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Participation and diffusion effects of a peer-intervention for HIV prevention among adults in rural Malawi

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ABSTRACT

This paper examines whether a peer group intervention that reduced self-reported risky behaviors for rural adults in Malawi also had impacts on non-participants in the same communities. We randomly assigned two districts to the intervention and control conditions, and conducted surveys at baseline and 18 months post-intervention using unmatched independent random samples of intervention and control communities in 2003–2006. The six-session peer group intervention was offered to same-gender groups by trained volunteers. In this analysis, we divided the post-intervention sample into three exposure groups: 243 participants and 170 non-participants from the intervention district (total n = 415) and 413 control individuals.

Controlling for demographics and participation, there were significant favorable diffusion effects on five partially overlapping behavioral outcomes: partner communication, ever used condoms, unprotected sex, recent HIV test, and a community HIV prevention index. Non-participants in the intervention district had more favorable outcomes on these behaviors than survey respondents in the control district. One behavioral outcome, community HIV prevention, showed both participation and diffusion effects. Participating in the intervention had a significant effect on six psychosocial outcomes: HIV knowledge (two measures), hope, condom attitudes, and self-efficacy for community HIV prevention and for safer sex; there were no diffusion effects.

This pattern of results suggests that the behavioral changes promoted in the intervention spread to others in the same community, most likely through direct contact between participants and non-participants. These findings support the idea that diffusion of HIV-related behavior changes can occur for peer group interventions in communities, adding to the body of research supporting diffusion of innovations theory as a robust approach to accelerating change. If diffusion occurs, peer group intervention may be more cost-effective than previously realized. Wider implementation of peer group interventions can help meet the global goal of reducing new HIV infections.

1. Introduction

Although new HIV infections have been declining steadily since 2001, there are still 2.1 million new HIV infections globally, and nearly 70% of new infections occur in sub-Saharan Africa. Reducing new infections is essential to control the epidemic (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2014), Throughout sub-Saharan Africa, heterosexual transmission accounts for the substantial majority of new infections (UNAIDS, 2014), and although prevalence is higher among recognized high risk groups such as commercial sex workers, the epidemic rapidly penetrated the general community. Injecting drug use is rare. Because homosexuality is highly stigmatized and illegal in many African countries, transmission from men who have sex with men or are bisexual is not well documented but is estimated to be low. In a generalized epidemic, preventing new infections is especially difficult because nearly all sexually active youth and adults are at risk. These difficulties are exacerbated by widespread poverty and severe

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shortages of health workers and supplies in many sub-Saharan African countries. The study described here occurred in Malawi, a very low-resource country in sub-Saharan Africa, with a high adult HIV prevalence of 12.4% when this study began and 10.3% today (Malawi Progress Report, 2014). Like the rest of sub-Saharan Africa, Malawi's epidemic is spread mainly by heterosexual transmission (88%) and high-risk groups such as commercial sex workers contribute less than 1% of new infections in Malawi, reinforcing the importance of reaching the general community to prevent new infections (Malawi Progress Report, 2014).

Meta-analyses and systematic reviews documented that behavioral change interventions reduce risky behaviors, HIV and sexually transmitted infections (STIs) (Albarracín et al., 2005; 2008; Medley et al., 2009; Muula and Mfutso-Bengo, 2004; Scott-Sheldon et al., 2011). These same reviews identified that efficacy was increased by a peer-based approach, interpreted as being more effective because peers share a common sociocultural identity, often come from the same social network, and face the same challenges in adopting safer behaviors. Behavior change messages from peers are appropriate for the specific context, and peer social support enhances credibility and trust. Explicit discussion of condoms and inclusion of skill-building activities also enhance efficacy. Peer-based interventions are appropriate for reaching both high-risk groups and the general population. However, bringing these interventions to scale has been viewed as difficult because of the need to reach each individual. If behavior change interventions have community-wide impacts beyond the immediate participants, this would increase the feasibility and cost-effectiveness of widespread implementation. In this paper, we examine whether a peer group intervention that reduced reported risky behaviors for rural adults in Malawi (Kaponda et al., 2011) also shows results consistent with a process of diffusion to non-participants in the same communities. One strategy for wider diffusion of a behavioral intervention is to use a community's social networks to foster informal spread of the behavioral change message. The theoretical foundation for this approach comes from Rogers' theory of the diffusion of innovations (1962, 199; 2004). Diffusion is the process by which an innovation is communicated through certain channels over time among the participants in a social system. Over 50 years of research in diverse fields have found an essentially similar exponential curve that describes the adoption rate of new interventions (Dearing, 2008; Rogers, 1962, 2004). This same research has identified that only a few (2.5%) persons in a community are innovators who first adopt an innovation. They tend to be relatively independent risk-takers who may have high social status but are not opinion leaders. The early adopters (about 14%), in contrast, are likely to have both high local status and social influence, and are opinion leaders. The early majority (34%) are connected to and influenced by the early adopters. The late majority (34%) generally have lower social status, more skepticism about innovations and connections to the early majority that eventually influence them to adopt the innovation. The last to adopt, the "laggards" (16%), are highly skeptical about change and/or relatively isolated in their social network (Rogers, 1962). Thus, local opinion leaders play a critical role in diffusion because their endorsement and early adoption of the innovation encourage others to adopt it.

Beginning early in the AIDS epidemic, diffusion of innovation theory was used to guide behavior change programs for gay men. The STOP AIDS campaign in San Francisco, which engaged opinion leaders to hold small group discussions in their homes, was highly successful in reframing the AIDS issue in the gay community and was associated with a dramatic decrease in new HIV infections (Singhal and Rogers, 2003). Kelly and colleagues adapted this approach in a classic study in three Southern cities later replicated in an 8-city randomized trial. Trained opinion leaders delivered the intervention in gay bars and communities. There were substantial and sustained declines in reported HIV risk behaviors in the intervention communities (Kelly et al., 1991, 1992, 1997; St. Lawrence et al., 1994). Since then, this approach, usually referred to as peer leader intervention but more narrowly labeled as a popular opinion leader intervention by Kelly (2004), has been widely adopted for HIV prevention for many different target groups in many countries (Ngugi et al., 1996; Sikkema et al., 2000; Welsh et al., 2001).

However, two opinion leader interventions for gay men in Great Britain were not effective (Elford et al., 2001; Elford et al., 2002; Flowers et al., 2002). Also, a recent 5-country study for high-risk groups showed no greater behavior change in the intervention than the control communities (The NIMH Collaborative HIV/STD Prevention Trial Group, 2010).

It is unclear why some of these interventions succeeded while others did not. All these opinion leader interventions used informal contacts between trained opinion leaders and the target population and did not have structured small-group sessions. Kelly (2004) identified several issues of fidelity that he asserts led to lack of success in the two Great Britain interventions. However, Hart et al. (2004) attribute their lack of success to cultural barriers against explicit safer sex discussions in public settings and the difficulties of recruiting and retaining true opinion leaders in large cities; their intention was to follow the same model as Kelly but contextual factors made several aspects of fidelity difficult to achieve. The authors of the 5-country trial argue that their design included so many services to the control group, including counseling, testing and treatment of STIs, that the control group experienced the same level of change as those in the intervention groups (NIMH Collaborative HIV/STD Prevention Trial Group, 2010).

Another type of HIV prevention using peer leaders is the peer group intervention, where the intervention is offered to small groups in semi-structured sessions facilitated by trained peer leaders. Peer group leaders are not chosen because they are opinion leaders, although they often are influential in their communities. In addition to our own work, peer group interventions have been shown to be efficacious for different target groups, settings, and countries (Duan et al., 2013; Jemmott et al., 2010; Kirby et al., 2006).

However, whether peer group interventions also lead to diffusion of innovations beyond those who attend the groups has not been explored. An extensive literature search identified only one prior study that examined diffusion in a peer group intervention. Three companies of Thai military conscripts were assigned to an intervention group, a diffusion group (men at the same military base whose company did not receive the intervention), and controls at a distant location. Compared to the control group, the intervention group but not the diffusion group had reduced STIs (Celentanon et al., 2000). No other studies using a peer group intervention have examined whether there is any diffusion beyond the participants.

To begin to address this gap, we reanalyze outcome data for a peer group intervention for HIV prevention conducted in rural Malawi to evaluate separately the direct effects of program participation and those due to diffusion of a peer group intervention. Using multiple regression controlling for demographic factors, we previously reported that adults in the intervention communities had significantly more favorable outcomes than adults in control district communities at 18 months post-intervention, including four behavioral outcomes: partner communication, reported condom use, HIV testing, and community prevention activities (Kaponda et al., 2011). However, because the previous evaluation combines both participants and non-participants in the intervention district, that analysis masks the distinction between effects due to participation and those due to diffusion.