> A final study from Peru found that length of participation in a microfinance scheme had no association with women’s access to cancer screening or their number of sick days.<sup>25</sup>

## **Discussion**

Although we searched for evaluations of group-based microfinance schemes that covered any disadvantaged group in any country, all identified studies that met our inclusion criteria were concerned with the empowerment of poor women in low- or middle-income countries, mainly in Asia.

There is clear evidence of improvements in some important maternal and child health outcomes associated with membership of the long-established BRAC and Grameen Bank microfinance schemes in Bangladesh, including better child survival.<sup>21,22</sup> and use of contraceptives.<sup>31</sup> Results from studies, in a range of countries, on nutritional status and the general health of women who were members of schemes were equivocal. Membership of a microfinance scheme specifically for female sex workers in India was associated with decreases in sexually transmitted infections and increases in condom use during paid sex.<sup>33</sup> A complex picture emerges for the impact of microfinance on interpersonal violence. The evidence indicates that, while microfinance may eventually lead to a reduction in such violence, an initial increase may occur as gender norms are challenged. The most robust

study, a cluster-randomized controlled trial, showed that microfinance schemes can reduce the risk of physical or sexual violence by an intimate partner.<sup>30</sup>

The few included studies that measured aspects of empowerment generally found improvements in empowerment associated with membership of the major schemes<sup>30–32,46,48</sup> – though these did not necessarily translate into improved health outcomes.<sup>32</sup> Others have warned that the provision of credit to women does not guarantee their control over the credit's use and may lead to excess anxiety over the pressure to pay back loans – diminishing, rather than increasing, any sense of empowerment.<sup>30</sup> The studies with a strong qualitative component provided some of the most convincing evidence of the role of empowerment in the creation of the beneficial effects of microfinance schemes. In the study of the South African Microfinance for AIDS and Gender Equity intervention, participants revealed how reductions in violence resulted from a range of responses – some linked to increasing confidence and empowerment of the women in handling potential flash points.<sup>30</sup> In Bangladesh, microfinance schemes can empower women by strengthening their economic roles, increasing their say over household decision-making and changing community norms.<sup>32</sup>

We found no relevant studies that assessed the impact of microfinance schemes on ethnic inequalities in health. Some evidence did emerge on how microfinance schemes might help tackle socioeconomic and gender inequalities in health. Most notably, evaluations in Bangladesh indicated that the BRAC microfinance scheme may help to narrow the inequalities in health between boys and girls and the rich and poor.<sup>35,44</sup> Such schemes may work not only through improvements in the economic status of the mothers who become members but also through cultural changes in the way girls are valued and nurtured, leading to additional gains for poor girls in relation to poor boys.

The potential for a microfinance scheme to have adverse health impacts was largely unexplored in the evaluations included in our review. Although there have been indications of increased violence between intimate partners as the result of the female empowerment promoted by microfinance, the most robust relevant studies have shown overall reductions in such violence, at least in the long term.<sup>30,37</sup> The potential negative health impacts of microfinance schemes as a result of the debt stress associated with the repayment of loans have yet to be investigated in detail.<sup>11–14,52</sup>

Research into the positive and negative impacts of microfinance schemes may be particularly challenging, not least because of the potential for selection bias of various forms.

Very few of the relevant studies we identified employed the most robust designs. There is a need for more high quality studies that employ appropriate designs that can cope with all of the complexity and potential confounding to be found in the settings in which microfinance schemes must operate. Few, if any, of the evaluations included in our review could disentangle the effects of the main microfinance scheme from those of additional health-promotion and/or health-care components. Even within the microfinance component, it is hard to disentangle the role of the empowerment strategy from that of the poverty-reduction component. Measurement of differential impacts by socioeconomic status is also rare but studies in Bangladesh have shown how this could be done and revealed its potential value.

In conclusion, group-based microfinance schemes represent perhaps the largest experiment in collective empowerment in the world to date. These schemes – and their potential impacts on both health and poverty – deserve close scrutiny. In terms of improvements in selected health outcomes, the evidence coming from the larger, long-established schemes is encouraging. Many questions remain, however, including the scale of the potential for microfinance schemes to do harm. These questions need to be addressed by appropriately designed evaluations that incorporate community-wide assessments of all potential impacts.

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None declared.

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### **Box 1. Microfinance schemes based on collective empowerment**

Roughly 5 million poor rural women in Bangladesh are involved in microcredit programmes, most of them associated with the BRAC or Grameen Bank microfinance schemes.

The BRAC scheme is designed for women living in poor and landless households. It involves the formation of women's groups for saving and credit, training and skills development, functional literacy – including legal and social awareness – and technical and marketing support. Money saved by a group is used to make loans to group members to support income-generation activities such as cottage industries and goat rearing. Sometimes these elements are combined with so-called bolt-on public health components such as the promotion of maternal and child health or family planning.

The main aims of the scheme are to reduce women's economic dependence on men, strengthen their positions within their families, draw them into the public sphere and expose them to new ideas and education. The theory is that the scheme may influence health in many different ways – e.g. it may increase demand for family planning services and reduce the social costs of fertility regulation, leading to fewer, healthier children and better maternal health. It may also lead to improvements in the care and nutrition of children and so reduce child mortality in general and, particularly, the high rates recorded among girls.

### **Box 2. Embase, MEDLINE, MEDLINE In-Process, PsycINFO and Social Policy & Practice search strategy**

Titles and abstracts of articles published between 1 January 1980 and 29 February 2016 were searched for the following terms: “micro-credit\$”, “microcredit\$”, “micro credit\$”, “micro-finance\$”, “microfinance\$”, “micro finance\$”, “microsaving\$”, “micro-saving\$”, “micro saving\$”, (Bangladesh and BRAC), (IMAGE adj2 (scheme or intervention or initiative)), Pragati, “Bangladesh Rural Advancement Committee”, “Grameen Bank” and “credit union”.

### **Box 3. Social Sciences Citation Index and Conference Proceedings Citation Index search strategy**

Titles and abstracts of articles published between 1 January 1980 and 29 February 2016 were searched for the following terms: “micro-credit\$”, “microcredit\$”, “micro credit\$”, “micro-finance\$”, “microfinance\$”, “micro finance\$”, “microsaving\$”, “micro-saving\$”, “micro saving\$”, IMAGE adj2 (scheme or intervention or initiative)), Pragati, “Bangladesh Rural Advancement Committee”, “Grameen Bank”, “credit union” and (Bangladesh and BRAC).

**Table 1. Summary of the studies included in the systematic review of group-based microfinance schemes**

| Study no. | Publication                        | Country and study design                              | Follow-up period        | Intervention and target population   | Study participants  | Comparison group(s)   | Outcome measures   | Quality <sup>a</sup> |
|-----------|------------------------------------|---|-------------------------|--------------------------------------|---|---|--|----------------------|
| 1         | Bhuiya and Chowdhury <sup>21</sup> | Bangladesh, controlled before-and-after study         | 1988–1992 and 1993–1997 | BRAC, <sup>b</sup> poor women        | 13 549 children of poor women                                     | Children of poor non-members and children of rich non-members                         | Infant and childhood mortality rates, recorded as survival status on set date for two birth cohorts                                    | Higher               |
| 2         | Bhuiya et al. <sup>22</sup>        | Bangladesh, controlled before-and-after study         | 1982–1996               | BRAC, poor women                     | Children of poor women from 12 000 households                     | Children of poor non-members  | Childhood mortality rates, recorded as cumulative child survival probability by household  | Higher               |
| 3         | E-Nasreen et al. <sup>23</sup>     | Bangladesh, case-control and qualitative case studies | NA                      | BRAC, poor women                     | 117 neonates born 1999–2000 who died within first 28 days of life | Live children   | Neonatal death   | Lower                |
| 4         | Ahmed et al. <sup>24</sup>         | Bangladesh, post-intervention study                   | NA                      | BRAC, poor women                     | Poor women from 3817 households                                   | Non-member households that met eligibility for BRAC, and rich non-eligible households | Self-reported illness episodes over last 15 days and health-seeking behaviour  | Lower                |
| 5         | Hamad and Fernald <sup>25</sup>    | Peru, post-intervention study                         | NA                      | PRISMA, <sup>c</sup> poor households | 1593 adult female members   | Long-duration members and short-duration members                                      | Depressive symptoms, contraceptive use, cancer screening: in last year, self-reported days sick in last month                          | Lower                |
|           | Moseson et al. <sup>26</sup>       |   |                         |                                      | 511 adult female members and 596 of their children aged < 5 years | Long-duration members and short-duration members                                      | Child length-for-age, weight-for-age, anaemia, questions on respiratory infections and diarrhoea in child last 6 months, food security | Lower                |
|           | Hamad and Fernald <sup>27</sup>    |   |                         |                                      | 1593 adult female members   | Long-duration members and short-duration members                                      | Age-adjusted BMI, haemoglobin levels and food insecurity   | Lower                |
| 6         | Pronyk et al. <sup>28</sup>        | South Africa, cluster-RCT with qualitative component  | 2 years                 | IMAGE, <sup>d</sup> poor women       | 5156 residents of intervention villages aged 14–35 years          | Matched controls from waiting-list villages   | Rate of unprotected sex: occurrence at last intercourse with a non-spousal partner in past 12 months, HIV incidence                    | Highest              |

|   |                                   |   |                                     |  |   |  |  |         |
|---|-----------------------------------|---|-------------------------------------|--|---|--|--|---------|
|   | Pronyk et al. <sup>29</sup>       |   |                                     |  | 220 female members aged 14–35 years   | Matched controls from waiting-list villages  | HIV-related communication, access to voluntary counselling and testing, rate of unprotected sex at last intercourse with non-spousal partner                             | Highest |
|   | Kim et al. <sup>30</sup>          |   |                                     |  | 860 women from intervention villages, as 430 matched pairs of members and non-members | Matched controls from waiting-list villages  | Physical and sexual violence by spouse or other intimate partner within last year, women's empowerment   | Highest |
| 7 | Schuler and Hashemi <sup>31</sup> | Bangladesh, controlled before-and-after study with ethnographic component | Single time-points in 1991 and 1993 | BRAC and Grameen Bank, <sup>g</sup> poor women                                   | 1305 poor rural married women aged < 50 years   | Eligible non-members and non-eligible non-members  | Respondent or partner currently using any form of contraception  | Higher  |
|   | Schuler et al. <sup>32</sup>      |   |                                     |  | 1305 poor rural married women aged < 50 years   | Eligible non-members and non-eligible non-members  | Relative mobility, economic security, ability to make purchases, freedom from domination and violence, political and legal awareness, participation in political spheres | Higher  |
| 8 | Souverein et al. <sup>33</sup>    | India, longitudinal study   | 2005–2008                           | Pragati, <sup>f</sup> female sex workers   | 20 330 female sex workers   | No comparator – women followed up from first point of contact with scheme until last point of reported contact | STI incidence from syndromic surveillance data, condom use at last paid sex  | Higher  |
| 9 | Amin et al. <sup>34</sup>         | Bangladesh, post-intervention study                                       | NA                                  | 5 small or medium-sized credit NGOs that adopted loan system of Grameen Bank, NS | 3564 rural women, aged < 50 years   | Non-loanees from NGO areas and women from non-NGO areas  | Current contraceptive use, freedom to manage household expenses, autonomy in movement, authority in family affairs   | Lower   |
|   | Amin and Li <sup>35</sup>         |   |                                     |  | 3564 rural women, aged < 50 years   | Non-loanees from NGO areas and women from non-NGO areas  | Child immunization, infant and child mortality rate  | Lower   |

|    |                                    |   |                                     |   |  |  |  |        |
|----|------------------------------------|---|-------------------------------------|---|--|--|--|--------|
| 10 | Desai and Tarazi <sup>36</sup>     | Ethiopia, controlled before-and-after study                               | 2003–2006                           | Two credit schemes combined with family planning activities, poor women | 6440 women aged 15–49 years from poor households         | Just the family planning component and just the credit component | Contraceptive use  | Lower  |
| 11 | Schuler et al. <sup>37</sup>       | Bangladesh, controlled before-and-after study with ethnographic component | Single time-points in 1991 and 1993 | BRAC and Grameen Bank, poor women                                       | 1305 poor rural married women aged < 50 years            | Eligible non-members and non-eligible non-members                | Physical beating by husband in last year, relative mobility, economic security, ability to make purchases, freedom from domination and violence, political and legal awareness, participation in political spheres | Higher |
| 12 | Chin <sup>38</sup>                 | Bangladesh, post-intervention study                                       | NA                                  | BRAC, BRDB and Grameen Bank schemes, NS                                 | 1843 rural women   | Eligible non-members and non-eligible non-members                | Spousal violence directed at women – ever and in last year   | Lower  |
| 13 | Ahmed <sup>39</sup>                | Bangladesh, post-intervention study                                       | NA                                  | BRAC, poor women  | 2044 poor women who were or had been married             | Non-member households that met eligibility for BRAC              | Violence against women from their husbands in preceding 4 months   | Lower  |
| 14 | Dalal et al. <sup>40</sup>         | Bangladesh, post-intervention study                                       | NA                                  | BRAC, BRDB, Grameen Bank, PROSHIKA or any microcredit organization, NS  | 4465 women aged 15–49 years who were or had been married | Non-members  | Moderate physical, severe physical, sexual and any interpersonal violence in last year, economic empowerment   | Lower  |
|    | Dalal et al. <sup>41</sup>         |   |                                     |   | 4925 women aged 15–49 years who were or had been married | Non-members  | Last delivery at home without skilled birth attendant or with institutional delivery services, economic empowerment  | Lower  |
| 15 | Bajracharya and Amin <sup>42</sup> | Bangladesh, post-intervention study                                       | NA                                  | BRAC, BRDB, Grameen Bank, PROSHIKA or any microcredit organization, NS  | 4195 married women aged 15–49 years                      | Matched non-members  | Physical and sexual against women by their husbands in last year   | Lower  |

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|    |                                   |  |   |  |   |  |   |        |
|----|-----------------------------------|--|---|--|---|--|---|--------|
| 16 | Imai and Azam <sup>43</sup>       | Bangladesh, household panel survey                       | 1997–1998, 1998–1999, 1999–2000 and 2004–2005 | Any microfinance scheme, NS  | Women from > 3000 households in 91 intervention villages  | Women from neighbouring villages without microfinance            | BMI   | Higher |
| 17 | Khatun et al. <sup>44</sup>       | Bangladesh, controlled before-and-after study            | 3 time-points in 1995–1996                    | BRAC, poor women   | 576 children of poor women, aged 6–72 months  | Children of poor non-members and children of rich non-members    | Stunting, recorded as height-for-age compared with reference median   | Higher |
| 18 | Jalal and Frongillo <sup>45</sup> | Bangladesh, controlled before-and-after study            | 3 time-points in 1995–1996                    | BRAC-based CFPR-TUP initiative, poor women                                 | 3551 women and 4131 children from households with child aged 6–60 months  | Children and women from non-member households                    | Nutritional status of women and pre-school children   | Higher |
| 19 | Deininger and Liu <sup>46</sup>   | India, pipeline comparison of current and future members | NA  | Indhira Kranthi Patham programme, <sup>g</sup> poor women                  | Poor women from 1964 households   | People who later joined programme when it came to their village  | Energy intake, protein intake and food consumption over last 30 days, social capital, economic empowerment, political empowerment   | Higher |
| 20 | Doocy et al. <sup>47</sup>        | Ethiopia, post-intervention study                        | NA  | WISDOM World Vision Microfinance Institution, <sup>h</sup> poor households | Clients from 819 rural households and their children aged 6–59 months   | Similar incoming clients and community controls                  | Arm circumference   | Lower  |
| 21 | MkNelly and Dunford <sup>48</sup> | Ghana, repeat cross-sectional study                      | 1993–1996                                     | Credit with Education scheme, poor rural households                        | 308 mother-and-child pairs from poor rural households that had participated in scheme for at least 1 year, with each child aged < 3 years | Non-participants in microfinance areas and waiting-list controls | Child's weight-for-age and height-for-age plus maternal BMI, self-confidence, vision for the future, status and bargaining power within the household, status and networks in the community | Lower  |

|    |                               |                                     |    |                              |   |  |  |        |
|----|-------------------------------|-------------------------------------|----|------------------------------|---|--|--|--------|
| 22 | Mohindra et al. <sup>49</sup> | India, post-intervention study      | NA | Self-help groups, poor women | 928 poor women aged 18–59 years                                 | Women who had been members for > 2 years, women who had been members for < 2 years, non-members living in house with a member and non-members living in a house without a member | Self-assessed physical and mental health, exclusion from health care in last year, whether or not husband is sole decision-maker | Lower  |
|    | Mohindra <sup>50</sup>        |                                     |    |                              | 928 poor women aged 18–59 years                                 | Women who had been members for > 2 years, women who had been members for < 2 years, non-members living in house with a member and non-members living in a house without a member | NA   | Higher |
| 23 | Ahmed et al. <sup>51</sup>    | Bangladesh, post-intervention study | NA | BRAC, poor women             | Poor women, from 3 624 households, who were or had been married | Non-member households that met eligibility for BRAC and rich non-eligible households   | Three specific questions about emotional stress and its consequences   | Lower  |

ASA: Association for Social Advancement; BMI: body mass index; BRDB: Bangladesh Rural Development Board; CFPR-TUP: Challenging the Frontiers of Poverty Reduction – Targeting Ultra Poor; HIV: human immunodeficiency virus; IMAGE: Intervention with Microfinance for AIDS and Gender Equity; NGO: nongovernmental organization; NA: not applicable; NS: not specified; RCT: randomized controlled trial; STI: sexually transmitted infection.

<sup>a</sup> Assessed using procedures tailored to social interventions in community contexts.<sup>16</sup>

<sup>b</sup> The aims of the BRAC scheme are to improve health and socioeconomic condition through group formation, skill training and collateral-free loans for income-generating activities.

<sup>c</sup> Scheme based on loan groups run by a nongovernmental organization.

<sup>d</sup> Includes a large health promotion component related to human immunodeficiency virus.

<sup>e</sup> The Grameen Bank is a bank for poor rural people that focuses on women.

<sup>f</sup> Multicomponent microfinance scheme with empowerment approach.

<sup>g</sup> Largely based on the creation of self-help groups.

<sup>h</sup> Promotes community banking and solidarity group lending.

Fig. 1. **Flowchart showing the selection of studies on group-based microfinance schemes**

