

Can family-centered programming mitigate HIV risk factors among orphaned and vulnerable adolescents? Results from a pilot study in South Africa

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ABSTRACT

Let's Talk is a structured, family-centered adolescent HIV prevention program developed for use in South Africa using key components adapted from programs successfully implemented in the US and South Africa. It is designed to address individual HIV transmission risk factors common among orphaned and vulnerable adolescents, including elevated risk for poor psychological health and sexual risk behavior. These efforts are accentuated through parallel programming to support caregivers' mental health and parenting skills. Twelve Let's Talk groups, each serving approximately 10 families, were piloted by two local community-based organizations in Gauteng and Kwa-Zulu Natal provinces, South Africa. Face-to-face interviews were conducted among participating caregivers and adolescents at baseline and three months post-intervention to explore the potential effects of the program on intermediate outcomes that may support HIV preventive behavior. Specifically, generalized estimation equations were used to estimate average change on HIV prevention knowledge and self-efficacy, caregiver and adolescent mental health, and family dynamics. Among the 105 adolescents and their 95 caregivers who participated in Let's Talk and completed both surveys, statistically significant improvements were found for adolescents' HIV and condom use knowledge as well as condom negotiation self-efficacy, but not sexual refusal self-efficacy. Both caregivers and adolescents demonstrated significantly better mental health at post-test. Adolescent/caregiver connection and communication about healthy sexuality also improved. These preliminary results highlight the potential of HIV prevention interventions that engage caregivers alongside the vulnerable adolescents in their care to mitigate adolescent HIV risk factors. A more rigorous evaluation is warranted to substantiate these effects and identify their impact on adolescents' risk behavior and HIV incidence.

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Introduction

South Africa is home to the largest HIV epidemic in the world and accounts for almost one-fourth of all new cases among adolescents (UNICEF, 2016a). Further, an estimated 3.3 million children and adolescents in South Africa have lost one or both parents, many to AIDS (UNICEF, 2016b), and orphanhood increases HIV risk twofold (Operario, Underhill, Chuong, & Cluver, 2011). Programs that effectively mitigate HIV risk among adolescents – especially orphans and others whose vulnerability is greatest – are therefore vital to epidemic control.

While research from South Africa and elsewhere supports the importance of HIV knowledge and related skills for predicting safer sex intentions and behaviors (Bryan, Kagee, & Broaddus, 2006; Eggers, Aarø, Bos,

Mathews, & de Vries, 2014; Walsh, Senn, Scott-Sheldon, Vanable, & Carey, 2011), behavioral prevention programs for youth have demonstrated limited potential in South Africa (Harrison, Newell, Imrie, & Hoddinott, 2010; Michielsen et al., 2010; Scott-Sheldon, Walstrom, Harrison, Kalichman, & Carey, 2014). Interventions that address a broader array of intermediate factors, such as mental health and family dynamics, may increase program effectiveness (Coates, Richter, & Caceres, 2008; DiClemente et al., 2008; Nduna, Jewkes, Dunkle, Shai, & Colman, 2010; Perrino, González-Soldevilla, Pantin, & Szapocznik, 2000). Addressing these factors among orphans and HIV-affected children is particularly important given their elevated levels of psychological distress and family dysfunction (Chi & Li, 2013; Cluver & Gardner, 2007; Cluver, Orkin, Gardner, & Boyes, 2012; Thurman, Kidman, Nice, & Ikamari, 2015).

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Growing evidence links poor mental health to HIV risk behaviors among young people in Sub-Saharan Africa, including higher numbers of sexual partners, inconsistent or low rates of condom use, transactional sex, and age-disparate sexual relationships (Agardh, Cantor-Graae, & Östergren, 2012; Nduna et al., 2010; Smit et al., 2006). Caregiver mental health problems have also been associated with increased sexual risk behavior among adolescents in the US (Mellins et al., 2009). These findings highlight the potential of HIV prevention interventions that provide psychological support to both adolescents and their caregivers.

Engaging caregivers as co-participants also affords the opportunity to optimize other protective factors, including the quality of the caregiver-adolescent relationship and sexual health communication. A systematic review from the US concluded that parent-child connectedness, including communication about sexuality, predicts adolescent sexual and reproductive health outcomes (Markham et al., 2010). Similarly, research from sub-Saharan Africa suggests that the quality of the parent-adolescent relationship and parent-adolescent communication about sex are associated with lower sexual risk behavior among adolescents (Namisi et al., 2013; Peltzer, 2010; Visser, 2017). Longitudinal data from the US also found that higher quality parent-child relationships predict young peoples' greater use of personal prevention strategies and lower risk of sexually transmitted infections (Deptula, Henry, & Schoeny, 2010). Evidence from sub-Saharan Africa indicates that it is possible to foster improved adolescent-caregiver sexual health communication (Bogart et al., 2013; Phetla et al., 2008; Puffer et al., 2016; Vandenhoude et al., 2010) and connectedness (Betancourt et al., 2014). However, little is known about the effectiveness of family-centered interventions for adolescent HIV prevention in sub-Saharan Africa (Harrison et al., 2010; Kuo et al., 2016).

To address this gap, a curriculum-based, family-centered adolescent HIV prevention program for use among orphaned and vulnerable adolescents and their caregivers in South Africa was developed: Let's Talk. It was modeled on an existing evidence-based program for HIV-affected families in the US, Teenagers and Adults Learning to Communicate (Rotheram-Borus et al., 2003; Rotheram-Borus, Lee, Gwadz, & Draimin, 2001; Rotheram-Borus, Stein, & Lin, 2001), with content also derived from evidence-informed HIV prevention and parenting curriculums in South Africa (Cluver et al., 2016; Eloff et al., 2014; Swartz et al., 2012). This paper provides preliminary data on the program's potential effects on key intermediate outcomes that may support HIV prevention behavior in the target population. Analyses were directed towards the hypothesis that Let's Talk would improve

participants' HIV prevention knowledge and self-efficacy, mental health, the adolescent-caregiver relationship and sexual health communication.

Methods

Intervention

Let's Talk¹ was developed in South Africa by the Highly Vulnerable Children Research Center (HVC-RC) at Tulane University in collaboration with the University of Pretoria, with funding from the President's Emergency Plan for AIDS Relief (PEPFAR) via the United States Agency for International Development (USAID) Southern Africa. It is a structured, manualized HIV prevention intervention offered in a support group format to adolescents aged 13+ and their primary caregivers. The program aims to build core HIV knowledge and behavioral skills in tandem with support for caregiver and adolescent mental health, stronger relationships, and improved parenting practices. The intervention includes cognitive behavioral therapy-based components for adolescents and caregivers – emphasizing goal-setting, challenging negative thoughts, and problem-solving skills, as well as adolescent-caregiver communication and condom and sexual refusal negotiation. These social and self-regulatory strategies are coupled with knowledge and technical skills for condom use and pregnancy and HIV prevention. The guiding theoretical frameworks, program theory of change, and formative evaluation process for Let's Talk are described in detail elsewhere (Visser et al., 2018).

Let's Talk was piloted as a three-phase program with 19 caregiver and 14 adolescent sessions, of which six were joint caregiver-adolescent sessions. Participants meet in small closed-group 90-minute sessions led by a trained facilitator, and cover predetermined topics in sequence (Table 1). A manual covering activities and materials needed for each session in detail, including sample scripts and facilitation guidelines for each activity, is fundamental to the program. Facilitators received three separate one-week training sessions throughout implementation in order to gain experience between training sessions.

Study design and procedures

This study reflects an early-phase assessment of the Let's Talk program, applying a one-group pretest-posttest design to examine the sensitivity and directionality of hypothesized intermediate HIV risk outcomes. The study was embedded within the initial roll-out of the program by HIV AIDS in South Africa (HIVSA) and Children in Distress Network (CINDI): two South African non-profit organizations focused on capacity

Table 1. Let's Talk program session outline.

Caregiver sessions	Adolescent sessions
Phase 1: Caregivers Matter	
1. Building a healthy family	<i>No adolescent sessions</i>
2. Emotional awareness	
3. Coping with sadness	
4. Coping with anger	
5. Family problem-solving skills	
Phase 2: Adolescents Matter	
Joint 1 – Introduction and getting to know one another	
2. Raising an adolescent	
Joint 3 – Developing positive family relationships	
4. Effective communication about emotions	
Joint 5 – Problem solving	
6. Helping adolescents cope with difficult emotions	
7. Behavior Management	
Joint 8 – Conflict Management	
Phase 3: Protecting the Future	
9. Adolescent risk taking	9. Sexual relationships
10. Communicating with adolescents about sexual health	10. Communicating about sex
11. Understanding HIV	11. HIV and STI's – Fact and fiction
12. Preventing and responding to crises	12. Condom use
Joint 13 – Future planning	
Joint 14 – Graduation and looking ahead	

Note: Following the pilot, the program was shortened to 14 caregiver sessions and 13 adolescent sessions, including four joint sessions. See Visser et al., 2018 for details on the revised program.

building for community-based organizations (CBOs) serving orphans and vulnerable children and youth (OVCY) and their families. HIVSA and CINDI are based in Gauteng and KwaZulu-Natal provinces, respectively, where HIV prevalence is particularly high (Shisana et al., 2014).

CBO staff managed program recruitment, targeting female caregivers with adolescents' age 13–17 living in their household. Enrollment forms with basic contact information were completed among caregivers that both expressed interest in participating in the intervention and provided permission for their adolescent(s) to participate. Trained interviewers unaffiliated with the implementing organizations conducted baseline surveys with these enrollees in June and July 2015, prior to intervention, and post-test surveys three months after the final session (nine months after baseline assessment) in March 2016. Survey instruments were translated into isiZulu and Sesotho by professional translators familiar with the vernacular in study communities. Face-to-face interviews were administered to participants in their homes using portable electronic data collection devices, with adolescents using audio computer-assisted self-interviewing technology to respond to portions of the interview addressing topics related to sexuality. Caregivers provided written informed consent for their own and the adolescent's participation, and adolescents provided written informed assent. Ethical approvals were granted by the Tulane University Institutional Review Board, USA and the Faculty of Health Sciences Research Ethics Committee at the University of Pretoria, South Africa.

Measures

Adolescent and caregiver HIV knowledge

Drawing from the South African Demographic and Health Survey, seven yes/no questions were used to develop an index variable reflecting respondents' level of knowledge about HIV transmission and prevention, including rejection of common misconceptions (Department of Health, 2007).

Adolescent condom use knowledge

Five questions were used to develop an index measure reflecting awareness of how to use a condom correctly, how to put a condom on oneself or a male partner, and the protective value of condom use.

Adolescent condom negotiation & sexual refusal self-efficacy

Condom negotiation self-efficacy was measured using an index adapted from the Condom Use Self-Efficacy Scale (Brafford & Beck, 1991). Three questions addressed whether the adolescent believed that he/she could convince a new partner to use a condom, ask a partner to start using condoms, and convince an intoxicated partner to use a condom (Cronbach's alpha = 0.8236 at baseline). Sexual refusal self-efficacy was measured similarly with four questions reflecting how certain the respondent was that he/she could refuse sex under specific circumstances (Cronbach's alpha = 0.8689 at baseline).

Caregiver-adolescent sexual risk communication

Sexual risk communication was assessed using five questions derived from a family communication scale used in

previous evaluations of adolescent HIV prevention interventions in South Africa and Uganda (Bhana et al., 2004; Ismayilova, Ssewamala, & Karimli, 2012). A composite score was developed by totaling adolescents' coded response scores reflecting the frequency (on a four-point scale) of related conversational topics (Cronbach's $\alpha = 0.7849$ at baseline).

Adolescent-caregiver connectedness

Connectedness was assessed using adolescent's completion of the Inventory of Parental and Peer Attachment (IPPA) (Armsden & Greenberg, 1987). The IPPA includes 25 items measuring communication, trust, and alienation in parental attachment using a four-point likelihood scale with a total sum score (Cronbach's $\alpha = 0.7580$ at baseline).

Adolescent and caregiver mental health

The 21-item Depression Anxiety Stress Scale (DASS 21) (Lovibond & Lovibond, 1996) was used with both adolescents and caregivers. Respondents recorded the frequency of symptoms during the previous seven days using a four-point scale, with results averaged (Cronbach's $\alpha = 0.8701$ for adolescents and $\alpha = 0.8971$ for caregivers at baseline).

Analysis

Significant changes in group means from baseline to follow-up were identified using generalized estimating equations (GEE) in Stata/IC 14 (College Station, TX) because of GEE's flexibility in specifying outcome distributions. All models employed autoregressive correlation matrices to account for repeated measures, and an identity link function to express the coefficients of each outcome in the original scale units. Models of adolescent outcomes used bootstrapped standard errors to correct for clustering by caregiver. HIV transmission and condom use knowledge measures were expressed as counts of correctly answered questions; accordingly both were modeled with a Poisson distribution. Condom negotiation self-efficacy, sexual refusal self-efficacy, adolescent/caregiver sexual communication and DASS-21 outcomes were modeled with a Gamma distribution due to their skewed distributions. Adolescent/caregiver connection was approximately normally distributed and was modeled with a Gaussian distribution. All models included an age term and the adolescent models also included a gender term. Coefficients from a dummy variable indicating data from the post-test survey is the measure of change reported. Adjusted marginal means by survey round were generated post-estimation to be consistent with the GEE coefficients and to allow for calculations of percentage change.

Results

Participation

The program implementing partners aimed to offer 12 groups with an average of 15 members each, and ultimately recruited 178 caregivers with a total of 216 adolescents under their care for program enrollment. Of these, 131 caregivers and 114 adolescents attended at least one program session (for uptake rates of 74.9% and 55.6% respectively). Approximately 98% of these program participants completed both survey rounds.

The analytical sample was restricted to the 95 caregivers and 105 adolescents where both members of the dyad attended at least one program session. Ten caregivers had two adolescents enrolled in the program and provided separate answers for any adolescent specific questions during the interviews. Attendance was generally high in the analytical sample with adolescents attending an average of 10.3 sessions (out of 14 possible) and caregivers attending an average of 14.6 sessions (out of 19 possible). Further details on participant attendance patterns is available elsewhere (Visser et al., 2018).

Demographics and changes over time

Table 2 presents descriptive statistics for adolescents and caregivers at baseline. The mean age of adolescents was 14.7 years and 61% were female. Almost half of adolescents had experienced the death of at least one parent and half were being cared for by their biological mothers,

Table 2. Baseline characteristics of adolescents and their caregivers.

	Adolescents (N = 105)		Caregivers (N = 95)		
	N	%	N	%	
Female	64	60.95	Female	95	100.00
Male	41	39.05	Married	45	47.37
Sexually active	17	16.19	Chronically ill	10	10.53
Orphan (single or double)	49	46.67	HIV positive	22	23.16
Caregiver relationship			Age		
Mother	53	50.48	19–29	9	9.47
Grandmother	32	30.48	30–39	23	24.21
Sister	9	8.57	40–49	26	27.37
Aunt	10	9.52	50–59	9	9.48
Non-relative	1	0.95	60–69	16	16.84
			70–82	12	12.63
Age			Sessions Attended		
12–13	21	20.00	1–5	8	8.42
14–15	55	52.38	6–10	12	12.63
16–17	29	27.62	11–15	18	18.95
Sessions Attended			16–19	57	60.00
1–5	14	13.33	Attended a joint session with adolescent	92	96.84
5–10	21	20.00			
11–14	70	66.67			
Attended a joint session with caregiver	104	99.05			

Table 3. Adjusted means and standard errors of key outcomes at pre- and post-intervention with group change expressed in unit terms and percentage of baseline average.

	Baseline		Post-test		GEE Results		% Change
	Mean	S.E.	Mean	S.E.	Coefficient	<i>p</i> -value	
Adolescent Level (<i>N</i> = 105)							
Sex Refusal Self-efficacy	5.137	0.309	5.224	0.298	0.087	0.847	1.687
HIV Transmission Knowledge	5.696	0.136	6.113	0.154	0.417	0.008	7.313
Condom Knowledge	3.379	0.116	3.964	0.090	0.586	0.000	17.333
Condom Negotiation Self-efficacy	4.281	0.192	4.782	0.156	0.501	0.005	11.710
Mental Health	0.640	0.042	0.471	0.043	-0.169	0.004	-26.440
Caregiver Connection	50.633	0.872	55.986	0.897	5.353	0.000	10.573
Caregiver Sexual Communication	8.339	0.267	10.083	0.448	1.745	0.000	20.922
Caregiver Level (<i>N</i> = 95)							
Mental Health	0.993	0.490	0.770	0.055	-0.223	0.007	-22.468
HIV Transmission Knowledge	6.280	0.061	6.477	0.089	0.197	0.040	3.133

with another 30% cared for by a grandmother. The average age of caregivers was 48.1 years; all were female and almost half were married. Twenty-three percent of caregivers reported that they were living with HIV and 11% reported being chronically ill.

Table 3 presents the GEE estimated baseline and follow-up adjusted group means and percentage change for each outcome. Statistically significant improvements were found for all outcomes except sexual refusal self-efficacy. There was a 21% increase in caregiver-adolescent communication about sexual health issues ($p = 0.000$) and an 11% improvement in relationship connectedness ($p = 0.000$). Further, results showed a 12% improvement in adolescents' self-efficacy regarding condom negotiation ($p = 0.005$) and 17% increase in condom use knowledge ($p = 0.000$). Adolescents showed a 7% increase in HIV transmission knowledge ($p = 0.008$) and caregivers a 3% increase ($p = 0.040$). Caregiver mental health issues decreased by 22% ($p = 0.007$) and adolescent mental health by 26% ($p = 0.004$).

Discussion

Results from this study suggest that Let's Talk holds significant potential as an adolescent HIV prevention intervention. It incorporates many of the intervention elements identified as effective in global reviews, including skills provision and attitudinal motivation (Johnson, Michie, & Snyder, 2014) and intensive parental involvement (Wight & Fullerton, 2013). The observed changes in HIV knowledge and self-efficacy for condom use are consistent with findings from evaluations of behavioral interventions for young people in the region (Cowan et al., 2010; Doyle et al., 2010; Mathews et al., 2012; Paul-Ebhohimhen, Poobalan, & van Teijlingen, 2008; Rijdsdijk et al., 2011; Ross et al., 2007). However, a recent systematic review of longitudinal cohort studies and mediational analyses of trials denotes the limitations of these individually-based factors in predicting sexual

behavior, suggesting the value of a more comprehensive theoretical and programmatic approach (Huebner & Perry, 2015). The amplified potential of Let's Talk therefore lies in its additional impact on mental health and caregiver-adolescent dynamics.

Research on the impact of psychological health programming on adolescent HIV risk behavior from sub-Saharan Africa is scarce but encouraging. A randomized controlled trial among orphaned and vulnerable adolescents in South Africa found that adolescents who participated in both a psychological and behavioral intervention demonstrated reductions in sexual risk behavior over two years, while those who participated in either intervention in isolation did not (Thurman, Kidman, Carton, & Chiroro, 2016). A randomized trial of a structured family-centered mental health promotion and HIV prevention program in Kenya found reduced sexual risk behavior among adolescents at one month post-intervention (Puffer et al., 2016). However, in spite of the interventions' mental health focus, psychological improvements were not found among participants in either study (Puffer et al., 2016; Thurman, Nice, Taylor, & Luckett, 2017). Let's Talk shows potential to reduce psychological distress among adolescents and their caregivers while also bolstering other protective individual and family-level factors, which could plausibly support HIV preventive behavior (DiClemente et al., 2008).

Few comparative studies of HIV prevention models that include both caregivers and children in sub-Saharan Africa are available, and most are similarly limited to investigating changes in family dynamics versus sustained risk behavior. Two prior pilot trials in South Africa and the above trial in Kenya found improved family communication about sexual health (Armistead et al., 2014; Bell et al., 2008; Puffer et al., 2016). Such communication alongside the improvements in connectedness seen in the current study have been linked to reduced sexual risk behavior and utilization of preventive

services among adolescents (Deptula et al., 2010; Markham et al., 2010).

The study had several important limitations, including the use of a one group design with a relatively small sample. The lack of a comparison group is a major caveat and makes it difficult to determine whether observed changes were due to the intervention or other factors. The study population was limited to beneficiaries currently enrolled or newly recruited by CBOs into their OVCY program, and may not be generalizable to other groups. Further, there is the potential for selection bias as a large portion of those who expressed interest in the program chose not to participate. CBO recruitment efforts targeted caregivers, and adolescents' participation was likely contingent on their caregiver's commitment to the program. Findings from the formative evaluation conducted alongside the pilot suggest the program's length and job and childcare responsibilities inhibited caregivers' optimal participation (Visser et al., 2018). Caregivers available to engage in the program likely differ in important ways from those with competing priorities that prohibited participation. Correspondingly, attendance was also treated uniformly in this analysis despite variations, as dose response effects would require a larger sample size to discern. Average attendance was high overall and treating the sample uniformly better reflects outcomes achieved under real-world conditions where sub-optimal attendance patterns are expected.

Despite these limitations, results from this pilot study may be used to inform the design of future trials (Craig et al., 2008). The measures employed were sensitive to change and mediational analyses among a larger sample could elucidate which theoretical components have the greatest predictive power for reducing adolescent risk behavior. Further, program improvements have been enacted pursuant to the pilot findings, including shortening the program and introducing strategies to encourage attendance (Visser et al., 2018). Future research should investigate if and how the revised Let's Talk model results in sustainable, reduced sexual risk behavior and HIV incidence for young people using a longer follow-up period and a credible counterfactual.

Replicable program models that successfully increase adolescents' uptake of HIV prevention strategies are urgently needed. The revised version of Let's Talk has already undergone extensive scale-up serving an estimated 18,000 adolescent-caregiver dyads in South Africa in 2017 alone. Equally large targets are projected annually through 2019 (A. Sampson, USAID Southern Africa, personal communication, September 2017). This extensive reach coupled with the significant investment required to initiate family-based versus individual-level interventions warrants additional study. In the

meantime, findings from the pilot study highlight the potential of HIV prevention interventions that engage adolescents alongside their caregivers and go beyond standard behavioral knowledge and skills to address family dynamics and mental health.

Note

1. The authors wish to acknowledge another program in South Africa called *Let's Talk!* which similarly focuses on improving parenting practices to prevent children from acquiring HIV. That program focuses exclusively on parents and there is no affiliation with the current program under study. Further details on that program are available elsewhere (Bogart et al., 2013).

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