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Effect of a church-based intervention on abstinence communication among African-American caregiver–child dyads: the role of gender of caregiver and child

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Abstract

Parent–child sexual-health communication is critical. Religious involvement is important in many African-American families, but can be a barrier to sexual-health communication. We tested a theory-based, culturally tailored intervention to increase sexual-abstinence communication among church-attending African-American parent–child dyads. In a randomized controlled trial, 613 parent–child dyads were randomly assigned to one of three 3-session interventions: (i) faith-based abstinence-only; (ii) non-faith-based abstinence-only; or (iii) attention-matched health-promotion control. Data were collected pre- and post-intervention, and 3-, 6-, 12- and 18-months post-intervention. Generalized-estimating-equations Poisson-regression models revealed no differences in communication by intervention arm. However, three-way condition × sex-of-child × sex-of-parent interactions on children's reports of parent–child communication about puberty [IRR=0.065, 95% CI: (0.010, 0.414)], menstruation or wet dreams [IRR=0.103, 95% CI: (0.013, 0.825)] and dating [IRR=0.102, 95% CI: (0.016, 0.668)] indicated that the non-faith-based abstinence intervention's effect on increasing communication was greater with daughters than with sons, when the parent was the father. This study highlights the importance of considering parent and child gender in the efficacy of parent–child interventions and the need to tailor interventions to increase fathers' comfort with communication.

Sexual-health communication by parents is critical to the sexual socialization of adolescents, with parents exerting extraordinary influence and being uniquely positioned to inform adolescents' values, attitudes and behaviors [1]. Parent–child sexual risk communication is associated with increased rates of abstinence and contraceptive use [2, 3]. African-American youth report that parents place a greater emphasis on sexual-abstinence messages [4], with religiously involved adolescents reporting that while parents were forthcoming with information, communication is perceived as limited and judgmental [5].

Interventions that include both parents and children, promote parent involvement, provide sex education to parents and provide opportunities to practice new parent–child communication skills are found to be most effective for improving the sexual-health outcomes of African-American youth [6]. Theory-based group interventions have improved sexual-health communication among African-

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American mothers and their adolescent sons [7, 8]. This highlights the importance of families in reducing sexual risk behaviors among adolescents, and the critical needs of parents to accomplish the goal. In this work, we tested a theory-based, culturally tailored parent–child behavioral intervention to improve sexual-health communication among church-attending African-American families.

Sexual risk behaviors of African-American youth

Compared to their non-Hispanic white and Hispanic peers, African-American youth are more likely to report intercourse before 13 years of age and intercourse with four or more individuals by the end of high school [9]. Further, reported condom use during last sexual intercourse was lower among African-American youth compared to their non-Hispanic white counterparts [9]. Peer and family promotive factors, such as peer prosocial behavior and family involvement, are shown to be protective of sexual risk among African-American youth. In contrast, sexual risk behavior increased among youth who reported having conflictual relationships with their parents [10]. Beyond the importance of relationships with parents, youth with active religiosity, such as church attendance, were more likely to delay sexual intercourse [11].

Parent–child sexual risk communication

Parent–child communication about sexual health is associated with future success of adolescents and young adults including less risky behaviors [6]. However, discussions are often general and framed around consequences [6]. Parental knowledge deficits, lack of directness by parents, and tone of conversations contribute to challenges in parent–child sexual risk communication [6, 12]. Prior interventions have improved multiple sexual risk communication domains, including frequency of communication, quality of communication, intentions to communicate and comfort and communication self-efficacy [6, 8]. This increased parent–child sexual risk communication is associated with safer sex behaviors [3], particularly among adolescent girls. Therefore, supporting parents with education and opportunities to increase sexual-health communication efficacy is critical to reducing the risky sexual behaviors of adolescents.

Religiosity and parent–child sexual risk communication

Religious beliefs about abstinence and safer sex are foundational to how some parents deliver messages to their children [13]. These beliefs can directly influence parent–child sexual-health communication, with parents generally reporting greater hesitancy to communicate about sexual health, particularly topics other than abstinence [5]. Further, religious parents may have greater preference for children's exposure to messages that are congruent with their own attitudes [14]. This may be particularly true for Christian parents who typically report higher levels of religiosity [15] and see the home as the place to receive normative messages about abstinence and safer sex [14]. This communication becomes a way to learn religious/family values, accurate facts and clarify prevention messages related to sexual health [5]. Given that Black Churches have been long-standing institutional backbones of the African-American community [16], faith-based interventions may be particularly resonant with African-American families. As such, using churches as a site for interventions and religious teachings as part of messaging may facilitate abstinence and safer sex behaviors in adolescents.

Gender differences in parent–child sexual risk communication

There are identified patterns in abstinence and safer sex communication by parent and child gender. A review by Flores and Barroso [6] found that more studies reported parent–child sexual communication occurring between mothers and daughters. Mothers also figure more predominantly in communication

with boys [17]. Overall, same-gender dyads reported discussing the highest number of topics; daughters received more communication from mothers, and sons from fathers [6]. However, the influence of parental religiosity and communication on youth risk engagement is inconsistent. For example, Ritchwood *et al*. [18] found that greater religiosity among parents was associated with greater sexual risk communication with boys, but not girls. Given the inconsistency in the literature related to gender congruence, parent–child abstinence, and safer sex communication, understanding the ways in which the gender of parents and children may influence the efficacy of faith-based risk reduction programs will contribute to our understanding of how to most effectively tailor interventions.

Current study

Researchers have noted that African-American families have unmet communication needs [7, 12], with religious organizations being an important ally for religious families [12]. Effective interventions can help reduce these barriers. Because there is inconsistent evidence that religious youth delay sexual initiation at differing rates than their non-religious peers [19, 20], and that families are important in promoting adolescent wellbeing [1], it is important to help religious families find ways to successfully communicate about safer sex (in the context of values and morality).

Prior studies have shown evidence supporting abstinence-based interventions' efficacy among African-American adolescents [21, 22], and we recently reported a study that investigated whether abstinence-only interventions implemented with church-attending adolescents and their caregivers would reduce sexual risk behaviors among African-American adolescents [23]. We randomized caregiver–child dyads to one of three interventions: a faith-based abstinence-only intervention, a non-faith-based abstinence-only intervention and a health-promotion intervention, which served as the attention-matched control group and followed the participants for 18 months after the interventions. We found the adolescents in the non-faith-based abstinence-only intervention who endorsed engagement in sexual behavior were less likely to report condomless sex, reported sexual intercourse less frequently and reported fewer partners compared to the attention-matched control group; these differences were not observed in the faith-based abstinence-only intervention [23]. This article reports tests of whether (i) the abstinence-only interventions would increase parent–child communication compared with the control group; (ii) the faith-based intervention would be more efficacious than the non-faith-based intervention; and (iii) the interventions would be more efficacious with caregiver–child gender concordant dyads, i.e. same-gender caregiver–child dyads, than with gender-discordant dyads.

Materials and methods

Participants were African-American caregivers and one of their children ages 11–14 years who were attending one of 14 partner African-American Baptist churches in Philadelphia, PA. As reported elsewhere [23], churches were elicited as recruitment sites through meetings with pastors and youth ministers; study goals and objectives were presented at that time. When the church leadership agreed to participate as a recruitment site, posters and brochures (tailored to the church site) describing the study were distributed to congregants. Further, ministers announced the study from the pulpit and allowed recruitment materials to be included in the church's bulletin and displayed at church events. Ministers, parents, community leaders and representatives from each church served as a Community Advisory Board, providing advice on recruitment and retention strategies, intervention protocol and measures and staff recruitment and hiring efforts to increase the acceptability of the project to the target population. All study procedures were approved by the Institutional Review Board of the University of Pennsylvania.

Study design

This study used a randomized control trial design. After stratifying caregiver–child dyads by child's

age and gender, we used computer-generated random number sequences to allocate them to one of three interventions: (i) faith-based abstinence-only which emphasized the importance of delaying or curtailing sexual intercourse until marriage drawing upon Biblical scriptures; (ii) non-faith-based abstinence-only, which emphasized delaying or curtailing sexual intercourse until marriage without mentioning scriptures; or (iii) an attention-matched health-promotion control focused on reducing the risk of cardiovascular disease, heart disease, hypertension and cancer. We employed concealment of allocation techniques, designed to minimize bias in assignment to interventions in randomized clinical trials. One researcher generated the random assignments; implementation of the assignments was done by the project director. Once participants were enrolled, data collectors, but not facilitators or participants, were blind to condition assignment. To participate, caregivers were required to provide informed consent and permission for their child's participation; children provided assent.

Interventions

Interventions, regardless of arm, were identical in duration and structure. Each consisted of 12 1-h modules implemented over 3 consecutive Saturdays at participating churches. The content in each of the three arms was grounded in social cognitive theory [24], the theory of planned behavior [25], formative research (focus groups) and pilot testing of the interventions conducted with the target population. Caregiver–child dyads participated in joint and separate (yet simultaneous) intervention activities. Separately and together, caregivers and children participated in activities to improve their understanding of each other's thoughts, reactions and feelings about discussing sexuality and abstinence. On each of the three Saturdays, children and caregivers received the intervention in separate groups during the morning and in joint group sessions during the afternoon. Separate group morning sessions focused on attitudes and beliefs about abstinence or health. Joint caregiver–child afternoon sessions focused on self-efficacy and skills for the targeted behaviors. For example, an afternoon session included role-plays in which caregivers practiced effective communication and listening skills with support and feedback provided by the group and facilitator. For caregivers and children, 3-h booster-session maintenance activities designed to reinforce lessons learned during the initial sessions occurred at 6- and 12-weeks post-intervention.

Abstinence-only interventions

The faith- and non-faith-based abstinence-only intervention arms were identical except for the inclusion of scripture/related religious content in the faith-based arm. Culturally appropriate education videos depicting African-American parents and children in various situations were viewed in each intervention. Role-plays allowed participants to practice and reinforce skills and bolster self-efficacy related to negotiation. Facilitated group discussions centered on the importance of, barriers to, and guidelines and support for strengthening parent–child communication.

'Together We Can Do All Things: Be Proud Be Responsible!' was the guiding intervention theme, which encouraged children to be future goal oriented, proud of themselves and their family, avoid risky behaviors that could be barriers to accomplishing their goals and utilize their parents for guidance and support. Caregivers were further encouraged to think about how to support their children in reaching their goals and consider barriers and facilitators to goal achievement. To allow for practice of content and skills learned during intervention session, homework activities were assigned. Neither the faith-based abstinence nor the non-faith-based abstinence-only curriculum contained any content related to condoms or other forms of birth control. However, the training manual and curriculum explicitly instructed facilitators to not denigrate the efficacy or use of condoms, or allow the view that condoms were ineffective for preventing pregnancy and sexually transmitted infections, to prevail.

Health-promotion control intervention

Caregivers and children in the health-promotion intervention served as attention controls. Content in

this intervention focused on prominent health issues in the African-American community, including heart disease, hypertension, stroke, diabetes and certain cancers. This arm was designed to change behaviors related to physical activity, dietary practices, tobacco use and breast and testicular self-examination. Drawing on the social cognitive theory [24] and the theory of planned behavior [25], the focus was on increasing communication comfort, skill and self-efficacy. Session number and structure mirrored the abstinence-only intervention arms to control for 'Hawthorne effects'.

Facilitators

All intervention facilitators were African-American adults recruited from participating churches (N=141). We randomly assigned them to be trained to implement one of the three interventions. All facilitators participated in three 6-h training sessions specific to their assigned intervention. The training covered the theoretical grounding of the intervention, the content and skill-based activities and intervention fidelity. We evaluated fidelity through completion of intervention logs and questionnaires by facilitators at the end of each intervention or booster session.

Data collection and measures

Caregivers and children separately completed questionnaires pre and immediately post-intervention, and 3-, 6-, 12- and 18-months post-interventions on caregiver–child communication. Questions were pilot tested with members of the target population prior to the study implementation. There were several methods used to increase the validity of self-reported behaviors, including the use of a calendar to facilitate recall and the inclusion of language that stressed the importance of honesty of self-reports. Consent forms noted the procedures to ensure confidentiality (e.g. use of code numbers rather than names). After consent/assent was received, participants completed a survey with questions on attitudes about abstinence, safer sex and general health behaviors, beliefs about engaging in abstinence, safer sex and general health behaviors, engagement in sexual risk behaviors (defined as vaginal penetration), engagement in general health behaviors (healthy eating, exercise, substance use and oral health), parent–child communication, parent–child relationship, religiosity and demographic variables.

For these analyses, we specifically explore the impact of the interventions on caregiver–child communication. Caregiver and child were asked parallel questions about abstinence and safer sex communication frequency. Single-item, open-ended questions were all framed in the same way, 'In the past 3 months, how many times have you talked to your child/has your parent talked to you about . . .': (i) puberty and the physical changes that accompany puberty, (ii) menstruation/periods or wet dreams, (iii) abstaining from sex until marriage, (iv) his or her dating (going out with a person of the other sex), (v) how to resist pressure from friends to have sex, (vi) resist pressure from his or her boyfriend or girlfriend to have sex, (vii) sexual morality, e.g. whether sex before marriage is right or wrong, (viii) how to prevent pregnancy, (ix) how to prevent sexually transmitted diseases and (x) how to prevent HIV and AIDS. Respondents wrote in the number of times (range 0–90).

Statistical analyses

Chi-square tests and logistic regression models were used to analyze attrition. We tested the efficacy of each intervention, the non-faith-based abstinence-only intervention and the faith-based abstinence-only intervention, compared with the attention-matched health-promotion control using generalized estimating equation Poisson-regression models. We adjusted for the outcome response at baseline, post-assessment time and correlation within subjects. We tested both the reports from children and caregiver as behavioral outcomes. Models included intervention condition, time and baseline measurement. We estimated incident risk ratios (IRR) and their 95% confidence intervals (95% CI). Thus, resulting estimates represent the effect of the intervention on the frequency of communication about a given abstinence and sex communication topic, averaged over subjects and post-

measurements, considering the correlation among multiple measurements within a subject. In these models, independent working correlation matrices were assumed, and heteroskedasticity-robust standard errors were estimated. We also tested whether the efficacy of each intervention differed depending on caregiver and child gender. Models for these tests included intervention condition, time, caregiver gender (male versus female), child gender (male versus female), baseline report of communication, the two-way interactions (between caregiver gender and condition, between children gender and condition and between caregiver gender and children gender) and the three-way interaction (caregiver gender, child gender and condition).

Results

The participants were 613 caregiver–child dyads. Of these, 207 dyads were randomized into the faith-based, 209 dyads into the non-faith-based abstinence-only intervention and 197 into the health-promotion attention control. Demographic characteristics by condition are presented in Table I. About 63% of caregivers were either biological or adoptive parents. Mean age of caregiver was 41.5 years (SD=10.1 years); 88% were female and 31% were married. Child mean age was 12.3 years (SD=1.1 years); 56% were female. At the baseline assessment, 18% of the children reported having engaged in vaginal intercourse with 11% reporting vaginal intercourse in the prior 3 months.

Attendance

About 99% of participants attended the first intervention session; retention rates for Sessions 2 and 3 were 89% and 95%, respectively. About 70% attended the 6-week booster session, and 77% attended the 3-month booster. Mean session attention was 4.30 (SD=1.02); there were no statistically significant differences in attendance by intervention arm.

Further, there were no statistically significant differences by intervention conditions in the number of participants attending at least one follow-up, χ^2 [2]=4.18, P=0.124. The completion rates of post-intervention assessments were 79% (483/613, 3 months), 77% (471/613, 6 months), 70% (428/613, 12 months) and 61% (376/613, 18 months). A total of 554 (90%) children completed at least one follow-up session. The percentage attending at least one follow-up assessment did not differ between the control and the non-faith-based intervention conditions (χ^2 [1]=1.512, P=0.219), or between the control and the faith-based intervention conditions (χ^2 [1]=0.109, P=0.741). However, the percentage attending at least one follow-up assessment was higher among girls as compared to boys (χ^2 [1]=6.60, P=0.010). There were no differences in attrition rate by the age of children.

Descriptive statistics about sexual-health communication frequency by condition and assessment period are shown in Table II. As shown in Table III, the effects of the interventions compared with the attention-control intervention were non-significant on these outcomes.

We also investigated parent–child gender concordance interacted with the interventions to affect outcomes by testing intervention condition × gender of child × gender of parent three-way interactions (see Table IV). For the non-faith-based abstinence-only intervention, this interaction was significant for communication about puberty [IRR=0.065, 95% CI: (0.010, 0.414)], menstruation or wet dreams [IRR=0.103, 95% CI: (0.013, 0.825)] and dating [IRR=0.102, 95% CI: (0.016, 0.668)]. Frequency of communication about how to prevent HIV and AIDS trending toward significance [IRR=0.165, 95% CI: (0.025, 1.093)]. As marginal means in Fig. 1 illustrate the non-faith-based intervention's effects on increasing communication, compared with the attention-matched control condition, were greater with daughters than with sons when the caregiver was male, but did not differ when the caregiver was female. These interactions were non-significant on the parent-reported communication frequencies.

Discussion

Our primary goal was to test the influence of a church-based parent–child intervention on the

Table I. *Baseline sociodemographic characteristics of participating parents and children by intervention condition, Philadelphia, PA*

Characteristic	Total	Faith-based abstinence-only intervention	Non-faith-based abstinence-only intervention	Attention-matched health-promotion control
No. of the parent–children dyad	613	207	209	197
Parents				
Age, mean (SD)	41.5 (10.1)	40.9 (10.3)	41.6 (10.0)	42.1 (10.0)
African American	526/556 (94.6%)	175/188 (93.1%)	182/191 (95.3%)	169/177 (95.5%)
Female	540/613 (88.1%)	182/207 (87.9%)	178/209 (85.2%)	180/197 (91.4%)
Married	192/611 (31.4%)	61/206 (29.6%)	74/209 (35.4%)	57/196 (29.1%)
Education				
Less than Graduated from High School	89/581 (15.3%)	37/197 (18.8%)	27/199 (13.6%)	25/185 (13.5%)
Graduated from high school	144/581 (24.8%)	49/197 (24.9%)	48/199 (24.1%)	47/185 (25.4%)
At least Some Trade School	57/581 (9.8%)	17/197 (8.6%)	21/197 (10.6%)	19/185 (10.3%)
At least Some College	291/581 (50.1%)	94/197 (47.7%)	103/197 (51.8%)	94/185 (50.8%)
Biological or adoptive parent	464/603 (76.9%)	163/204 (79.9%)	149/206 (72.3%)	152/193 (78.8%)
Employed	384/610 (63.0%)	129/206 (62.6%)	132/209 (63.2%)	123/195 (63.1%)
Children				
Age, mean (SD)	12.3 (1.1)	12.2 (1.1)	12.3 (1.2)	12.2 (1.1)
African American	550/592 (92.9%)	185/198 (93.4%)	181/201 (90.1%)	184/193 (95.3%)
Female	341/613 (55.6%)	117/207 (56.5%)	113/209 (54.1%)	111/197 (56.4%)
Grade				
5	79/613 (12.9%)	29/207 (14.0%)	31/209 (14.8%)	19/197 (9.6%)
6	169/613 (27.5%)	58/207 (28.0%)	47/209 (22.5%)	64/197 (32.5%)
7	160/613 (26.1%)	54/207 (26.1%)	53/209 (25.4%)	53/197 (26.9%)
8	131/613 (21.4%)	43/207 (20.8%)	50/209 (23.9%)	38/197 (19.3%)
9	74/613 (12.1%)	23/207 (11.1%)	28/209 (13.4%)	23/197 (11.7%)
Ever had vaginal intercourse	112/604 (18.5%)	32/203 (15.8%)	43/207 (20.8%)	37/194 (19.1%)
Had vaginal intercourse in the past 3 months	64/604 (10.6%)	19/203 (9.36%)	21/207 (10.1%)	24/194 (12.4%)

abstinence and sexual morality communication behaviors of caregivers. There were no significant differences found by intervention arm. This may be attributable to high reported communication at baseline across conditions. In addition, almost one-fifth of children in the study reported ever having sex at baseline. As supported by prior work that shows youth who report engaging in sexual intercourse are more likely to report having a parent who communicated with them about sex [26], it may be that parents were already engaged in conversations about abstinence and safer sex behaviors.

We also conducted analyses of the effects of the intervention conditions on communication frequency by caregiver and child gender. While our findings relating to frequency of communication and gender differences did not occur across all topics of communication, we found significant interaction effects in the non-faith-based abstinence intervention arm by gender concordance and

Table II. *Information quantity reported from parents and children by intervention condition and assessment period*

Variable	Baseline	3-month	6-month	12-month	18-month
Reports from children					
Communication about puberty, mean (SD)					
Faith-based abstinence-only intervention	8.7 (21.2)	10.4 (21.5)	9.7 (21.5)	9.1 (23.9)	11.2 (26.9)
Non-faith-based abstinence-only intervention	10.6 (23.9)	6.0 (10.3)	10.7 (21.8)	8.2 (19.9)	9.7 (25.9)
Attention-matched health-promotion control	9.7 (24.7)	6.2 (13.4)	13.2 (30.9)	7.2 (15.8)	9.3 (21.5)
Communication about menstruation or wet dreams, mean (SD)					
Faith-based abstinence-only intervention	5.9 (14.0)	8.0 (17.9)	7.9 (19.3)	5.9 (14.9)	9.0 (24.4)
Non-faith-based abstinence-only intervention	7.4 (15.4)	6.6 (15.4)	7.8 (18.2)	7.3 (19.6)	9.6 (32.0)
Attention-matched health-promotion control	5.5 (9.8)	5.0 (13.1)	9.7 (20.7)	5.5 (11.7)	8.4 (21.2)
Communication about abstaining from sex until marriage, mean (SD)					
Faith-based abstinence-only intervention	8.0 (20.4)	13.6 (39.9)	10.3 (22.9)	7.3 (17.9)	8.9 (24.6)
Non-faith-based abstinence-only intervention	10.3 (23.0)	7.5 (15.3)	10.7 (23.4)	8.4 (19.2)	12.7 (38.0)
Attention-matched health-promotion control	11.0 (28.2)	8.0 (20.3)	12.1 (25.1)	9.5 (21.5)	11.5 (37.6)
Communication about dating, mean (SD)					
Faith-based abstinence-only intervention	5.2 (11.8)	7.3 (17.2)	7.2 (17.5)	7.3 (17.8)	7.9 (17.6)
Non-faith-based abstinence-only intervention	16.9 (7.2)	7.2 (16.3)	9.2 (19.7)	9.0 (19.7)	11.2 (24.3)
Attention-matched health-promotion control	8.4 (20.0)	7.4 (17.4)	13.0 (29.4)	9.7 (20.8)	10.4 (21.4)
Communication about how to resist pressure from friends to have sex, mean (SD)					
Faith-based abstinence-only intervention	6.3 (16.0)	6.3 (12.1)	6.3 (16.3)	8.9 (23.3)	9.9 (25.2)
Non-faith-based abstinence-only intervention	6.7 (16.2)	5.1 (10.6)	10.8 (22.9)	7.7 (18.8)	9.0 (21.0)
Attention-matched health-promotion control	6.4 (15.9)	5.7 (15.0)	9.5 (20.4)	6.9 (18.6)	8.2 (19.4)
Communication about how to resist pressure from a boyfriend or girlfriend to have sex, mean (SD)					
Faith-based abstinence-only intervention	8.4 (24.7)	6.9 (15.5)	7.1 (17.1)	7.1 (17.1)	11.5 (26.6)
Non-faith-based abstinence-only intervention	7.5 (19.1)	7.0 (15.5)	11.7 (27.4)	7.2 (16.5)	8.4 (18.1)
Attention-matched health-promotion control	7.7 (21.5)	5.8 (14.0)	10.3 (23.1)	7.2 (17.5)	7.5 (17.4)
Communication about sexual morality, mean (SD)					
Faith-based abstinence-only intervention	6.3 (13.9)	7.7 (16.1)	8.1 (17.7)	8.0 (19.4)	9.9 (25.5)
Non-faith-based abstinence-only intervention	10.3 (29.1)	5.9 (12.1)	12.1 (29.4)	7.9 (18.4)	8.1 (17.5)
Attention-matched health-promotion control	7.1 (15.3)	8.5 (23.9)	10.0 (21.1)	7.4 (16.0)	9.5 (21.7)
Communication about how to prevent pregnancy, mean (SD)					
Faith-based abstinence-only intervention	9.8 (22.3)	9.7 (28.9)	8.2 (18.5)	10.0 (21.7)	11.8 (26.0)
Non-faith-based abstinence-only intervention	9.3 (22.2)	8.0 (21.0)	10.4 (22.4)	7.2 (15.2)	8.7 (18.9)
Attention-matched health-promotion control	9.2 (21.8)	7.9 (17.8)	10.9 (25.9)	8.3 (19.6)	10.4 (27.9)
Communication about how to prevent STDs, mean (SD)					
Faith-based abstinence-only intervention	8.5 (18.8)	7.8 (17.3)	10.6 (23.5)	9.5 (21.9)	10.4 (24.8)
Non-faith-based abstinence-only intervention	8.3 (16.2)	8.1 (16.4)	11.3 (25.4)	8.0 (17.8)	8.1 (19.0)
Attention-matched health-promotion control	9.7 (22.0)	7.6 (17.4)	12.5 (27.3)	8.9 (21.0)	8.1 (18.6)
Communication about how to prevent HIV and AIDS, mean (SD)					
Faith-based abstinence-only intervention	9.3 (26.7)	10.0 (21.6)	7.5 (18.0)	7.6 (18.4)	12.6 (28.1)
Non-faith-based abstinence-only intervention	7.1 (14.8)	10.2 (25.7)	10.0 (21.2)	7.8 (17.6)	8.8 (20.7)
Attention-matched health-promotion control	10.4 (21.4)	8.6 (19.2)	12.5 (26.4)	7.8 (17.6)	9.6 (21.9)
Reports from parents					
Communication about puberty, mean (SD)					
Faith-based abstinence-only intervention	5.3 (7.7)	8.0 (10.8)	5.8 (7.8)	6.9 (10.0)	5.9 (7.7)
Non-faith-based abstinence-only intervention	6.2 (10.2)	7.9 (11.0)	5.8 (7.6)	7.4 (10.3)	6.1 (9.2)
Attention-matched health-promotion control	3.8 (5.0)	5.3 (6.8)	5.6 (7.7)	6.0 (7.8)	6.0 (6.1)
Communication about menstruation or wet dreams, mean (SD)					
Faith-based abstinence-only intervention	3.9 (6.2)	5.7 (8.3)	4.5 (6.1)	5.0 (7.3)	5.5 (8.7)
Non-faith-based abstinence-only intervention	4.5 (8.6)	5.8 (9.9)	4.0 (4.4)	5.4 (8.0)	4.5 (7.1)

Table II. *(continued)*

Variable	Baseline	3-month	6-month	12-month	18-month
Attention-matched health-promotion control	3.2 (4.4)	4.7 (7.7)	4.3 (6.3)	4.9 (6.1)	5.3 (8.3)
Communication about abstaining from sex until marriage, mean (SD)					
Faith-based abstinence-only intervention	3.6 (6.7)	8.5 (12.5)	6.4 (10.5)	6.4 (9.1)	7.3 (12.3)
Non-faith-based abstinence-only intervention	5.1 (8.8)	6.9 (9.7)	5.0 (5.9)	6.5 (8.9)	6.6 (9.6)
Attention-matched health-promotion control	3.2 (5.0)	5.6 (8.9)	5.6 (7.8)	6.9 (11.0)	6.3 (7.6)
Communication about dating, mean (SD)					
Faith-based abstinence-only intervention	4.1 (7.4)	6.1 (10.1)	5.9 (10.8)	6.6 (10.9)	6.7 (10.6)
Non-faith-based abstinence-only intervention	3.2 (4.9)	6.2 (10.2)	4.8 (6.3)	6.7 (9.9)	6.3 (8.9)
Attention-matched health-promotion control	3.2 (6.0)	5.0 (8.3)	5.1 (7.7)	4.8 (7.2)	6.6 (9.4)
Communication about how to resist pressure from friends to have sex, mean (SD)					
Faith-based abstinence-only intervention	3.5 (6.6)	7.3 (12.3)	6.3 (11.8)	6.5 (10.4)	7.2 (11.5)
Non-faith-based abstinence-only intervention	3.9 (7.5)	5.7 (8.3)	5.0 (8.0)	6.4 (10.4)	6.6 (11.3)
Attention-matched health-promotion control	3.3 (6.9)	5.6 (8.8)	5.8 (8.9)	6.3 (10.6)	6.9 (9.4)
Communication about how to resist pressure from a boyfriend or girlfriend to have sex, mean (SD)					
Faith-based abstinence-only intervention	3.3 (7.3)	7.1 (12.6)	5.9 (11.9)	6.3 (10.2)	5.7 (8.9)
Non-faith-based abstinence-only intervention	4.1 (8.5)	5.5 (8.5)	5.2 (9.4)	6.6 (11.5)	6.4 (11.4)
Attention-matched health-promotion control	2.6 (4.9)	4.5 (7.7)	5.4 (9.0)	5.6 (10.3)	6.9 (10.5)
Communication about sexual morality, mean (SD)					
Faith-based abstinence-only intervention	4.3 (7.6)	7.7 (12.2)	6.7 (11.5)	6.5 (9.6)	7.3 (12.2)
Non-faith-based abstinence-only intervention	5.3 (9.7)	6.3 (9.7)	5.1 (7.1)	7.7 (13.6)	5.8 (8.2)
Attention-matched health-promotion control	3.4 (5.7)	5.5 (8.1)	5.9 (8.9)	6.9 (11.0)	7.3 (11.2)
Communication about how to prevent pregnancy, mean (SD)					
Faith-based abstinence-only intervention	3.8 (7.5)	6.5 (11.5)	6.9 (13.0)	6.2 (10.0)	6.1 (10.2)
Non-faith-based abstinence-only intervention	4.8 (8.3)	7.0 (12.3)	5.3 (7.8)	8.1 (14.3)	6.3 (10.2)
Attention-matched health-promotion control	3.5 (6.6)	5.6 (9.1)	6.7 (11.2)	6.4 (11.5)	7.7 (12.3)
Communication about how to prevent STDs, mean (SD)					
Faith-based abstinence-only intervention	4.1 (6.9)	7.2 (12.5)	7.1 (13.0)	7.4 (12.9)	6.6 (10.2)
Non-faith-based abstinence-only intervention	4.7 (8.6)	6.7 (10.3)	6.0 (8.5)	6.6 (10.3)	5.9 (9.1)
Attention-matched health-promotion control	4.0 (9.2)	5.4 (7.6)	6.2 (9.6)	6.3 (10.1)	7.7 (11.4)
Communication about how to prevent HIV and AIDS, mean (SD)					
Faith-based abstinence-only intervention	5.0 (10.1)	7.5 (13.2)	7.5 (13.7)	7.4 (11.6)	6.5 (10.3)
Non-faith-based abstinence-only intervention	4.9 (9.0)	6.9 (10.0)	6.6 (11.6)	6.9 (10.6)	6.1 (9.5)
Attention-matched health-promotion control	3.3 (6.9)	5.7 (8.6)	6.5 (11.1)	6.1 (9.8)	7.3 (11.1)

communication frequency for three communication types (puberty, menstruation/wet dreams, and dating), with frequency of communication about how to prevent HIV and AIDS trending toward significance. Compared with the control condition, among youth in the non-faith-based abstinence intervention, fathers were more likely to talk to their daughters but not their sons; in contrast, the intervention did not differentially affect mothers' communication with daughters and sons. Prior work found significant differences in parent–child communication about abstinence and safer sex by gender, with mothers more likely than fathers to be the communicators [5, 6, 27]. Comfort of abstinence and safer sex communication between fathers and their children may impact this disparity. For example, girls report that compared to mothers, fathers covered fewer sexual topics and were perceived as less comfortable with communication [28]. Closeness and connectedness between fathers and their children may also influence these relationships. Closeness is important because it can influence child's later views on responsible sexual behavior [29], with greater closeness and connectedness associated with

Table III. *Effects of the interventions on frequencies of communication*

Outcome	Faith-based abstinence-only intervention				Non-faith-based abstinence-only intervention			
	Parent		Children		Parent		Children	
	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value
Communication about puberty	1.088 (0.870, 1.360)	0.461	1.137 (0.807, 1.602)	0.462	1.023 (0.822, 1.274)	0.838	0.934 (0.664, 1.313)	0.692
Communication about menstruation or wet dreams	1.026 (0.787, 1.338)	0.849	0.992 (0.706, 1.395)	0.965	0.866 (0.661, 1.134)	0.296	0.984 (0.676, 1.433)	0.934
Communication about abstaining from sex until marriage	1.198 (0.924, 1.555)	0.173	1.115 (0.765, 1.627)	0.571	0.899 (0.713, 1.135)	0.372	0.964 (0.668, 1.392)	0.845
Communication about dating	1.226 (0.919, 1.634)	0.165	0.817 (0.581, 1.150)	0.247	1.230 (0.945, 1.600)	0.124	0.897 (0.642, 1.252)	0.522
Communication about how to resist pressure from friends to have sex	1.143 (0.859, 1.521)	0.360	1.034 (0.743, 1.437)	0.844	0.953 (0.721, 1.259)	0.734	1.028 (0.742, 1.424)	0.867
Communication about how to resist pressure from a boyfriend or girlfriend to have sex	1.064 (0.782, 1.447)	0.693	1.083 (0.763, 1.537)	0.654	0.914 (0.678, 1.232)	0.555	1.153 (0.832, 1.598)	0.393
Communication about sexual morality	1.137 (0.864, 1.496)	0.360	0.967 (0.676, 1.383)	0.852	0.817 (0.625, 1.068)	0.139	0.859 (0.598, 1.233)	0.409
Communication about how to prevent pregnancy	1.032 (0.740, 1.441)	0.852	1.097 (0.759, 1.586)	0.622	0.987 (0.705, 1.381)	0.940	0.901 (0.624, 1.301)	0.579
Communication about how to prevent STDs	1.228 (0.897, 1.681)	0.200	1.001 (0.717, 1.398)	0.995	1.045 (0.786, 1.390)	0.760	0.919 (0.662, 1.276)	0.614
Communication about how to prevent HIV and AIDS	1.078 (0.780, 1.490)	0.650	0.941 (0.663, 1.336)	0.733	0.995 (0.780, 1.490)	0.974	0.924 (0.659, 1.296)	0.646

Generalized estimating equation (GEE) Poisson-regression models were used. Estimates are coefficients of the models adjusting for the baseline outcome, time and correlation within subjects. The 95% CI in brackets. Outcomes were measured at the 3-, 6-, 12- and 18-month post-intervention assessments.

greater abstinence and safer sex communication by fathers [30]. Our findings extend the literature specific to fathers as sexual-health educators, and the influence of an intervention on fathers' safer sex communication.

While findings on the effectiveness of abstinence-only interventions are mixed, a recent meta-analysis [31] finds there are significant relationships between abstinence-only interventions and sex attitudes and behaviors (specifically delayed sexual debut). While abstinence plus safer sex interventions are crucial as children age, early communication of sexual development can be successfully grounded in the values of families and communities.

Table IV. *Three-way interaction (sex of children × sex of parents × intervention) predicting frequencies of communication*

Outcome	Faith-based abstinence-only intervention				Non-faith-based abstinence-only intervention			
	Parent		Children		Parent		Children	
	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value	IRR (95% CI)	*P*-value
Communication about puberty	0.236 0.052, 1.064)	0.060	0.318 (0.041, 2.456)	0.272	2.543 (0.610, 10.603)	0.200	0.065 (0.010, 0.414)	0.004
Communication about menstruation or wet dreams	0.920 (0.139, 6.073)	0.931	0.614 (0.243, 10.955)	0.614	3.842 (0.720, 20.492)	0.115	0.103 (0.013, 0.825)	0.032
Communication about abstaining from sex until marriage	0.565 (0.098, 3.246)	0.522	1.242 (0.217, 7.125)	0.808	2.476 (0.562, 10.903)	0.231	0.206 (0.029, 1.470)	0.115
Communication about dating	0.512 (0.094, 2.798)	0.440	0.634 (0.082, 4.927)	0.663	2.332 (0.504, 10.778)	0.278	0.102 (0.016, 0.668)	0.017
Communication about how to resist pressure from friends to have sex	0.581 (0.099, 3.416)	0.548	1.259 (0.283, 5.606)	0.762	1.348 (0.257, 7.058)	0.724	0.268 (0.050, 1.431)	0.123
Communication about how to resist pressure from a boyfriend or girlfriend to have sex	1.008 (0.200, 5.075)	0.992	0.433 (0.070, 0.267)	0.367	1.299 (0.217, 7.764)	0.774	0.236 (0.044, 1.264)	0.092
Communication about sexual morality	0.572 (0.109, 3.006)	0.509	1.597 (0.334, 7.632)	0.557	3.514 (0.694, 17.802)	0.129	1.444 (0.163, 12.788)	0.741
Communication about how to prevent pregnancy	1.187 (0.178, 7.906)	0.859	1.264 (0.214, 7.453)	0.796	2.693 (0.458, 15.824)	0.273	1.414 (0.203, 9.857)	0.727
Communication about how to prevent STDs	0.486 (0.083, 2.854)	0.424	0.542 (0.086, 3.397)	0.513	2.211 (0.332, 14.708)	0.412	0.565 (0.074, 4.342)	0.583
Communication about how to prevent HIV and AIDS	0.591 (0.073, 4.820)	0.623	0.184 (0.023, 1.487)	0.112	1.636 (0.256, 10.442)	0.603	0.165 (0.025, 1.093)	0.062

Generalized estimating equation (GEE) Poisson-regression models were used. Estimates are coefficients of the three-way interactions in the models. The models included condition, time, parent gender (male or female), child gender (male or female), the baseline outcome, the two-way interactions (between parent gender and condition, between children gender and condition and between parent gender and child gender) and the three-way interaction. The models adjusted for the correlation within subjects. Robust standard errors in parentheses. Outcomes were measured at the 3-, 6-, 12- and 18-month post-intervention assessments.

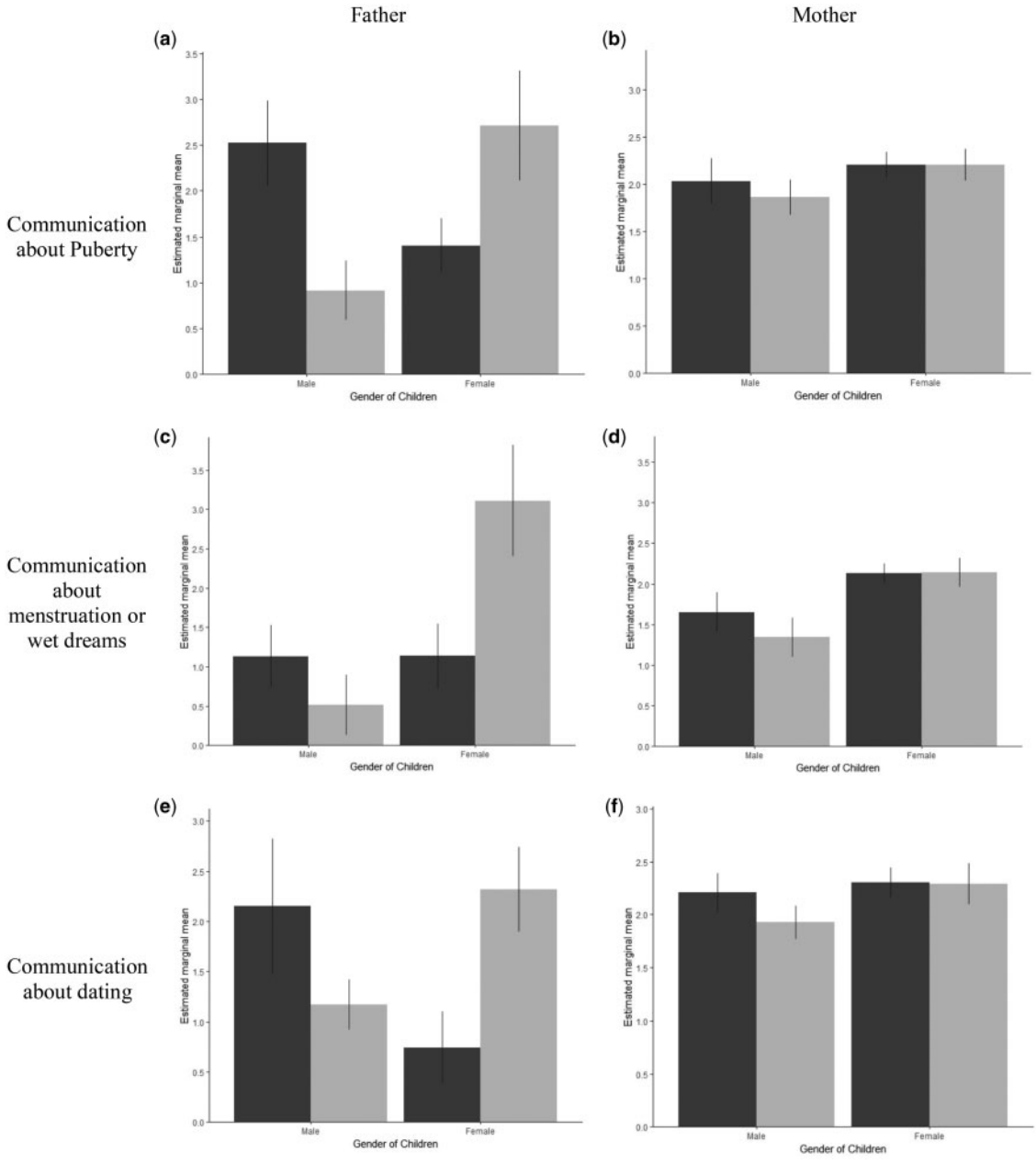

Fig. 1. Interaction among sex of children, sex of parents and the non-faith-based abstinence-only intervention compared to the attention-matched health-promotion intervention fit to frequencies of communication reported by children. The bars represent log-transformed marginal means estimated from GEE Poisson-regression models. The dark gray and light gray colors represent the health-promotion control and the non-faith-based intervention, respectively. The error bars represent estimated marginal means ± SEM.

Faith-based organizations are important vehicles for health communication [32]. Because of the importance of religion, spirituality and church attendance in the African-American community [33], African-American churches are ideal for the dissemination of knowledge and skills to promote health behaviors. While prior abstinence-only interventions have been limited by lack of theoretical grounding and limited follow-up [22], our intervention was theoretically grounded [25] and followed parents and adolescents over time. Carried out in African-American Baptist Churches, the intervention highlights the efficacy of carrying out sexual risk reduction interventions, which influence parent–child communication, particularly among fathers, and reduce engagement in sexual risk behaviors [23] among African-American youth.

The findings from this study highlight the importance of parent–child communication interventions, specifically for fathers, and suggest interventions can increase men's prominence in sexual socialization of their children. Specifically, the interaction between the intervention arm, caregiver gender and child gender contribute to the literature on the importance of gender concordance in parent–child sexual-health communication. Findings extend prior work on the relevance of parent–child gender concordance on sexual-health communication within families [5, 6, 17, 27] by examining concordant and discordant parent–child dyads in the same study. Further, we examined the interaction between parent–child communication, gender concordance and a theoretically grounded, culture-specific parent–child safer sex communication intervention. These results call for the continued need to find strategies that enhance fathers' comfort and ability to communicate about abstinence and safer sex, particularly communication needs associated with early adolescence, including puberty (including menstruation and wet dreams) and dating (versus pregnancy and HIV prevention).

Limitations

This work contributes to the literature by exploring differences in intervention effects by caregiver and child gender. While other work has explored difference in parent–child communication about abstinence and safer sex communication (see review by Santelli *et al*. [34]), no identified study has examined the way in which a church-based abstinence intervention may differently influence the frequency of communication by fathers versus mothers. However, there are several limitations that should be noted. First, this study included a convenience sample of church-connected families; as such, findings cannot be generalized to a larger population. This is particularly important to this work as parents who were more hesitant to talk about sexuality and abstinence or had less positive relationships with their children may have opted out of participation. In addition, communication behavior was self-reported. While both parent and child reports of communication frequency were used in the analysis to mitigate bias, it is possible that parents may have over-reported their communication. Further, communication from other sources (i.e. schools, peers and media) was not collected. Last, while data on tone of communication was not collected, role play on how to effectively communicate about challenging topics was part of intervention activities. How father versus mothers may have communicated with daughters versus sons is unknown. Future work should explore the potential gendering of messages that may influence communication between opposite sex parent–child dyads and particularly, differential messages given to girls (as compared to boys). Inclusion of these sources of influence and tone and frequency of communication should be considered in future work.

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Conflict of interest statement

None declared.

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