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Evaluations of Structural Interventions for HIV Prevention: A Review of Approaches and Methods

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Abstract

Structural interventions alter the social, economic, legal, political, and built environments that underlie processes and outcomes affecting population health. We conducted a systematic review of evaluations of structural interventions for HIV prevention in low- and middle-income countries (LMICs) to better understand the challenges they face and identify effective evaluation strategies. We included 27 peer-reviewed articles on interventions related to economic empowerment, education, and substance abuse in LMICs. Twenty-one evaluations included clearly articulated theories of change (TOC); 14 of these assessed the TOC by measuring intermediary variables in the causal pathway between the intervention and HIV outcomes. Although structural interventions address complex interactions, no evaluation included methods specifically designed to evaluate complex systems. To strengthen evaluations of structural interventions, we recommend clearly articulating TOCs and measuring the relationship of intermediate variables between the predictor and outcome variables. We additionally recommend adapting study designs and analytic methods outside traditional epidemiology to better capture complex results, influences external to the intervention, and unintended consequences.

Keywords

structural interventions; evaluation; HIV; prevention; low- and middle-income countries

Introduction

Structural interventions refer to public health interventions that alter the social, economic, legal, political, and built environment that shapes health processes and outcomes (1, 2).

While they have a long history of implementation and have been considered successful in

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sectors such as water and sanitation (e.g., water purification and latrine construction) (3, 4), structural interventions have only recently drawn attention in the HIV-prevention field. The World Health Organization's Global Health Sector Strategy for HIV/AIDS 2011–2015 included for the first time the removal of structural barriers as one of its four strategic directions to achieve universal access to HIV prevention, diagnosis, treatment, and care services (5). Similarly, the Institute of Medicine's (IOM's) 2013 evaluation of the United States President's Emergency Plan for AIDS Relief (PEPFAR) observed that structural interventions constitute the smallest proportion of PEPFAR's response thus far. The IOM recommended a stronger emphasis on prevention, using a balanced selection of biomedical, behavioral, and structural interventions (6). Development professionals have suggested that insufficient attention to structural factors has inhibited HIV prevention efforts (7).

In response to this emerging emphasis, several large-scale structural interventions have been implemented in low- and middle-income countries with high HIV prevalence. For example, because higher levels of education have been shown to reduce HIV risk among young women and girls (8–10), interventions in South Africa and Kenya have provided female adolescents and youth with cash transfers conditioned on school attendance (11–13). Other types of structural interventions include microenterprise programs that encourage financial planning and distribution of small loans to help reduce HIV risk behavior among young females (14–16).

Evaluations of structural interventions, however, face several methodological and implementation challenges. Structural interventions are affected by and frequently implemented at multiple levels (e.g., individual, community, and policy levels) (17), making it difficult to employ randomized control trials (RCTs), the traditional “gold standard” for biomedical and public health evaluations (18). Random assignment of groups may not be feasible or ethical (19). Without random assignment, it is difficult to rule out selection bias, where individuals exposed to the intervention are different from unexposed individuals, which obscures the intervention's effect on health outcomes. Relatedly, structural interventions, which are often multisectoral and complex, are typically comprised of many parts that interact with each other as well as with the built and social environment (20). This complexity has implications for measuring the potentially large number of factors that must be considered in designing and analyzing evaluation studies. Structural interventions also aim to influence factors that are “upstream,” or distal (e.g., poverty, residence) from health outcomes. As a result, measurable changes in health outcomes and health status may not be detectable within the relatively short timelines of government and donor project cycles (21).

Furthermore, implementation of structural interventions may be nonlinear, iterative, and adaptive (22); thus, using conventional methods, such as testing discrete hypotheses and measuring a predetermined set of intermediary and outcome variables, may not be suitable when evaluating structural interventions. Finally, the contextual nature of structural interventions means that factors such as economic barriers, political and legal constraints, cultural norms, and shifting power dynamics influence how an intervention is implemented by program staff and resonates with local communities (22). The variability in contextual factors across settings often limits the degree to which evaluation results from one context would apply to another context.

To better understand these challenges and identify effective strategies for evaluating structural interventions, we sought to (1) review the range and rigor of approaches and methods used in evaluations of structural interventions to prevent HIV and (2) provide recommendations for improving future evaluations of structural interventions for HIV prevention.

Methods

We conducted a systematic review of methods used to evaluate the outcomes and impacts of structural interventions for HIV prevention, focusing on economic empowerment, access to formal and informal education, and reduction of substance use in LMICs.

Search Strategy and Selection Criteria

Our review methods followed an adapted version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We searched for peer-reviewed articles in Pubmed, PsycInfo, Scopus, Popline, EconLit, Social Science Citation Index, and Global Health. We limited our search to articles published between January 1, 1990 and December 31, 2015 to focus on recent methods and approaches used to evaluate structural interventions for HIV prevention. Search terms included Medical Subjects Heading (MeSH) and other associated terms for HIV as well as terms related to economic empowerment; formative, informal, and formal education (e.g., “primary school”); or substance use prevention (see supplementary files for complete search string). To be included in this review the evaluation must have (a) been conducted in an LMIC, as defined by the World Bank (23); (b) described an impact or outcome evaluation; and (c) assessed outcomes that were explicitly related to HIV prevention (e.g., condom use, reducing multiple partners, etc.). We included evaluation studies that used quantitative-only or both quantitative and qualitative methods, an approach that permitted inclusion of evaluation designs ranging from RCTs to quasi- and non-experimental evaluations conducted in program implementation settings. We excluded articles that described process evaluations or monitoring data only. Interventions that addressed family planning or pregnancy prevention outcomes without also including HIV prevention as an objective were excluded from our review. Articles on biomedical studies, nonhuman research, and studies that focused solely on individual counseling or education programs to increase HIV-prevention awareness or sexual health knowledge were also excluded.

Article screening and selection

Article citations were uploaded into the reference management program Endnote X7, at which point duplicate articles were automatically removed using the de-duplication feature of the Endnote software. We then exported the title, author, year of publication, journal, and name of database into a Microsoft Excel spreadsheet for title and abstract review. Two of four authors (BS, MM, JL, LH) independently screened the titles to exclude studies that were not relevant. Discrepancies were resolved through discussions between the two original reviewers, or referral to a third reviewer, if necessary. For potentially relevant titles, reviewers screened the abstracts to decide if the article should be included in the final review. If the abstract did not provide adequate information to determine whether the article

should be included, we reviewed the full text of the article to determine its relevance (see Figure 1). In cases where multiple relevant articles evaluated the same intervention, we included all the articles if each used an evaluation approach distinct from the others.

Data abstraction and analysis

For all relevant peer-reviewed articles, we abstracted data for the following: (1) information on the intervention being evaluated, including type of structural intervention, target populations, and start and end date of the intervention; (2) components of the theory of change (TOC) or causal pathway framework including predictor variables, intermediate variables, and outcomes of interest; (3) components of the evaluation, including type of evaluation (outcome or impact), type of data collected and timeline for data collection, and statistical methods used to analyze evaluation data; (4) study limitations in conducting the evaluation; and (5) reported generalizability of the findings and scalability of the intervention.

To systematically compare the studies reported in the articles, the rigor of each evaluation was assessed using a checklist informed by published systematic reviews examining the quality of studies (24, 25). The checklist used 13 items to evaluate the study's methodological quality: inclusion of a theoretical framework that guided the program or study; use of mixed methods (included in the article or referenced); randomized assignment of participants; prolonged engagement in the study (greater than or equal to 18 months); sample size justified; use of a cohort; inclusion of a control or comparison group; use of comparison groups that have equivalent outcomes at baseline; use of comparison groups that are equivalent on sociodemographics; availability of pre and post data; a follow-up rate of 80 percent or higher; statistical significance testing; and reporting of intervention implementation details to facilitate replicability. Studies received one point each for fulfillment of each criterion, and the range of possible points was 0–13. Points were summed and a rigor score was applied using the following rubric: 0–4 low; 5–9 medium; 10–13 high.

Results

The search yielded 27 articles, describing evaluations of 20 interventions. Of the 27 articles, 23 were evaluations of economic empowerment interventions, six were of education interventions, and two included a substance abuse intervention with some overlap in intervention approaches (see Figure 2). The majority of evaluations came from interventions in sub-Saharan Africa (n=18). Other evaluations were implemented in South Asia (n=5) and Latin America and the Caribbean (n=3); one evaluation had a global scope.

Theory of Change

Over three-quarters (n=21) of the articles in this review included a description of the TOC that directed their program or evaluation. Among evaluations that did not include a TOC (n=6), three proposed causal pathways post hoc (26–28). Several studies developed TOCs specifically for the intervention (n=9). For example, the Avahan Initiative developed an Integrated Empowerment Framework for female sex workers that describes three components of power (power within, power with others, power over resources) which lead to

social and personal transformation for better health behavior and positive health outcomes (29). Other studies were guided by established models or theories, including Freierian and Chen models (30), Asset Theory (14, 31–33), the Social Development Model (34–36), empowerment theories (37–39), and Connell's theory of gender and power (15).

The Shaz! Project developed a theoretical framework that described the pathway between their program and the intended HIV outcomes: access to economic opportunities; HIV education; and HIV prevention, care, and treatment. Participation in the program contributes to economic and social empowerment, improving relationship power and reducing sexual risk behaviors and gender-based violence (GBV). This, in turn, leads to a reduction in HIV and other sexually transmitted infections. Dunbar et al., mirrored this framework in their evaluation, developing intermediate variables for economic factors, social factors, relationship power, and sexual risk factors. They additionally included measures of biological factors to measure impact of the program on HIV infection (40). This framework was published alongside the results of the evaluation to illustrate the possible causal links among factors.

Two-thirds of the evaluations that included a TOC used its components to develop and measure intermediate variables including measures of empowerment, gender norms, and attitudes and behaviors. Seven articles that described a TOC measured the association of the program's activities with various outcomes, but did not include the intermediate variables on the causal pathway. Two articles referenced other articles from the same study that did measure intermediate variables (14, 38).

Study Design

RCTs were the most common quantitative study design (n=16), with the remaining evaluations using quasi-experimental (n=7) and non-experimental designs (n=4). The majority (n=25) of evaluations used quantitative methods exclusively; three of these articles referenced publications from the same project for qualitative results (29, 39, 40). Only two articles employed both quantitative and qualitative methods in the same article (14, 36); however, one collected qualitative measures strictly for process monitoring (36). Only one article incorporated qualitative methods in its outcome measures (40). Pronyk et al., used thematic content analysis of observations of loan center meetings, focus group discussions, key informant interviews, and diaries of training facilitators to provide context and understand why the IMAGE program led to certain expected outcomes and not others in South Africa (14).

All articles provided basic sampling information such as sample size and sampling methods (i.e., randomized, matched, convenience). Eleven studies included additional information regarding sample size justification such as power calculations. Interventions commonly targeted specific populations including women or girls (n=17), adolescents or youth (n=15), orphans and vulnerable children (n=8), female sex workers (n=5), and adult couples (n=2). Three-quarters (n=20) of the articles included a control or counterfactual, of which 90 percent (n=18) were equivalent on socio-demographic characteristics and 65 percent (n=13) were equivalent on outcome measures, compared to intervention groups at baseline (see Table I).

The length of interventions varied widely from ten months to ten years. Study timelines generally mirrored intervention timelines (baseline measures collected at the start; end line measures collected at the close of studies), with the exception of three cross-sectional studies (28–30) that measured outcomes at one point in time. While most studies included multiple data collection time points (n=24), no studies conducted ex-post data collection and analysis to determine long-term effects of the intervention. Although the timelines for most studies were short (mean=18 months; median=12 months); many studies saw high levels of attrition. Thirty-seven percent of studies (n=10) reported participant follow-up rates of less than 80 percent between baseline and end line.

All studies included outcome-level measures; seven studies included impact-level measures. Study designs mapped closely to the type of evaluation; that is, evaluations that included impact measures more often used an RCT design (see Figure 3).

The most frequent outcomes measured were sexual and HIV and AIDS knowledge (n=11), attitudes (n=9), and behaviors (n=24). Couples communication and condom negotiation (n=8), gender based violence (n=6) and gender attitudes and norms (n=6) were also included as outcome variables. Articles that measured program impact on HIV infection collected biomarker data from rapid oral and/or blood tests to determine HIV incidence rates (n=7). Two articles included measures of STI incidence, but did not test specifically for HIV and were not considered HIV impact evaluations. Due to relatively low incidence, most evaluations that included HIV impact measures were not adequately powered to detect significant results (n=6). Only one was powered to detect differences in HIV incidence between experimental and control groups (41).

Seventy percent (n=19) of the evaluations included multivariable analyses. Of these, three-quarters (n=14) clearly drew from their TOC in their analysis and modeling.

After aggregating the above factors related to evaluation design, implementation, and analysis of results, most studies were high (n=9) or medium (n=14) rigor (see Table I). RCTs were generally rated as more rigorous than quasi-experimental studies. Many quasi-experimental studies did not provide adequate information about evaluation components, and therefore did not qualify as highly rigorous. Non-experimental designs were classified as low rigor.

Limitations, Generalizability, and Scalability

The major limitations described in these studies were attrition, short study timelines, selfselection bias, limited sample sizes, self-reported outcomes, and inability to show temporality. Nearly all studies (n=26) included mention of limitations related to the study design, evaluation implementation, and analysis and reporting of data. While study designs are often limited by resource availability and funding timelines, many study designs included in this sample were limited by the nature of the interventions. Programs may rely on participants actively choosing to join the intervention. Among these types of interventions, self-selection bias was cited as a challenge in evaluation (n=5). For example, empowered, lower-risk female sex workers may have been more likely to participate in a

sexual risk-behavior reduction intervention than their higher-risk, less-empowered colleagues (29).

In some studies (n=11) sample sizes were not adequately powered to detect changes in specified outcome or impact indicators because of limited resources and time, unexpected barriers during recruitment, or program populations that targeted hidden or smaller populations. Analyses of outcome indicators were also limited by the type of data collected; for example, many studies relied on self-reported attitude and behavioral data, which may be biased (n=12). Short timelines that reduced exposure to a program limited many articles (n=16), potentially causing them to underestimate positive outcomes that may take longer to present, or overestimate outcomes that may not be durable. Unclear causal chains linking programs to outcomes was a limitation among both cross-sectional studies and those without a clear TOC (n=12).

Replicability and generalizability were mentioned in just over half (n=14) of the included studies, and often as a limitation or opportunity for further study (n=9). Researchers expressed that findings could only be generalized to or replicable in similar situations, or within the same political borders. For example, Ashburn et al., mentioned that the results of their study were “generalizable only to partnered women participating in women’s groups within this or similar settings” (30). One article specifically discussed the scalability of child-focused grants within South Africa, with the statement “according to our findings, full coverage of child-focused cash transfers for the country’s 2.76 million girls aged 12–18 could prevent roughly 77,000 new incidences of transactional sex each year.” The authors noted, however, that study results were not generalizable outside South Africa (11).

Three-quarters of the studies (n=20) drew conclusions that matched the results of the study. That is, the manuscripts adequately acknowledged the scope, size, and limitations of the study for the observed measures of effect. For example, De Walque et al., concluded from a large (n=5370) 12-month RCT of conditional cash transfers in ten villages in Tanzania that “while these study results are important in showing that the idea of using financial incentives can be a useful tool for preventing HIV and STI transmission, it remains an initial study on a limited scale” (42). Seven studies (26 percent) drew conclusions that did not consider the scope, size, or limitations of the study, and often overstated the impact of the observed measures of effect. This was particularly prevalent among cross-sectional studies and studies that were conducted over one year or less.

Discussion

Our systematic review found that evaluations of structural interventions use a wide range of study designs, sample sizes, outcome measurement tools, and timelines. Most evaluations used RCTs, and a few RCTs supplemented their studies with qualitative methods. No article reported using methods and tools designed to evaluate complex systems, such as agent-based modeling, which uses computer simulations to model the actions and interactions of individuals (or collective entities such as organizations) in order to examine their effects on a system as a whole. This review also found that quasi-experimental studies show promise for rigorous evaluations when other rigor criteria, such as a clearly articulated TOC and

measurement of multiple factors along the TOC, are considered in the design, implementation, and reporting of results.

Theory of Change

Because structural interventions address factors upstream from health outcomes, and operate through indirect pathways, it is essential to clearly identify these pathways through a well-articulated TOC. Evaluations that did not include a TOC may have used causal pathways to direct their studies, but did not articulate them. There is a need to develop and publish TOCs alongside the results of an evaluation to better illustrate how the intervention influences proximal factors that impact health outcomes. TOCs should include common cultural, gender, and generational norms with an eye towards the intersectionality of factors (43–48). Measurement of intermediate variables within the TOC would provide evidence in support, or not, of the theory or parts of the theory. Additionally, measurement of outcomes of interest may be too difficult, time-consuming, or costly for researchers to obtain a sample size that confers adequate statistical power (1). Including measures along the causal pathway can show progress towards these outcomes, even in instances where impact cannot be measured.

Study Design

While RCTs are considered the gold standard for individual-level public health evaluations, some experts argue other designs may be more appropriate for evaluating multilevel and community-level interventions (17, 19, 49). In complex interventions randomization may not be possible, such as in the case of South Africa's ongoing cash transfer program (11); ethical, for example, where poverty reduction programs cannot be withheld from a control group; or feasible, such as in programs targeting female sex workers where members of the target population are difficult to define (19). An assessment of the rigor, or methodological quality, of a study must consider that study's contextual constraints (50). Nonrandom self-selection into intervention groups has the potential to introduce bias; however, this should be weighed against other criteria, such as the acceptability and sustainability of the study design.

Structural interventions include several pathways to an outcome, and it is challenging to define a comparison or rigorous counterfactual in which all factors except the intervention are the same (18). One-quarter of structural interventions included in this review did not include a comparison group, limiting their rigor and ability to claim that the intervention influenced HIV prevention outcomes. Researchers have argued that including qualitative methods in non-randomized designs can address some of the challenges in identifying an appropriate counterfactual (50, 51). Complexity-aware designs allow study of multifaceted and dynamic processes that may have emergent outcomes, and interactions between community and intervention factors; they also depart from traditional epidemiological methods by accommodating study characteristics such as the lack of counterfactuals, bidirectional effects, feedback loops, and unpredictability (52). Evaluations of structural interventions provide unique opportunities to apply methods such as agent-based modeling, synthetic comparisons, network analysis, and other methods that accommodate complexity. Because complex systems are greater than the sum of their parts, each complex system

should ideally be studied as a whole. However, no single method captures all factors of and perspectives on a complex system. Multiple methods yielding multiple perspectives are needed to provide a holistic evaluation of these systems. Qualitative data can inform how, where, when and from whom data should be collected; encourage buy-in from stakeholders; elucidate the context in which interventions take place; help interpret results; and provide insight into unanticipated responses (50, 53). Including qualitative methods in evaluations of structural interventions has the potential to improve the rigor of the study design and provide context for conclusions.

Generalizability and Scalability

While it is presumed that, due to their complexity, structural interventions have limited generalizability, it is possible to replicate the process of the intervention (17). Including a TOC with clearly defined intermediate and intersecting variables can help determine how or if a structural intervention process is replicable in other contexts. For small studies that show evidence of effectiveness, additional studies can assess scalability of structural interventions. Within our review, only one article discussed scale-up to a national level. Additional research should examine the sustainability of structural interventions, because most of those found in this review were evaluated within relatively short timelines.

Review Limitations

This review has several limitations. Our review included articles published in English only, which may have eliminated high-quality evaluations in other languages. We included only peer-reviewed evaluations and therefore did not examine evaluations from organizations and agencies that may focus on programmatic implementation rather than scientific research. In standardizing measures of rigor, we constructed a scale based on 13 common measures of methodological quality. Although we accounted for a broader definition of rigor, these measures are primarily based on RCTs as the gold standard. This perspective may overlook the need for flexibility in evaluating structural interventions. Lastly, we limited our definition of “structural interventions” to those that address economic empowerment, education, and substance abuse for HIV prevention. We did so to reduce the scope of the article and respond to a mandate from the author’s funders. Other structural and social constructs that may influence HIV infection were not included in this review.

Conclusions

Evaluation of programs is vital to strengthen the link between good science and sound implementation and to ensure efficient use of limited resources. Rigorous evaluations of structural interventions should include the same components as those of other public health programs. These components include: an identification of outcome(s) of interest, the justification of sampling and sample sizes, and the utilization of proper analysis techniques (54, 55).

However, structural interventions that aim to demonstrate impact on HIV outcomes present additional challenges to evaluation. The additional challenges presented by these types of structural interventions influence evaluation design, implementation, and the reporting of

results. Clear development, analysis, and reporting of a TOC is key to understanding the pathways by which structural interventions operate. By identifying, measuring, and reporting intermediate and intersecting variables in relation to outcomes, evaluators can better understand why programs are or are not successful. This practice is particularly useful in instances where the effects of a structural intervention may take years to observe and the cost of long-term studies may restrict measurement of impact. Evaluators may be able to evaluate effects from a structural intervention more holistically and accurately if the variables within a causal chain are more clearly identified. Natural experiments, qualitative methods, and approaches adapted from fields other than epidemiology, may be more suitable than RCTs for considering the complex processes of structural interventions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Literature review process for review of evaluations of structural interventions related to HIV prevention in low- and middle-income countries.

Figure 2.
Diagram of included evaluations by type of structural intervention

Figure 3.
Study design by type of evaluation

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Table 1.

Rigor scores for included evaluations

First author	Year	Type of structural intervention	Type of evaluation	Study design	Theoretical framework/ TOC	Mixed methods	Random assignment	Prolonged engagement in study setting (18 months)	Sample size justified	Cohort	Control or comparison group (quantity)	Comparison groups equivalent on socio-demographics	Comparison groups equivalent at baseline on outcome measure	Pre- / post- data	Follow-up rate of 80% or more	Statistical significance testing	Detail to facilitate replication	Points	Rigor: 0-4 weak; 5-9 moderate; 10-13 strong
<i>S. Baird</i>	2012	Economic empowerment; education	Impact	RCT	1	0	1	1	1	1	1	1	1	1	1	1	1	12	High
<i>D. Hallfors</i>	2012	Education	Outcome	RCT	1	1	1	1	0	1	1	1	1	1	1	1	1	12	High
<i>P. M. Pronyk</i>	2008	Economic empowerment	Impact and outcome	RCT	1	1	1	1	0	0	1	1	1	1	1	1	1	12	High
<i>M. S. Dunbar</i>	2014	Economic Empowerment	Impact and outcome	RCT	1	1	1	1	0	1	1	1	1	1	0	1	1	11	High
<i>P. M. Pronyk</i>	2006	Economic empowerment	Impact and outcome	RCT	1	0	1	1	1	1	1	1	0	1	1	1	1	11	High
<i>M. Rosenberg</i>	2014	Economic empowerment	Outcome	RCT	1	0	1	1	1	1	1	1	1	1	0	1	1	11	High
<i>F. M. Ssewamala</i>	2009	Economic empowerment; education	Outcome	RCT	1	0	1	0	1	1	1	1	1	1	1	1	1	11	High
<i>H. Cho</i>	2011	Education	Outcome	RCT	1	0	1	0	0	1	1	1	1	1	1	1	1	10	High
<i>D. Hallfors</i>	2011	Education	Outcome	RCT	1	0	1	1	0	1	1	1	0	1	1	1	1	10	High
<i>D. Swendeman</i>	2009	Economic empowerment	Outcome	Quasi-experimental	1	1	0	0	0	0	1	1	1	1	1	1	1	9	Medium
<i>D. de Walque</i>	2012	Economic empowerment	Impact and outcome	RCT	1	0	1	0	1	0	1	1	1	1	0	1	1	9	Medium
<i>F. M. Ssewamala</i>	2010	Economic Empowerment	Outcome	RCT	1	0	1	0	0	0	1	1	1	1	1	1	1	9	Medium
<i>F. M. Ssewamala</i>	2010	Economic empowerment	Outcome	RCT	1	0	1	0	1	0	1	1	1	1	0	1	1	9	Medium
<i>L. Cluver</i>	2013	Economic empowerment	Outcome	Quasi-experimental	0	0	0	0	1	0	1	1	1	1	1	1	1	8	Medium
<i>S. Baird</i>	2010	Education	Outcome	RCT	0	0	1	0	1	0	1	1	0	1	1	1	1	8	Medium
<i>J. Kim</i>	2009	Economic empowerment	Outcome	RCT	1	0	1	1	0	0	1	1	0	0	1	1	1	8	Medium
<i>F. Spielberg</i>	2013	Economic empowerment	Outcome	RCT	0	0	1	0	1	0	1	1	1	1	1	1	0	8	Medium
<i>K. Austrian</i>	2014	Economic empowerment	Outcome	Quasi-experimental	1	0	0	0	0	1	1	0	0	1	1	1	1	7	Medium
<i>H-P. Kohler</i>	2012	Economic empowerment	Outcome	RCT	0	0	1	0	0	1	1	0	0	1	1	1	1	7	Medium
<i>W. O. Odek</i>	2009	Economic empowerment	Outcome	Quasi-experimental	1	0	0	1	0	1	0	0	0	1	1	1	0	6	Medium

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First author	Year	Type of structural intervention	Type of evaluation	Study design	Theoretical framework/ TOC	Mixed methods	Random assignment	Prolonged engagement in study setting (18 months)	Sample size justified	Cohort	Control or comparison group (quantity)	Comparison groups equivalent on socio-demographics	Comparison groups equivalent at baseline on outcome measure	Pre- / post- data	Follow-up rate of 80% or more	Statistical significance testing	Detail to facilitate replication	Points	Rigor: 0-4 weak; 5-9 moderate; 10-13 strong
<i>A. K Blanchard</i>	2013	Economic empowerment	Outcome	Non-experimental	1	1	0	0	1	0	0	0	0	0	0	1	1	5	Medium
<i>S. Elser</i>	2012	Economic empowerment; substance abuse	Outcome	Non-experimental	1	0	0	1	0	1	0	0	0	0	0	1	1	5	Medium
<i>D. Souverein</i>	2013	Economic empowerment; substance abuse	Impact and outcome	Quasi-experimental	1	0	0	1	0	0	0	0	0	1	0	1	1	5	Medium
<i>M. S. Rosenberg</i>	2011	Economic empowerment	Outcome	Non-experimental	1	0	0	0	1	0	0	0	0	0	0	1	1	4	Low
<i>R. J. Magnani</i>	1998	Economic empowerment	Outcome	Quasi-experimental	0	0	0	0	0	0	1	1	0	0	0	1	1	4	Low
<i>R. D. Sherer</i>	2004	Economic empowerment	Outcome	Quasi-experimental	0	0	0	0	0	1	0	0	0	1	1	0	1	4	Low
<i>K. Ashburn</i>	2008	Economic empowerment	Outcome	Non-experimental	1	0	0	0	0	0	0	0	0	0	0	1	0	2	Low