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Original article

The Impact of a Sexual and Reproductive Health Intervention for American Indian Adolescents on Predictors of Condom Use Intention

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A B S T R A C T

Purpose: American Indian (AI) adolescents experience inequalities in sexual health, in particular, early sexual initiation. Condom use intention is an established predictor of condom use and is an important construct for evaluating interventions among adolescents who are not yet sexually active. This analysis evaluated the impact of Respecting the Circle of Life (RCL), a sexual and reproductive health intervention for AI adolescents, on predictors of condom use intention.
Methods: We utilized a cluster randomized controlled trial design to evaluate RCL among 267 AIs ages 13–19. We examined baseline psychosocial and theoretical variables associated with condom use intention. Generalized estimating equation regression models determined which baseline variables predictive of condom use intention were impacted.
Results: Mean sample age was 15.1 years (standard deviation 1.7) and 56% were female; 22% had initiated sex. A larger proportion of RCL versus control participants had condom use intention post intervention (relative risk [RR] = 1.39, $p = .008$), especially younger (ages 13–15; RR = 1.42, $p = .007$) and sexually inexperienced adolescents (RR = 1.44, $p = .01$); these differences attenuated at additional follow-up. Baseline predictors of condom use intention included being sexually experienced, having condom use self-efficacy, as well as response efficacy and severity (both theoretical constructs). Of these, the RCL intervention significantly impacted condom use self-efficacy and response efficacy.
Conclusions: Results demonstrate RCL intervention efficacy impacting variables predictive of condom use intention at baseline, with greater differences among younger, sexually inexperienced adolescents. To sustain intervention impact, future RCL implementation should reinforce education and training in condom use self-efficacy and response efficacy and recruit younger, sexually inexperienced AI adolescents.

IMPLICATIONS AND CONTRIBUTION

This study evaluated a sexual health intervention for American Indian adolescents on condom use intention. Respecting the Circle of Life improved condom use intention among younger, sexually inexperienced adolescents and condom use self-efficacy and response efficacy, both predictors of condom use intention. Results support Respecting the Circle of Life implementation with younger and sexually inexperienced American Indian adolescents.

Despite profound diversity in health behaviors and contextual factors impacting health across urban and reservation-based communities, American Indians (AIs) experience inequalities in sexual health. In 2011, AIs had the second highest Chlamydia and Gonorrhea rates and third highest primary and secondary syphilis rates in the United States [1]. While the U.S. American

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Indian/Alaska Native (AI/AN) HIV diagnosis rate is less than U.S., all-races (2.8 vs. 5.2/100,000), 4 Indian Health Service areas, have higher rates of 5.6, 6.6, 6.8, and 25.7/100,000, respectively [2]. Furthermore, AIs have the poorest 3-year survival rates following an HIV diagnosis compared with all other U.S. groups [2].

AI adolescents and young adults are particularly burdened by poor sexual health. In 2011, AI/AN females ages 15–24 reported the highest age-specific Chlamydia rates compared with all other U.S. females [1]. Additionally, the majority of Chlamydia cases in Indian Health Service areas (68.6%) were among those ages 13–24 [2]. In 2011, the AI/AN Gonorrhea rate of 115.7/100,000 increased 7.7% from 2010, with the highest rate occurring among 13- to 24-year-olds (238.9/100,000) [2].

Among adolescents, early sexual initiation predicts future sexual risk taking [3,4]. Youth who initiate sex at younger than 14 years are more likely to have sex more often, multiple partners, and sex without a condom [5]. It follows that adolescents and young adults who acquire sexually transmitted infections (STIs) more often report initiating sex at a young age [4]. National data show that AI youth are more likely to initiate sex before age 13 than all other groups, with the exception of black/African-American youth [6].

Given AI/AN youth are more likely to initiate sex before age 13, it is not surprising that in 2012, AI/AN females ages 15–19 had the third highest teen birth rate in the United States (35/1,000 vs. 29.1,000 nationally) and, in 2010, had the highest prevalence of repeat teen births [7]. Nearly half (41%) of AI females begin childbearing in adolescence and within their lifetime bear twice as many children as the general U.S. population [7]. Compared with all U.S. groups, AI adolescents are more likely to have ever had sex (69% vs. 47%); had sex with four or more persons during their lifetime (22% vs. 15%); and drank alcohol or used drugs prior to sex (32% vs. 22%) [8]. Taken together, these sexual health disparities underscore the need for interventions targeting young AI adolescents, prior to sexual initiation.

Several tribal-academic partnerships are developing and evaluating sexual health interventions for AI adolescents and young adults [9–14]. Evaluating sexual health interventions with adolescents poses challenges when participants are young and/or have not initiated sexual intercourse and behavioral outcomes of interest may not occur during data collection (i.e., condom use). As an alternative, condom use intention or the perceived likelihood of engaging in condom use, has been utilized [15,16].

Theoretically, condom use intention is an established predictor of condom use behavior [15,17–23]. Yet, to our knowledge, no published evaluations of a sexual health intervention implemented with AI adolescents have explored intervention impact on baseline variables predictive of condom use intention, including psychosocial and intervention theoretical constructs. This paper presents results from a secondary analysis of the evaluation of Respecting the Circle of Life (RCL): Mind, Body and Spirit, a culturally adapted sexual health and HIV risk-reduction intervention for AI adolescents [9,10]. RCL was evaluated through a randomized controlled trial with AI adolescents and demonstrated promising intervention impacts, which have been described in detail elsewhere [9,10]. (Note: information about the tribal-academic partnership and the participatory process shaping the RCL intervention and evaluation design are described in the aforementioned citations).

RCL is grounded in protection motivation theory (PMT), which posits that protection from a threat such as HIV is based on two pathways: threat appraisal and coping appraisal [9,18]. With regard to condom use intention and actual condom use, PMT suggests that youth's perceived severity of HIV and likelihood that sex without a condom will result in contracting HIV, is balanced with the internal and external rewards of having sex without a condom. Similarly, youth's perceived ability to use a condom and belief that using a condom will prevent HIV, is balanced with the costs of using a condom. Reflecting these PMT constructs, the RCL intervention aims to increase condom use intention by providing knowledge and skills to increase youth's ability and motivation to use condoms and decrease desire to have sex without a condom.

Several evaluations of sexual health interventions rooted in PMT have been conducted with diverse adolescent samples. A meta-analysis found the constructs comprising the coping (protective) appraisal pathway to be greater predictors of behavioral intent outcomes than those of the threat (risk) appraisal pathway [24]. For example, among Bahamian youth, self-efficacy and response efficacy were related to intention to initiate sex, while response efficacy and subjective norms explained 22% of the variance in condom use intention among South African youth [25,26]. Though the constructs of PMT and predictors of condom use intention have been studied with other adolescent populations, there is a dearth of similar analyses in the AI/AN adolescent health literature.

Current study

We analyzed data from the sample of AI youth (ages 13–19) who participated in the evaluation of RCL [9,10]. In the primary analysis, RCL intervention participants were more likely than control participants to have condom use intention immediately post intervention. That analysis did not explore differences by age group or sexual experience and intervention impact on condom use intention attenuated by 6- and 12-months follow-up [10]. The majority of participants were sexually inexperienced, thus exploring RCL intervention impact on condom use intention is important for strengthening the RCL intervention to sustain long-term impact.

Our goals for this secondary analysis were to: (1) examine intervention impact on condom use intention by age group and sexual experience; (2) identify baseline psychosocial and PMT (theoretical) predictors of condom use intention; (3) assess RCL intervention impact on these baseline predictors; and (4) inform future RCL implementation and dissemination efforts. We hypothesized that post intervention, a larger proportion of younger and sexually inexperienced participants receiving the RCL program would have higher condom use intention than participants in the control group.

Methods

Participants

Participants were 267 self-identified AIs ages 13-19 who participated in the evaluation of RCL [9,10]. We used a non-probability sampling frame and recruited through local schools and at public events in the participating tribal community. Trained paraprofessionals from the community described the purpose, general design, and enrollment criteria to potential participants. For those interested, written informed consent (if $\geq$ 18 years old) or assent/parental permission (if $<$18 years old) was completed. The study was approved by relevant tribal

Table 1
Proportion of youth reporting condom use intention, by time point and study group[a]

Condom use intention (Yes/no)	Baseline RCL N = 138 n (%)	Baseline Control N = 129 n (%)	Baseline RR[a]	Baseline p value	Post camp RCL N = 131 n (%)	Post camp Control N = 126 n (%)	Post camp RR[a]	Post camp p value	6-month follow-up RCL N = 123 n (%)	6-month follow-up Control N = 111 n (%)	6-month RR[a]	6-month p value	12-month follow-up RCL N = 124 n (%)	12-month follow-up Control N = 115 n (%)	12-month RR[a]	12-month p value
Overall[b]	75 (52.7%)	72 (58.3%)	.90	.443	91 (69.6%)	62 (50.3%)	1.39	.008	79 (66.6%)	60 (54.7%)	1.22	.191	84 (67.0%)	68 (61.0%)	1.10	.379
Girls[c]	46 (58.0%)	40 (58.9%)	.98	.929	58 (79.5%)	31 (44.5%)	1.79	.001	49 (77.0%)	34 (53.7%)	1.43	.032	49 (70.2%)	41 (63.6%)	1.10	.414
Boys[d]	29 (45.7%)	32 (57.1%)	.80	.273	33 (56.6%)	31 (56.5%)	1.00	.997	30 (52.5%)	26 (56.9%)	.92	.767	35 (61.3%)	27 (57.7%)	1.06	.760
13–15 years[e]	44 (48.2%)	56 (55.1%)	.88	.432	62 (68.9%)	48 (48.6%)	1.42	.007	40 (62.9%)	48 (56.7%)	1.11	.544	32 (60.7%)	41 (54.9%)	1.10	.509
16–19 years[f]	31 (65.5%)	16 (66.2%)	.99	.953	29 (71.6%)	14 (56.3%)	1.27	.271	39 (71.0%)	12 (47.9%)	1.48	.123	52 (73.2%)	27 (71.0%)	1.03	.821
Ever vaginal sex[g]																
Yes	26 (71.7%)	20 (85.3%)	.84	.152	29 (84.1%)	15 (68.8%)	1.22	.230	33 (73.4%)	19 (64.3%)	1.14	.497	48 (89.1%)	29 (72.4%)	1.23	.063
No	49 (47.1%)	52 (49.7%)	.95	.758	62 (65.7%)	47 (45.7%)	1.44	.010	45 (62.5%)	41 (50.4%)	1.24	.178	36 (52.9%)	39 (53.5%)	.99	.946
Vaginal sex past 6 months[h]																
Yes	20 (70.2%)	16 (88.0%)	.80	.094	25 (85.9%)	12 (70.7%)	1.22	.298	22 (67.5%)	12 (64.6%)	1.04	.867	39 (85.8%)	19 (77.1%)	1.11	.387
No	55 (49.7%)	55 (51.1%)	.97	.862	66 (66.1%)	50 (46.3%)	1.43	.011	56 (66.1%)	48 (52.3%)	1.26	.090	45 (58.5%)	49 (55.7%)	1.05	.718

PMT = protection motivation theory; RCL = Respecting the Circle of Life; RR = relative risk.
[a] Note: All models adjusted for group correlation, age, and mean score on extrinsic rewards subscale of PMT at baseline.
[b] Missing values: Baseline: RCL-5, control-3; post-camp: control-7; 6 month: RCL-6, control-1; 12 month: RCL-2, control-2.
[c] Baseline: RCL-3, control-2; post camp: RCL-4; 6 months: RCL-4; 12 months: RCL-1, control-1.
[d] Baseline: RCL-2, control-1; post camp: RCL-1, control-23; 6 months: RCL-2, control-1; 12 months: RCL-1, control-1.
[e] Baseline: RCL-4, control-2; post camp: RCL-3, control-2; 6 months: RCL-4, control-0; 12 months: RCL-2, control-1.
[f] Baseline: RCL-1, control-1; post camp: RCL-2; 6 months: RCL-2, control-1; 12 months: RCL-0, control-1.
[g] Baseline: RCL (no: 5, yes: 0), control (no: 2, yes: 0); post camp: RCL (no: 4, yes: 1), control (no: 2, yes: 0); 6 months: RCL (no: 4, yes: 2), control (no: 1, yes: 0); 12 months: RCL (no: 2, yes: 0), control (no: 2, yes: 0).
[h] Baseline: RCL (no: 5, yes: 0), control (no: 2, yes: 0); post camp: RCL (no: 4, yes: 1), control (no: 2, yes: 0); 6 months: RCL (no: 5, yes: 1), control (no: 1, yes: 0); 12 months: RCL (no: 2, yes: 6), control (no: 2, yes: 6).

and university research review boards. This manuscript was approved by the governing body of the participating tribal community.

Study design

The evaluation was a cluster randomized controlled trial comparing RCL to a control condition. The study team hosted two, 8-day summer basketball camps (summer 2011 and 2012) to deliver both programs. Each camp day consisted of 90 minutes of basketball play, 60-minute lunch, and 90 minutes of education (RCL or control). Two separate gymnasiums located several miles from each other were utilized for each group.

Randomization

On the first day, participants formed self-selected peer groups, also called "teams" of the same gender and age range (13–15 and 16–19). Through a randomization sequence created by the study data manager in Stata 9.0 [27], peer-group "teams" were randomized to receive RCL or control. Different camp locations plus self-selection of teams were utilized to reduce contamination [9,10].

Outcome measures

Youth completed the Youth Health Risk Behavior Inventory (YHRBI), created by Stanton et al. [28] (the developer of the program from which RCL was adapted), via hard copy at baseline, immediately post camp, and 6 and 12 months after camp. The YHRBI measures demographics, knowledge, intentions, past experience regarding risk and protective factors, sexual perceptions and behaviors, as well as the seven PMT constructs (self-efficacy, response efficacy, response cost, intrinsic reward, extrinsic reward, severity, and vulnerability). The YHRBI was tailored and pilot tested with input from the participating tribal community to be culturally and linguistically relevant. Confirmatory factor analysis examined YHRBI subscales; items were removed if they diminished the Cronbach's alpha value for a particular factor [10]. YHRBI questions include dichotomous, categorical, and continuous response options (i.e., "if my sexual partner uses drugs or alcohol before sex I should use them too," range = strongly disagree to strongly agree; "the last time you had sex, did you or your partner use a condom," range = yes or no); each administration takes a maximum of 30–45 minutes to complete.

The primary outcome was condom use intention. Participants were asked if they would use a condom if they had sex in the next 6 months. Response options included: (1) yes; (2) maybe; (3) do not know; (4) probably not; and (5) no. We dichotomized condom use intention with yes coded as 1 and all other response options coded as 0. A full description of the seven PMT construct variables can be found elsewhere [10].

Analysis

Statistical analyses were carried out using Stata 14 [27]. Initial analyses examined condom use intention at each time point by group (RCL vs. control) (Table 1). Condom use intention was stratified by selected demographic variables and sexual activity indicators across groups and time points. We utilized generalized estimating equation regression models (Poisson for

Table 2
Differences in knowledge, efficacy, protection motivation theory constructs, and behavioral intent/behavioral outcomes according to reported condom use intention (CI) at baseline (N = 267)[a]

	CI yes M (SE)	CI no M (SE)	AMD[a]	*p* value
Knowledge				
HIV prevention/transmission (range 0–1; higher score = higher knowledge)[b]	.80 (.02)	.75 (.02)	.05	.007
Efficacy				
Partner negotiation on condom use (range 1–4; higher score = higher efficacy)[c]	2.56 (.10)	2.41 (.11)	.14	.285
Partner negotiation on drug use during sex (range 1–5; higher score = higher efficacy)[d]	4.52 (.07)	4.38 (.09)	.14	.201
Condom use self-efficacy (range 1–5; lower score = higher efficacy)[e]	2.32 (.09)	2.88 (012)	−.56	<.001
Coping appraisal				
Self-efficacy (range 1–5; lower score = higher risk)[f]	4.35 (.06)	4.18 (.09)	.17	.077
Response efficacy (range 1–5; lower score = higher risk)[f]	3.94 (.07)	3.57 (.07)	.37	<.001
Response cost (range 1–5; higher score = higher risk)[b]	2.95 (.05)	3.02 (.05)	−.07	.342
Threat appraisal				
Intrinsic reward (range 1–5; higher score = higher risk)[g]	1.66 (.07)	1.64 (.08)	.02	.831
Extrinsic reward (range 1–5; higher score = higher risk)[b]	3.29 (.05)	3.06 (.08)	.24	.011
Severity (range 1–5; higher score = higher risk)[f]	3.73 (.06)	3.53 (.08)	.20	.015
Vulnerability (range 1–5; higher score = higher risk)[g]	1.67 (.06)	1.66 (.09)	.01	.899
	n (%)	n (%)	RR[a]	
Behavioral intent/behavioral				
Belief condoms prevent HIV/STIs[g]	88 (57.5%)	53 (48.5%)	1.18	.251
Belief abstinence prevents HIV/STIs[g]	65 (41.2%)	37 (33.2%)	1.24	.228
Talked with family member/adult about HIV/AIDS in past 6 months[g]	39 (25.8%)	25 (22.6%)	1.14	.617
Had vaginal sex in past 6 months[b]	36 (18.6%)	11 (8.8%)	2.11	.010

AMD = adjusted mean difference; M = mean; SE = standard error; STI = sexually transmitted infection.
[a] Note: All models adjusted for group correlation and for age at baseline.
[b] N = 259, 8 missing.
[c] N = 240, 27 missing values.
[d] N = 257, 10 missing values.
[e] N = 255, 12 missing values.
[f] N = 258, 9 missing values.
[g] N = 260, 7 missing values.

dichotomous and Gaussian for continuous outcomes) to account for cluster randomization of self-selected peer group teams, with exchangeable correlation structure and robust variance. Models were adjusted for age and extrinsic rewards scale score due to statistically significant differences between study groups at baseline.

We then examined whether knowledge, self-efficacy, PMT constructs, behavioral intent, and behavioral outcomes were associated with condom use intention at baseline, regardless of group. Separate regression models were created for each variable (Table 2). Variables statistically significantly associated with condom use intention at baseline in the bivariate models included HIV prevention and transmission knowledge, condom use self-efficacy, response efficacy, extrinsic reward, severity, and having had vaginal sex in the past 6 months.

Then, we tested a larger multivariate model. Table 3 includes a full model with all variables tested and a final model with only those variables that remained statistically significant in the context of the other variables. All models were adjusted for age at baseline. The variables significant in the final multivariate model included response efficacy, severity, condom use self-efficacy, and having had vaginal sex in the past 6 months.

Finally, we investigated differences between baseline and post camp by group (RCL or control) among the variables from the final multivariate model, to determine which factors associated with condom use intention were impacted by the RCL intervention. This was done using multilevel mixed models with random effects at the peer-group/team and individual level to account for within-team correlation and repeated individual measures. An interaction term between group assignment and time point was included to assess whether changes in baseline/postcamp values within the control group differed from the changes observed in the RCL group. Multilevel models were adjusted for age, gender, and extrinsic rewards scale score at baseline. These data are presented graphically in Figure 1.

Results

The final analytic sample was comprised of 267 AI youth ages 13–19; 56% were female with mean age of 15.1 years

Table 3
Multivariate predictive model of condom use intention at baseline (N = 251)[a,b]

	Full model		Final model	
	RR	95% confidence interval	RR	95% confidence interval
Age at baseline	1.01	.95–1.07	1.03	.97–1.09
HIV prevention/transmission knowledge	1.45	.73–2.90		
Self-efficacy (coping appraisal)	1.12	.90–1.40		
Response efficacy	1.18	1.02–1.37	1.20	1.04–1.39
Extrinsic reward	1.09	.92–1.30		
Severity	1.14	1.00–1.31	1.19	1.04–1.35
Had sex in the last 6 months				
No	Ref		Ref	
Yes	1.28	.97–1.69	1.25	1.00–1.56
Condom use self-efficacy	.83	.74–.94	.82	.73–.92

RR = rate ratio.
[a] Note: Model is adjusted for group correlation.
[b] Total of 16 participants excluded due to missing values.

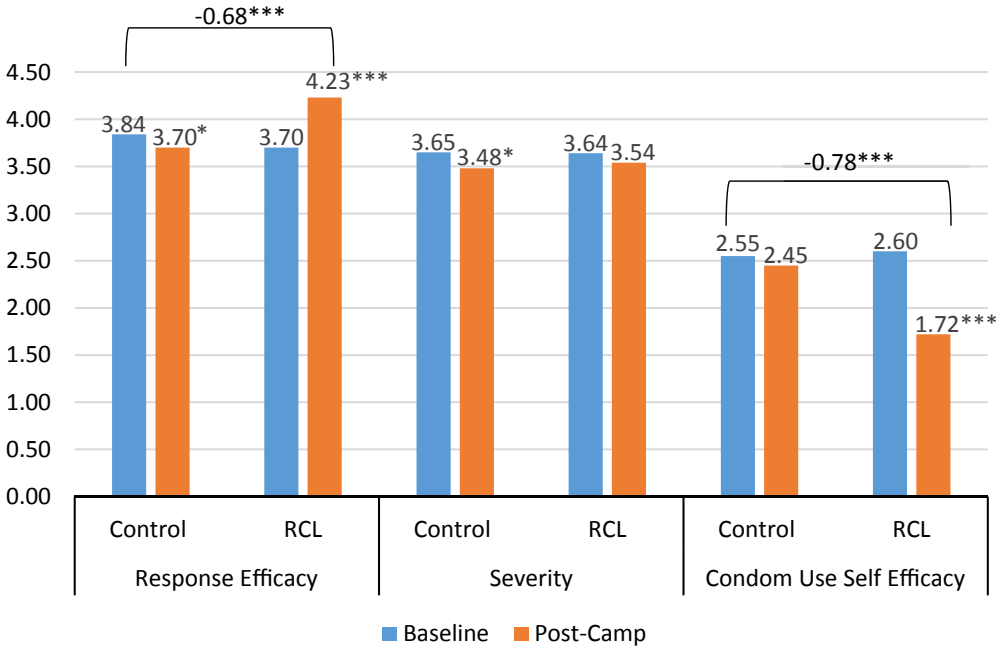

Figure 1. Comparison of control versus RCL group baseline/post camp values among variables predictive of condom use intention at baseline (N = 263) (Note: All models have been adjusted for group correlation, gender, extrinsic reward at baseline, and age at baseline. Total of four participants excluded due to missing values.) $^{*}p < .05$ and $^{***}p < .005$.

(standard deviation = 1.7). Less than one-quarter (22%) reported ever having vaginal intercourse (data not shown). Participants in both study groups attended an average 6.7/8 days of camp. Study groups had similar sociodemographic characteristics at baseline with the exception of age (control participants were younger; $p < .001$).

Overall, we found a statistically significant difference in condom use intention between RCL and control groups post camp (relative risk [RR] = 1.39, $p = .008$). When comparing groups, condom use intention was significantly improved post camp among the subgroups of girls (RR = 1.79, $p = .001$), younger adolescents (ages 13–15) (RR = 1.42, $p = .007$), and those who had never had vaginal sex in their lifetime, or past 6 months, respectively (RR = 1.44, $p = .01$ and RR = 1.43, $p = .01$) (Table 1). A statistically significant difference in condom use intention among girls was sustained at 6 months; all other differences in condom use intention attenuated.

In the bivariate models, the significant knowledge and efficacy variables associated with condom use intention at baseline included HIV prevention and transmission knowledge (adjusted mean difference [AMD] = .05, $p = .007$) and condom use self-efficacy (AMD = −.56, $p < .001$). The significant PMT constructs associated with condom use intention included response efficacy (AMD = .37, $p < .001$), extrinsic reward (AMD = .24, $p = .01$), and severity (AMD = .20, $p = .015$). The significant behavioral variable was having had vaginal sex in the past 6 months (RR = 2.11, $p = .01$). No other variables were significantly associated (the PMT construct of self-efficacy was marginal, AMD = .17, $p = .077$) (Table 2).

In the final multivariate model, which retained variables statistically significant at $p \leq .05$, we found that higher response efficacy, severity, and condom use self-efficacy in addition to having had vaginal sex in the past 6 months were predictive of condom use intention at baseline. No other variables were significantly predictive of condom use intention at baseline in the context of the other covariates (Table 3).

Figure 1 illustrates a comparison between changes in the RCL and control groups from baseline to post camp among the variables shown to be predictive of condom use intention at baseline (response efficacy, severity, and condom use self-efficacy). (Note: vaginal sex in the past 6 months was not included because the 8 days between baseline and post camp were insufficient to see a change.) For response efficacy, the control group experienced a significant decrease from baseline to post camp (AMD = −.14, $p < .05$) whereas the RCL group experienced a significant increase (AMD = .53, $p < .005$). This change in response efficacy was significantly different between RCL and control groups ($p < .005$).

There was a significant decrease in severity for control participants from baseline to post camp (AMD = −.17, $p \leq .05$) and no change for RCL participants. This change in severity between groups was not significant. For condom use self-efficacy, the control group difference from baseline to post camp was not significant; however, there was a significant improvement among RCL participants (AMD = −.88, $p < .0001$, lower score = higher efficacy). This change in condom use self-efficacy among RCL participants was significantly different than the change among control participants ($p < .005$). Thus, Figure 1 illustrates that the RCL intervention impacted two of the factors significantly associated with condom use intention at baseline (condom use self-efficacy and response efficacy). The RCL intervention did not impact severity.

Discussion

The RCL intervention was successful at increasing the proportion of younger, sexually inexperienced adolescents with condom use intention in the short term. These results confirm

our hypotheses and are supported by: (1) Youth that had never had vaginal sex in their lifetime or the past 6 months, and received RCL, had higher condom use intention post camp than sexually experienced youth; yet sexually experienced youth had higher condom use intention at baseline. (2) Younger RCL participants (13–15 years) had higher condom use intention post camp than control participants, although this difference was not significant between older RCL and control participants (ages 16–19); additionally, age was not associated with condom use intention at baseline.

Greater intervention impact among younger, sexually inexperienced adolescents with low condom use intention has been demonstrated in other evaluations of the program from which RCL was adapted (Focus on Youth [FOY]) [19,20,29]. In one evaluation of FOY, when the sample was stratified by baseline condom use intention score, low and medium initial scorers showed the largest improvements in condom use intention [29]. Additionally, other research among sexually inexperienced youth shows condom-related cognitions may be theoretical, based on practical considerations and not on actual use [30]. When examining these studies and our results together, we may conclude that younger and sexually inexperienced adolescents with less initial intention to use condoms were more impacted by the RCL intervention than those who were older and sexually experienced at baseline. Future implementation of RCL may consider recruitment of younger and/or sexually inexperienced youth to maximize intervention impact.

Baseline predictors of condom use intention

At baseline, predictors of condom use intention from the bivariate models included HIV prevention and transmission knowledge, condom use self-efficacy, as well as the PMT constructs of response efficacy (coping-appraisal pathway), extrinsic reward, and severity (threat-appraisal pathway). In the final multivariate model, only condom use self-efficacy, response efficacy, and severity remained predictive of condom use intention. Our results regarding response efficacy corroborate that found in evaluations of FOY among other samples of adolescents [15,25]. However, severity (of the threat appraisal pathway), is worth further exploration, as this finding differs from a meta-analysis which found the only threat appraisal construct associated with subsequent behavior was vulnerability [24].

Qualitative data collected with youth in this community describe inconsistent access to sexual health education contributing to low levels of HIV prevention and transmission knowledge (also a predictor of condom use intention) [31]. Collinearity between severity and HIV prevention and transmission knowledge could be impacting the strength of these variables in predicting condom use intention at baseline among this sample of youth.

RCL intervention impact on baseline predictors

The RCL intervention significantly improved condom use self-efficacy and response efficacy. These findings shed light on the potential mechanisms of RCL intervention impact and provide direction for future implementation.

Condom use self-efficacy. Adolescents with higher condom use self-efficacy are likely equipped with better communication and problem-solving skills [23,32,33]. The increase in condom use self-efficacy among RCL participants may therefore be attributable to several communication and problem-solving skill-building activities, including role-playing communication styles, use of a problem-solving tool, and negotiating sexual decision-making. The importance of having self-efficacy for condom use intention may also be underscored for younger and sexually inexperienced adolescents, as found in other studies with sexually inexperienced versus experienced adolescents [26].

Response efficacy. Response efficacy is the belief condoms effectively prevent STI/HIV. In RCL, key content messaging and several skill-based exercises teach information related to condom effectiveness and correct condom use (including a condom demonstration and condom "race"). It is, therefore, not surprising that youth receiving RCL had significantly improved response efficacy scores post intervention (AMD = .53, $p < .005$). As mentioned, there is inconsistent access to sexual health education in this AI community resulting in low levels of HIV prevention/transmission knowledge [31]. Thus, though possible collinearity between response efficacy and HIV prevention/transmission knowledge exists, findings support the role of RCL in filling a gap in essential sexual health education in a reservation-based setting.

Condom use self-efficacy and response efficacy are both positive protective factors to increase condom use intention within the context of STI/HIV prevention and sexual health promotion. The strength of RCL intervention impact on these two constructs is especially salient for this and other AI communities. A growing body of literature shows that programs promoting positive protective factors are more efficacious in native communities than those focused on risk [34,35]. Enhancing condom use self-efficacy and response efficacy through programs such as RCL, may be an effective way to improve condom use–related knowledge, intentions, and behaviors among AI adolescents.

Future implementation. As described, RCL intervention impact on condom use intention attenuated at 6 and 12 months follow-up. Results show RCL significantly impacts condom use self-efficacy and response efficacy, which predict condom use intention. To sustain RCL intervention impact past the immediate post-intervention time point, curriculum content providing education and skills training in these domains should be reinforced after the initial eight sessions. Specifically, communication and problem-solving skill-building activities (to reinforce condom use self-efficacy) and education on condom effectiveness and role-playing correct use of condoms (to reinforce response efficacy) could be packaged into a ninth curriculum lesson taught as a booster or follow-on session. FOY added a ninth lesson delivered to youth-parent dyads incorporating the aforementioned content and skills training and found intervention impacts sustained through 24 months follow-up [19,21].

Limitations

There are limitations to this study. First, self-report data may not be accurate and/or impacted by response bias. The randomized study design helps alleviate this limitation. Second, baseline inequalities between RCL and control participants could bias results. Statistical adjustment for these differences in the analyses minimizes this concern. Finally, use of nonprobability sampling and participation by one tribal community limits the

generalizability of our findings to other tribal populations. Limitations aside, sexual health risks challenging the participating community also impact other AI populations. The RCL intervention may be more amenable to replication in these communities than those not evaluated with samples comprised exclusively of AI adolescents.

Adolescent sexual health research can be improved with the inclusion of a condom use intention construct, closer attention to theoretical grounding, experimental study designs, and use of multivariate statistical techniques [36]. This study adds to the growing body of work directly addressing these deficits [23,33,37–40]. Our findings illustrate the importance of developing interventions specific to an AI context and which incorporate theoretical components predictive of behavior-change intentions among native adolescents. Our analyses address gaps in the AI adolescent health literature around condom use intention while simultaneously providing relevant findings for implementing and evaluating sexual health interventions for AI adolescents.

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