Efficacy of Interventions with Behavioral Components for HIV Prevention in Africa: A Meta-Analysis

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Introduction:
Recognizing that the continent of Africa and especially sub-Saharan Africa has highest prevalence of HIV/AIDS in the world, scholars have conducted numerous trials in this geographical region, with the first trials conducted in about 1986 and active trials continuing today. Yet the efficacy of trials has varied widely and to date systematic reviews have summarized only subset- or this literature (see 1,2).

The current study addresses interventions evaluated in this region and examines the extent to which study and regional characteristics may explain variations in efficacy. A special emphasis of this study is on the needs and resources, such as the human development index (HDI) and income inequality (Gini coefficient).

Methods:
Studies conducted in Africa that were available by March 2010 were included in the database if they (a)examined risk-reduction interventions focused on increasing HIV-related knowledge or condom use with some face-to-face interaction (b) conducted either a randomized controlled trial design or evaluated success relative to baseline, and (c) if they reported measures for condom use or HIV knowledge. Interrater reliability exceeded 0.94 for all coded dimensions.

Selection Process for Study Inclusion

- Studies conducted in Africa
- Interventions were education or behavioral
- Interventions had a control or comparison group or were randomized
- Interventions were face-to-face
- Interventions were published (1986–2010)

Note: 13 (41 separate interventions) of those 56 studies have a posttest + a FUP and only 3 (6 separate interventions) of 56 have 6 FUP

Analyses of standardized mean effect sizes (d) followed maximum-likelihood random-effects assumptions for overall means and fixed-effects assumptions for tests of moderators. The last available measures that trials offered were examined.

Results:
Interventions’ efficacy varied widely and by outcome. Interventions generally increased knowledge and self-efficacy for safer sexual behavior. There was also a significant overall improvement in condom use.

Interventions improved knowledge and condom use more in nations with lower human development index levels and less equality; they also had greater success with samples at higher risk. The Figure to the right shows the HDI pattern collapsing mean effect sizes for each nation.

The HDI pattern was more pronounced for studies with samples of females than it was for samples of males. (Gini information was missing for most nations, making a Figure less informative.)

Interventions also succeeded better in increasing condom use for samples with larger proportions of HIV-positive individuals.

Analyses also explored other factors that may underlie efficacy. Design (controlled vs. uncontrolled) and the nature of the control group used (if controlled) appeared to relate to efficacy. Yet these effects lessened or disappeared when other factors were controlled. Of note, the patterns reported here were the same (and sometimes more pronounced) in studies that had higher judged methodological quality.

Conclusions:
African countries bear the greatest burden of HIV/AIDS infections in the world, both in total and new cases, making it imperative to find and implement the best evidence-based methods of prevention in this region. Our findings suggest that in general, HIV prevention interventions are successful at increasing the occurrence of some behaviors that are protective, especially the use of condoms. Findings on psychological outcomes suggested that interventions improve efficacy for safer sex behaviors and knowledge relevant to HIV/AIDS. Yet findings were quite variable.

Further analyses revealed that interventions succeed where they are most needed, as defined especially by the human development index and especially for female samples. Females likely suffer more than males in relatively poor nations but interventions help to empower them, implying that HIV prevention activities work better for females than for males in relatively poor nations. On a sample level, interventions also worked better for samples of HIV positives and for those characterized as sexually active. Both trends suggest that interventions work best for those who need them most (Johnson et al., in press). Similarly, intervention features delivering needed resources (e.g., condoms, relevant education) succeeded better for sexually-active samples than did interventions that did not feature these elements.

References:

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