Published in final edited form as:

J Pediatr Health Care. 2017 ; 31(3): 302–313. doi:10.1016/j.pedhc.2016.09.004.

The Effect of a Youth-Centered Sexual Risk Event History Calendar (SREHC) Assessment on Sexual Risk Attitudes, Intentions, and Behavior

Michelle L. Munro-Kramer, PhD, CNM, FNP-BC^{1,*} [Assistant Professor], Nicole M. Fava, PhD, MSW^{2,*} [Assistant Professor], Tanima Banerjee, MS¹ [Statistician], Cynthia S. Darling-Fisher, PhD, FNP-BC¹ [Clinical Assistant Professor], Michelle Pardee, DNP, FNP-BC¹ [Clinical Assistant Professor], Antonia M. Villarruel, PhD, RN, FAAN³ [Professor and Margaret Bond Simon Dean of Nursing], and Kristy K. Martyn, PhD, CPNP-PC, FAAN⁴ [Professor and Assistant Dean of Clinical Advancement]

¹University of Michigan School of Nursing, Ann Arbor, MI 48109-5482

²Florida International University, Robert Stempel College of Public Health & Social Work, Miami, FL 33139

³University of Pennsylvania School of Nursing, Philadelphia, PA 19104

⁴Emory University Nell Hodgson Woodruff School of Nursing, Atlanta, GA 30322

Abstract

Introduction—The purpose of this study is to examine the effect of a youth-centered assessment, the sexual risk event history calendar (SREHC), compared to the Guidelines for Adolescent Preventive Services (GAPS) assessment, on sexual risk attitudes, intentions, and behaviors.

Methods—The Interaction Model of Client Health Behavior guided this participatory research-based randomized control trial. Youth participants recruited from university and community clinics in the Midwest were randomized to a healthcare provider visit using either the SREHC or GAPS and completed surveys at baseline, post-intervention, 3, 6, and 12 months.

Results—Participants included 181 youth (15–25 years old) and nine providers. Findings demonstrated youth in the SREHC group reported stronger intentions to use condoms compared to those in the GAPS group. Age and race were also significant predictors of sexual experience.

Discussion—This study highlights the importance of using a youth-centered, systematic approach in assessment of sexual risk behaviors.

^{**}Corresponding author: University of Michigan School of Nursing, 400 N. Ingalls, Room 3188, Ann Arbor, MI 48109, mlmunro@umich.edu.

^{*}Co-First Authors contributed equally to the work

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Keywords

youth-centered; sexual health risk assessment; event history calendars

The transition into young adulthood is associated with myriad of preventable health problems, higher rates of mortality, and more involvement in health risk behaviors (Ozer, Urquhart, Brindis, Park, & Irwin, 2011). High quality youth-centered healthcare is needed to engage youth with healthcare providers around behaviors and contextual factors that may influence health over time. In this study, the term youth refers to adolescents (ages 15–18) and emerging adults (19–25). The purpose of this study was to examine the effects of an innovative youth-centered sexual risk event history calendar (SREHC) on youths' sexual risk attitudes, intentions, and behaviors.

Sexual Risk Behaviors among Youth

Despite declines in pregnancy rates, youth remain at high risk for unintended pregnancy and acquiring sexually transmitted infections (STIs; Centers for Disease Control and Prevention, 2011; Hamilton, Martin, & Ventura, 2012). The United States has one of the highest teen pregnancy rates among developed countries (United Nations Population Fund, 2013), and youth aged 15–24 have the highest rates of STIs, even though they represent only one quarter of the sexually active population (Satterwhite et al., 2013).

There have been numerous studies investigating the effectiveness of sexual risk reduction behavioral interventions; however, few of these have focused on clinical assessment interactions between youth and healthcare providers. In an extensive review of sexual risk reduction programs, Kirby (2007) determined that teens increased their utilization of contraceptives when they received one-on-one counseling, information about both abstinence and contraception, and when provided contraceptive options (e.g., condoms, birth control pills). Other research supports these findings: (a) a systematic review of school-based programs concluded that contraceptive education significantly impacts youth's knowledge and use of contraception (Bennett & Assefi, 2005); (b) a review of sex and human immunodeficiency (HIV) education programs concluded that successful educational curricula must incorporate the needs and values of a community while also addressing multiple contextual factors (Kirby, Laris, & Roller, 2007); and (c) risk reduction interventions utilizing theoretical frameworks and cultural tailoring have also demonstrated effectiveness (Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003; Villarruel, Jemmott, & Jemmott, 2006). Youth development programs with high-risk, diverse adolescent populations have demonstrated increased awareness of sexual risk behaviors, positive attitudes about healthcare utilization, consistent contraception use, and greater stress management skills (Kalmuss, Armstrong, Franks, Hecker, & Gonzalez, 2008; Sieving et al., 2011; Tuttle, Bidwell-Cerone, Campbell-Heider, Richeson, & Collins, 2000). Based on this empirical evidence, effective youth-centered approaches take into consideration the individual's personal contextual factors and incorporate contraceptive education and youth development.

Sexual Risk Assessment

Sexual risk screening is a standard recommendation in preventive care guidelines for youth (American Academy of Pediatrics, 2008; Elster & Kuznets, 1994; United States Department of Health and Human Services, 2012). However, there is limited data on the impact pre-existing tools have on youth sexual risk attitudes, intentions, and behaviors. Therefore, we set out to examine the outcomes of two tools with a focus on understanding any differences between the effects of the two tools. One youth assessment tool, the Guidelines for Adolescent Preventive Services (GAPS), is recognized as a model of standard care for adolescent health assessment in the clinical setting (Levenberg, 1998; Low, 2003), but it is not an established evidence-based practice.

Another assessment tool, the SREHC, was designed with youth to improve their awareness of their own health risk behaviors and enhance youth-provider communication by showing sexual histories in life context (Martyn, 2009; Martyn et al., 2013a). The SREHC utilizes an event history calendar format based on autobiographical memory concepts to improve data quality, retrieval cues, cognitive abilities, and conversational engagement to capture social and health risk behaviors across a four year timespan (Belli, Lee, Stafford, & Chow, 2004). The SREHC is written at a 5th grade reading level and includes open-ended questions, making it appropriate to a diverse range of individuals based on education, socioeconomic status, sexual identity, and location (Flesch, 1948; Kincaid, Fishburne, Robers, & Chisson, 1975). In previous research, it has generated quality data about activities, behavior, events, and transitions occurring over extensive time periods with youth from diverse racial and ethnic backgrounds (Fava et al., 2016; Martyn & Martin, 2003; Martyn, Reifsnider & Murray, 2006; Saftner, Martyn, Momper, Kane Low, & Loveland-Cherry, 2015).

Current Study

The Institute of Medicine (2001) proposed an integrative model of health and behavior focused on the intersections of physical, behavioral, and social factors critical to one's health status. Accordingly, this study is framed by the Interaction Model of Client Health Behavior (IMCHB; Figure 1) as a way to evaluate clinical assessment in health promotion and prevention visits (Cox, 1982). This multidirectional model influences health outcomes by integrating youths' individual characteristics, life context, and communication with providers to effect their sexual risk attitudes, intentions, and behaviors. Therefore, youth sexual health can be promoted by using an assessment tool that integrates youth risk behaviors and life events, youth risk perception and intention (cognitive appraisal), and youth-provider communication. Because "clients act in accordance with their perception of reality" (Cox, 1982, p. 50), cognitive appraisal directly influences health risk behavior outcomes by preparing youth to communicate with providers.

Prior research suggests that the use of the SREHC as a clinical assessment tool can facilitate provider sexual risk assessment, improve the quality of communication between youth and providers, and increase youths' risk perception by focusing on the interrelationship of sexual risk behaviors with other risk behaviors and life events (Martyn, 2009; Martyn et al., 2006; Martyn et al., 2013a; Martyn & Martin, 2003). In this participatory research-based

randomized control trial (PR-RCT), youth from diverse racial and ethnic populations and providers were recruited from three community and university health clinics and randomly assigned to: (a) an SREHC intervention or (b) a GAPS control condition. The primary aims of this study were to examine: (1) the effect of a youth-centered assessment tool on youths' sexual risk attitudes, intentions, and behaviors at 3, 6, and 12 months post-intervention; (2) differences according to age, gender, and race; and (3) differences between the SREHC and GAPS.

Methods

Guided by the tenets of participatory research, this PR-RCT was designed to evaluate the potentially differential effect of the SREHC and GAPS clinical assessments on male and female youths' sexual risk attitudes, intentions, and behaviors. Youth and clinic providers and staff were involved throughout the research process, including youth input on design of the SREHC (Fava et al., 2016; Trinh-Shevrin et al., 2007). Institutional review board approval was obtained from the University of Michigan and institutions involved with data collection. Additionally, a Certificate of Confidentiality was obtained.

Participants

Youth were recruited using flyers and by research assistants and clinic staff informing new patients about the study in three healthcare clinics in the Midwestern United States including a: (a) community health center that serves an Arab-American population; (b) STI testing clinic; and (c) university health center. Eligible youth (n=181) enrolled between April 2010 and 2011 included those who were: (a) 15–25 years of age, (b) new patients, and (c) spoke and read English. Clinic providers (n=9) were enrolled if they: (a) were physicians, nurse practitioners, or physician assistants and (b) had at least one year of experience with youth. There were several reasons for youth attrition, such as relocation and incarceration (Figure 2).

Randomization

Providers and youth were randomized: youth were randomized via a computer-generated sequence, blocked by time and stratified by gender (SREHC=99; GAPS=82); and in order to have at least one provider at each clinic in each condition, providers were randomized within each clinic to the SREHC intervention (n=6) or GAPS control (n=3) condition. Due to part-time schedules of two providers, we purposively enrolled these two providers in the SREHC condition. In addition, during the study, two SREHC providers left their respective practices, which necessitated the inclusion of new providers into the study based on the randomization of the original provider. This resulted in the higher total number of providers randomized to the SREHC intervention.

Youth Procedures

Youth gave written consent or assent prior to beginning any study procedures. A waiver of consent from parents was obtained for those under age 18. At a study clinic visit, youth completed a pre-intervention survey, either the SREHC or GAPS assessment (~10–15 minutes to complete), had a clinic visit with a provider who used the youth's SREHC or

GAPS assessment to inform the visit and clinical recommendations, and then completed a post-intervention survey. Survey data were also collected from youth in both conditions 3, 6, and 12 months after their clinic visit. Youth received a \$25 gift card after each data collection session.

GAPS Control Assessment—The GAPS is a four-page self-administered questionnaire (ranging from 60–72 questions) including yes/no items about risk behaviors and the leading causes of morbidity among youth (e.g., eating disorders, alcohol use, tobacco use; Levenberg, 1998). The GAPS also includes items assessing sexual history (e.g., having sex or thinking of having sex, ever had a sexually transmitted infection). Participants in this study completed the GAPS assessment in the waiting room and then the provider reviewed it prior to the visit to guide the conversation during their healthcare interaction with the youth participant.

SREHC Intervention Assessment—The SREHC utilizes a calendar format which captures information about the current year, the past two years, and future information in vertical columns in relation to life events, interpersonal relationships, and health risk behaviors in horizontal rows (i.e., Where do you stay and who do you stay with? What negative events or losses have you had? What positive events have you had and/or what are your goals? What is your sexual activity?). Patients are able to write in their own words, convey thoughts, and emphases (e.g., by underlining or using exclamation points) for the healthcare provider to see. Youth participants completed the SREHC in the waiting room prior to their visit with the healthcare provider. The healthcare provider then reviewed it prior to their healthcare interaction with the youth participant to guide the interaction. Providers were also encouraged to take notes on the SREHC sitting side-by-side with the participant so they could review it together.

Provider Procedures

Providers gave written consent and completed a pre-training survey (e.g., demographics, usual communication) before receiving a two-hour study procedures training. Providers used the SREHC or GAPS during the clinic visit in place of their usual history form/methods and otherwise followed their usual standard of care. Providers using the SREHC sat side-by-side with the youth to view and discuss their risk behaviors and life context over the past 3 years and their future goals. Providers using the GAPS reviewed the questionnaire to identify risks based on items marked yes by the youth. Providers received a \$60 gift card after the two-hour training and again at the post-study interview.

Measures

Study outcomes focused on sexual risk attitudes, intentions, and behaviors. We utilized sexual behavior questions with established reliability and validity from the Youth Risk Behavior Surveillance Survey (YRBSS; Brener et al., 2002; Centers for Disease Control and Prevention, 2016). Accordingly, questions about sexual risk behaviors adapted from the YRBSS included three dichotomous questions about participating in oral, vaginal, and/or anal sex over the last three months (Centers for Disease Control and Prevention, 2016). Sex

was defined as “the type you usually have, such as penis in vagina, mouth on genitals, penis in anus.”

Based on the IMCHB theoretical framework (Figure 1), the participant’s cognitive assessment of sexual behaviors may be influenced by their assessment and perception of risk. These concepts were measured by a participant’s *attitudes or feelings* about a behavior as well as by their *intention or likelihood* to engage in that behavior. The strong reliability and validity of these items has been previously demonstrated (Jemmott, Jemmott, & Villarruel, 2002; Martyn, 2009; Villarruel, Jemmott, Jemmott, & Ronis, 2004). Similarly, good reliability was obtained in this study ($\alpha = .77$). Four items on a Likert scale of 1 (maximum intentions or attitudes against a risk behavior) to 5 (maximum intentions or attitudes in favor of the behavior) were used to represent the outcome variables in the final models including: (a) feelings about and (b) likelihood of having sex in the next three months; (c) feelings about and (d) likelihood of using a condom with sex in the next three months. An additional item related to reported sexual activity over the past three months was also a dependent variable.

Analyses

As quality assurance, all data were double entered by two research assistants. All significance values were set at $p < .05$. Descriptive statistics (i.e., participant characteristics and baseline sexual attitudes, intentions, and behaviors) were completed using SPSS 19.0. All dependent variables were assessed for normality and standardized/transformed when appropriate. Linear mixed modeling (LMM) was completed in SAS 9.3 using PROC MIXED and PROC GLIMMIX to describe changes over time with respect to the intentions of participants to have sex or use condoms, their attitudes about having sex and using condoms, and whether or not they had ever had sex. In general, LMM is a more flexible approach to studying individual change over time using longitudinal data with repeated measures compared to traditional analysis of variance (rmANOVA; West, 2009). LMM does not use list wise deletion, therefore accommodating missing data without removing a participant from the analyses, which is more efficient in identifying significant effects.

For models examining participants’ attitudes and intentions, random intercept and slope were included in the LMM. This model posits that subjects not only vary in their baseline level of responses but also in terms of changes in responses over time. Mixed models were used to account for the correlations of the repeated measures within the same subject in this study. When interaction terms were not significant, they were removed from the models. PROC GLIMMIX was used to investigate genital behavior, a binary outcome representing if a participant had ever had oral, vaginal, and/or anal intercourse (yes/no). In all of the LMMs, age, gender, race, time, group, and baseline rates of the dependent variables were used as predictors.

Results

Youth Characteristics

Youth participants ranged in age from 15–25 years old ($M=19.51$, $SD=2.51$) and self-reported their race as predominately White (64.6%), but expressed more diversity with regards to their ethnicity: Non-Hispanic/Latino (59.1%), Hispanic (4.4%), and Arab (33.7%). The majority of participants reported being female (57.5%), students (93.4%), and single (71.3%). There were no differences between conditions in relation to demographics (Table 1).

The sexual activity of youth at baseline were not significantly different between the SREHC and GAPS conditions regarding oral sex (72.7% vs. 65.9%), vaginal sex (67.7% vs. 61.0%), and anal sex (22.2% vs. 17.1%). The majority of youth at baseline in both the SREHC and GAPS conditions reported it was a *very good idea* (attitude) to use condoms when having sex in the next 3 months (64.3% vs. 55.6%) and reported it was *very likely* (intention) that they would use condoms (52.1% vs. 55.6%; Table 1).

Correlations among the outcomes were completed prior to LMM (Table 2). Significant (positive and strong) correlations were noted among the outcomes “feelings about having sex” and “likelihood of having sex” ($r = .788$, $p < .001$) and “feelings about using condoms” and “likelihood for using condoms” ($r = .751$, $p < .001$). Significant (negative and weak) correlations were noted among the “likelihood of having sex” and “likelihood of using condoms” ($r = -.227$, $p = .009$) as well as “feelings about having sex” and “likelihood of using condoms” ($r = -.237$, $p = .006$).

Changes over Time Related to Attitudes, Intentions, and Behaviors

We analyzed longitudinal data using LMM models to address study aims. Each model will be considered in turn: (1) attitudes (i.e., feelings about having sex; feelings about using condoms); (2) intentions (i.e., likelihood for having sex; likelihood for using condoms); and (3) sexual behaviors. Examining sexual behaviors is specifically related to Aim 1, whereas investigating differences according to age, race, and gender in each model addressed Aim 2. For all of the models, the condition (group) by time interaction term was not significant. Therefore, reduced mixed models without interaction terms were fitted for final analyses (see Table 3).

The overall model for attitudes about having sex was a good fit [$\chi^2(3) = 94.06$, $p < .001$]. Age and attitudes at baseline were significant predictors of engaging in sex. Accordingly, older participants reported more positive attitudes about having sex, and those with positive baseline attitudes about having sex continued to have more positive attitudes at the end of the study. Gender, race, time, and condition were not significant predictors of attitudes toward sex.

Similarly, significant main effects were found in the reduced model considering attitudes about using condoms [$\chi^2(3) = 118.55$, $p < .0001$]. There was a significant main effect for age and race, such that older participants were more likely to report more positive attitudes about using condoms, as were participants of color. Moreover, participants who thought that

using condoms at baseline was a good idea were more likely to feel this way at the end of the study. Gender and condition were not significant predictors of attitudes toward using condoms.

Next, we examined models regarding participants' intentions towards having sex [$\chi^2(3) = 100.08, p < .0001$], and using condoms [$\chi^2(3) = 77.24, p < .0001$]. In line with the findings for the attitude models, the interaction between time and condition was not significant in either model. Therefore, we present reduced models for intentions to have sex and to use condoms (Table 3). Older participants reported stronger intentions to have sex, and those who reported a higher likelihood of having sex at baseline continued to report a higher likelihood to have sex at the end of the study.

With respect to intentions to use condoms, participants with stronger intentions to use condoms at baseline were also more likely to report stronger intentions to use condoms at the end of the study. In our final model examining reports of sexual experience (ever having sex or not), we found age and race to be significant predictors (see Table 3). Younger participants had a greater probability of not ever having sex during the study. Put another way, as age increased, there was a higher probability of a participant ever having had sex over the course of the study. In addition, White participants had a higher probability of ever having had sex during the study compared to participants of color.

Differences between the SREHC and GAPS

To address Aim 3, we specifically looked for differences in attitudes, intentions, and behaviors over time between the SREHC intervention and GAPS control conditions. Throughout the course of the study, all participants, regardless of their intervention condition, were generally more likely to report positive attitudes towards using condoms and more likely to report a higher likelihood of having sex. However, participants generally reported an increase in the likelihood, or intention, to use condoms over time, but those in the SREHC condition reported statistically significant stronger intentions to use condoms compared to those in the GAPS condition. Finally, there were no significant differences noted in sexual behaviors between the SREHC intervention and GAPS control condition during the course of this study.

Discussion

In summary, the findings of this study demonstrate that the SREHC intervention influenced participants' intentions to use condoms during intercourse. That is, participants in the SREHC condition showed a significant difference in comparison to those in the GAPS condition with more positive intentions to use condoms over the course of the study. The SREHC format may promote cognitive appraisal (i.e., intentions; Cox, 1982) by providing a visual structure for youth to reflect on their risk behavior history in context and by facilitating youth-provider communication through viewing the calendar together and discussing their sexual risk history (Martyn, 2009; Martyn et al., 2013a). These results are consistent with those found in a study with Hispanic adolescents who were more likely to report intentions to use condoms after using the SREHC (Martyn, 2009).

Although there were no statistically significant differences found between SREHC and GAPS conditions with respect to sexual activity or condom use 3 months after completing the intervention, there is research to support behavior change after using the SREHC; for example, in a prior study with high-risk 15–19 year olds a statistically significant decrease in sexual intercourse was found one month after using the SREHC assessment (Martyn et al., 2013b). Our SREHC research provides a basis for more targeted interventions as indicated by these results. Furthermore, many of the youth in this study asked if they could complete the SREHC assessment at follow-up study visits (this was not part of the study protocol). This is consistent with prior SREHC research where youth recommended using the SREHC to help them communicate with providers and address their sexual health needs (Martyn et al., 2013a).

There were no other trends in our results favoring one assessment tool over the other in terms of effectiveness. This could be related to the fact that none of the participating clinics had previously used an assessment tool related to sexual behavior, thus the introduction of either tool made providers more tuned in to this aspect of youths' health. It may also be plausible that using any type of assessment tool (SREHC or GAPS) could influence attitudes and intentions regarding condom use and safe sexual practices among youth.

Older participants in this study were more likely to: have positive attitudes about engaging in sex over time, have positive attitudes about using condoms over time, and have sex over time. Youth with more positive attitudes about engaging in sex and using condoms continued to have more positive attitudes throughout the study. Those who had higher intentions to engage in sexual activity and use condoms at baseline continued to have higher intentions throughout the study.

In a review of primary prevention strategies aimed at reducing unintended pregnancies in adolescents, it was determined that these interventions are not effective in delaying initiation of sexual intercourse or improving birth control use (DiCenso, Guyatt, Willan, & Griffith, 2002). However, this review also noted that very few sexual health interventions are actually designed with input from the youth they are designed to help (DiCenso et al., 2002). The SREHC, designed and modified based on input from a diverse group of adolescents and emerging adults has demonstrated improved patient-provider communication (Martyn et al., 2013a) as well as acceptance by providers and patients (Martyn et al., 2006; Martyn & Martin, 2003). These findings support the growing focus on patient-centered outcomes research by including the research population of interest in the planning and design of the intervention.

Limitations

Despite the strengths of utilizing a participatory research framework, this study should also be interpreted within its limitations. Due to the participatory design of this study, recruitment procedures varied based on clinic procedures and staff involvement (Fava et al., 2016), and randomization procedures were slightly altered to accommodate changes in providers at some of the clinics. In addition, self-report bias may have occurred as all data collected was by self-report at the clinic visit followed by a face-to-face interaction with a provider. To minimize this effect, validated questions of sexual risk from the YRBSS were used (Centers

for Disease Control and Prevention, 2016). Finally, we did not capture all relationship configurations which may impact sexual attitudes, intentions, and behaviors. Our assessment of relationship status was limited to single, partner, married, or divorced/separated and did not capture developmentally relevant relationships such as “friends with benefits,” “hook-ups,” and non-romantic sexual relationships (Manning, Giordano, & Longmore, 2006).

Implications

The SREHC assessment improved youths’ intentions to use condoms and supports the tenets of IMCHB (e.g., cognitive appraisal) and event history calendar methods (e.g., autobiographical memory, reflection and awareness of risks). Namely, increased reflection on the individual’s risk behavior in life context improved intentions to use condoms. Helping youth think before they act is especially critical for prevention of sexual risk behavior. However, few interventions are available like the SREHC which facilitates youth awareness of their own risk behavior in life context and results in safer sex intentions.

The SREHC also holds great promise in its ability to serve as an assessment tool to understand youth using a trauma-informed framework. Trauma-informed care is a way of delivering healthcare services that is responsive to the impact of trauma; recognizes the effects; and then responds to them to provide physical, psychological, and emotional safety (Substance Abuse and Mental Health Services Administration, 2014). There is an abundance of evidence linking childhood trauma to increased risk behavior (including risk sexual behaviors), less preventive care, as well as significant morbidity and mortality (Felitti et al., 1998; Noll, Shenk, & Putnam, 2009; Trickett, Noll, & Putnam, 2011; Widom, Czaja, Bentley, & Johnson, 2012). It is imperative that clinicians remain alert to the frequency of trauma experienced in childhood and adolescence as it impacts brain development and the overall health and wellbeing of youth (Fratto, 2016). However, assessing for a history of trauma or current trauma with youth is difficult as most screening tools (i.e., Child Trauma Questionnaire, Traumatic Events Screening Inventory) are lengthy, require training, or require a longer clinical interaction than is often feasible in our current healthcare system (Strand, Sarmiento, & Pasquale, 2005). Many youth are also not forthcoming about their traumatic experiences and do not present with obvious risk factors (Pardee, Munro-Kramer, Bigelow, & Dahlem, 2016). Furthermore, these tools do not take into consideration the context around which these events occur or how they impact youth from a holistic perspective (i.e., relationships, school, and other risk behaviors). The SREHC therefore holds great potential in aiding youths’ disclosure of events such as sexual trauma, unwanted sexual experiences, sex trafficking, and dating violence as they impact sexual risk behaviors of youth.

Although the two assessments did not appear to differ significantly regarding effectiveness, these results provide important implications for interacting with youth and for future research. Utilizing established youth-centered sexual risk assessments may be an important step in influencing attitudes, intentions, and behaviors regarding condom use and sexual activity. Future research should focus on exploring more proximal mechanisms that may influence (mediate or moderate) the relation between the youth-centered assessment and sexual behavior outcomes. Additionally, some of the participants commented on limitations

of the paper-format assessments, including how to incorporate them into the electronic medical record. Therefore, future work should explore electronic formats for youth assessments in clinic settings.

Conclusions

This study highlights the importance of youth-centered assessment of sexual risk behaviors. The results indicate that the SREHC enhanced cognitive appraisal and improved intentions for safer sex behavior. Additionally, youth-centered assessments like the SREHC create opportunities for open dialogue about sensitive issues, such as sexual trauma, unwanted sexual experiences, and sex trafficking. They also facilitate discussion and reinforcement of safer sex practices (e.g., condom use). Further research is needed to explore the mechanisms that influence this interaction and ways to facilitate the use of these approaches in clinical practice and research.

Acknowledgments

We gratefully acknowledge grant support by the National Institutes of Health (NIH) and National Institute of Mental Health, R34-MH-082644 (PI: Kristy K. Martyn).

References

- American Academy of Pediatricians. Recommendations for preventive pediatric health care. Elk Grove, IL: Bright Futures; 2008. Retrieved from <http://brightfutures.aap.org/pdfs/aap%20bright%20futures%20periodicity%20sched%20101107.pdf>
- Belli RF, Lee EH, Stafford FP, Chow CH. Calendar and question-list survey methods: Association between interviewer behavior and data quality. *Journal of Official Statistics*. 2004; 20:185–196.
- Bennett SE, Assefi NP. School-based teenage pregnancy prevention programs: A systematic review of randomized controlled trials. *Journal of Adolescent Health*. 2005; 36(1):72–81. DOI: 10.1016/j.jadohealth.2003.11.097 [PubMed: 15661604]
- Brener ND, Kann L, McManus TL, Kinchen S, Sundberg EC, Ross JG. Reliability of the 1999 youth risk behavior survey questionnaire. *Journal of Adolescent Health*. 2002; 31(4):336–342. DOI: 10.1016/S1054-139X(02)00339-7 [PubMed: 12359379]
- Centers for Disease Control and Prevention. STDs in adolescents and young adults. 2011. Retrieved from <http://www.cdc.gov/std/stats11/adol.htm>
- Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance Survey (YRBSS): 2009 questionnaires and item rationale. 2016. Retrieved from http://www.cdc.gov/HealthyYouth/yrbs/questionnaire_rationale.htm
- Cox CL. An interaction model of client health behavior: Theoretical prescription for nursing. *Advances in Nursing Science*. 1982; 5(1):41–56. [PubMed: 6817699]
- DiCenso A, Guyatt G, Willan A, Griffith L. Interventions to reduce unintended pregnancies among adolescents: Systematic review of randomised controlled trials. *British Medical Journal*. 2002; 324:1426–1434. DOI: 10.1136/bmj.324.7351.1426 [PubMed: 12065267]
- Elster, AB., Kuznets, NJ. AMA guidelines for adolescent preventive services (GAPS): Recommendations and rationale. Baltimore: Williams & Wilkins; 1994.
- Fava NM, Munro-Kramer ML, Felicetti IL, Darling-Fisher DS, Pardee M, Helman A, Martyn KK. Patient-centered participatory research in three health clinics: Benefits, challenges, and lessons learned. *Western Journal of Nursing Research*. 2016; Online First. doi: 10.1177/0193945916654665
- Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, Marks JS. Relationship of childhood abuse and household dysfunction to many of the leading causes of death

in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*. 1998; 14:245–258. [PubMed: 9635069]

Flesch R. A new readability yardstick. *Journal of Applied Psychology*. 1948; 32(3):221–233. [PubMed: 18867058]

Fratto CM. Trauma-informed care for youth in foster care. *Archives of Psychiatric Nursing*. 2016; 30(3):439–446. DOI: 10.1016/j.apnu.2016.01.007 [PubMed: 27256954]

Hamilton BE, Martin JA, Ventura SJ. Births: Preliminary data for 2011. *National Vital Statistics Report*. 2012; 61(5):1–19. Retrieved from http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_05.pdf.

Institute of Medicine. *Health and behavior: The interplay of biological, behavioral, and societal influences*. Washington, DC: National Academy Press; 2001.

Jemmott LS, Jemmott JB III, Villarruel AM. Predicting intentions and condom use among Latino college students. *Journal of the Association of Nurses in AIDS Care*. 2002; 13(2):56–69. DOI: 10.1016/S1055-3290(06)60201-X

Johnson BT, Carey MP, Marsh KL, Levin KD, Scott-Sheldon LA. Interventions to reduce sexual risk for the human immunodeficiency virus in adolescents, 1985–2000: A research synthesis. *Archives of Pediatrics & Adolescent Medicine*. 2003; 157(4):381–388. DOI: 10.1001/archpedi.157.4.381 [PubMed: 12695235]

Kalmuss D, Armstrong B, Franks M, Hecker G, Gonzalez J. Evaluation of a community-based sexual health intervention for young adult Latino and African-American men. *Journal of Men's Health*. 2008; 5(4):318–326. DOI: 10.1016/j.jomh.2008.08.003

Kincaid, JP., Fishburne, RP., Robers, RL., Chissom, BS. Derivation of new readability formulas (Automated Reliability Index, Fog Count and Flesch Reading Ease Formula) for Navy enlisted personnel (Research Branch Report 8-75). Memphis, TN: Naval Air Station; 1975. Retrieved from <http://digitalcollections.lib.ucf.edu/cdm4/document.php?CISOROOT=%2FIST&CISOPTR=26301&REC=0&CISOBX=Flesch-Kincaid+grade+level>

Kirby, D. *Emerging answers 2007: Research findings on programs to reduce teen pregnancy and sexually transmitted diseases*. Washington, DC: National Campaign to Prevent Teen Pregnancy; 2007. Retrieved from http://www.thenationalcampaign.org/EA2007/EA2007_full.pdf

Kirby DB, Laris BA, Rollieri LA. Sex and HIV education programs: Their impact on sexual behavior of young people throughout the world. *Journal of Adolescent Health*. 2007; 40(3):206–217. DOI: 10.1016/j.jadohealth.2006.11.143 [PubMed: 17321420]

Levenberg PB. GAPS: An opportunity for nurse practitioners to promote the health of adolescents through clinical preventive services. *Journal of Pediatric Health Care*. 1998; 12(1):2–9. DOI: 10.1016/S0891-5245(98)90023-2 [PubMed: 9515492]

Low LK. Guidelines for adolescent preventive services (GAPS). *Journal of Midwifery & Women's Health*. 2003; 48(3):231–233. DOI: 10.1016/S1526-9523(03)00071-0

Manning WD, Giordano PC, Longmore MA. Hooking up: The relationship contexts of “nonrelationship” sex. *Journal of Adolescent Research*. 2006; 21(5):459–483. DOI: 10.1177/0743558406291692

Martyn, KK. Adolescent health research and clinical assessment using self-administered event history calendars. In: Belli, R.Stafford, F., Alwin, D., editors. *Calendar and time diary methods in life course research*. Thousand Oaks, CA: Sage; 2009. p. 69-86.

Martyn KK, Darling-Fisher CS, Pardee M, Ronis DL, Felicetti IL, Saftner MA. Improving sexual risk communication with adolescents using event history calendars. *Journal of School Nursing*. 2013b; 28:108–115.

Martyn KK, Martin R. Adolescent sexual risk assessment. *Journal of Midwifery & Women's Health*. 2003; 48(3):213–219. DOI: 10.1016/S1526-9523(03)00064-3

Martyn KK, Munro ML, Darling-Fisher CS, Ronis DL, Villarruel AM, Pardee M, Faleer H, Fava NM. Patient-centered communication and health assessment with youth. *Nursing Research*. 2013a; 62(6):383–393. DOI: 10.1097/NNR.0000000000000005

Martyn KK, Reifsnider E, Murray A. Improving adolescent sexual risk assessment with event history calendars: A feasibility study. *Journal of Pediatric Health Care*. 2006; 20(1):19–26. DOI: 10.1016/j.pedhc.2005.07.013 [PubMed: 16399476]

- Noll JG, Shenk CE, Putnam KT. Childhood sexual abuse and adolescent pregnancy: A meta-analytic update. *Journal of Pediatric Psychology*. 2009; 34(4):366–378. [PubMed: 18794188]
- Ozer EM, Urquhart JT, Brindis CD, Park MJ, Irwin CE. Young adult preventive health care guidelines: There but can't be found. *Archives of Pediatrics & Adolescent Medicine*. 2012; 166(3):240–247. DOI: 10.1001/archpediatrics.2011.794 [PubMed: 22393182]
- Pardee M, Munro-Kramer ML, Bigelow A, Dahlem G. Domestic minor sex trafficking: Missed clinical opportunities. *Clinical Advisor*. 2016 Retrieved from <http://www.clinicaladvisor.com/features/domestic-minor-sex-trafficking-missed-clinical-opportunities/article/495972/>.
- Saftner MA, Martyn KK, Momper SL, Kane Low L, Loveland-Cherry CS. Urban American Indian adolescent girls: Framing sexual risk behavior. *Journal of Transcultural Nursing*. 2015; 26(4):365–375. DOI: 10.1177/1043659614524789 [PubMed: 24803532]
- Satterwhite CL, Torrone E, Meites E, Dunne EF, Mahajan R, Ocfemia MCB, ... Weinstock H. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. *Sexually transmitted diseases*. 2013; 40(3):187–193. DOI: 10.1097/OLQ.0b013e318286bb53 [PubMed: 23403598]
- Sieving RE, McMorris BJ, Beckman KJ, Pettingell SL, Secor-Turner M, Kluger K, Garwick AW, Resnick M, Bearinger L. Prime Time: 12-month sexual health outcomes of a clinic-based intervention to prevent pregnancy risk behaviors. *Journal of Adolescent Health*. 2011; 49(2):172–179. DOI: 10.1016/j.jadohealth.2010.12.002 [PubMed: 21783050]
- Strand VC, Sarmiento TL, Pasquale LE. Assessment and screening tools for trauma in children and adolescents. *Trauma, Violence, & Abuse*. 2005; 6(1):55–78. DOI: 10.1177/1524838004272559
- Substance Abuse and Mental Health Services Administration. Trauma-informed care in behavioral health services. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2014. Treatment Improvement Protocol (TIP) Series 57. HHS Publication No. (SMA) 13-4801
- Trickett PK, Noll JG, Putnam FW. The impact of sexual abuse on female development: Lessons from a multigenerational, longitudinal research study. *Developmental Psychopathology*. 2011; 23(2):453–476.
- Trinh-Shevrin C, Islam N, Tandon SD, Abesamis N, Hoe-Asjoe H, Rey M. Using community-based participatory research as a guiding framework for health disparities research centers. *Progress in Community Health Partnerships*. 2007; 1(2):195–202. DOI: 10.1353/cpr.2007.0007 [PubMed: 19081761]
- Tuttle J, Bidwell-Cerone S, Campbell-Heider N, Richeson G, Collins S. Teen Club: A nursing intervention for reducing risk-taking behavior and improving well-being in female African American adolescents. *Journal of Pediatric Health Care*. 2000; 14(3):103–108. DOI: 10.1016/S0891-5245(00)70020-4 [PubMed: 10823968]
- United Nations Population Fund. Motherhood in childhood: Facing the challenge of adolescent pregnancy. New York, NY: United Nations Population Fund; 2013. Retrieved from <http://www.unfpa.org/webdav/site/global/shared/swp2013/EN-SWOP2013-final.pdf>
- United States Department of Health and Human Services. The guide to clinical preventive services. Washington, DC: Agency for Healthcare Research and Quality; 2012. (No. 12-05154) Retrieved from <http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/guide/guide-clinical-preventive-services.pdf>
- Villarruel AM, Jemmott JB III, Jemmott LS. A randomized controlled trial testing an HIV prevention intervention for Latino youth. *Archives of Pediatrics & Adolescent Medicine*. 2006; 160(8):772–777. DOI: 10.1001/archpedi.160.8.772 [PubMed: 16894074]
- Villarruel AM, Jemmott JB III, Jemmott LS, Ronis D. Predictors of sexual intercourse and condom use intentions among Spanish-dominant Latino youth. *Nursing Research*. 2004; 53(3):172–181. [PubMed: 15167505]
- West BT. Analyzing longitudinal data with the linear mixed models procedure in SPSS. *Evaluation and the Health Professions*. 2009; 32(3):207–228. [PubMed: 19679634]
- Widom CS, Czaja SJ, Bentley T, Johnson MS. A prospective investigation of physical health outcomes in abused and neglected children: New findings from a 30-year follow-up. *American Journal of Public Health*. 2012; 102(6):1135–1144. [PubMed: 22515854]

Figure 1.
Interaction Model of Client Health Behavior and Sexual Risk Behavior in Youth

Figure 2.
Participants Flow through Trial

Table 1

Baseline Characteristics of the Study Participants by Condition (n=181)

Demographic Characteristics	SREHC Intervention (n=99)	GAPS Control (n=82)	Significance tests comparing the two groups and <i>p</i> values
Age (years), mean (SD)	19.79 (2.43)	19.18 (2.58)	<i>t</i> (df=179)= -1.62, <i>p</i> =.107
	n (%)	n (%)	
Developmental Age Group			χ^2 (df=1)=.442, <i>p</i> =.506
Adolescent (15–18 years old)	47 (47.5)	43 (52.4)	
Emerging adult (19–25 years old)	52 (52.5)	39 (47.6)	
Clinic Type			χ^2 (df=2)=3.641, <i>p</i> =.162
Community Health Clinic	30 (30.3)	33 (40.2)	
STI Clinic	8 (8.1)	10 (12.2)	
University Health Clinic	61 (61.6)	39 (47.6)	
Gender			χ^2 (df=1)=.114, <i>p</i> =.736
Man	41 (41.4)	36 (43.9)	
Woman	58 (58.6)	46 (56.1)	
Ethnicity			χ^2 (df=2)=4.762, <i>p</i> =.092
Hispanic/Latino	6 (6.1)	2 (2.4)	
Not Hispanic/Latino	63 (63.6)	44 (53.7)	
Arab-American	27 (27.3)	34 (41.5)	
Missing	3 (3.0)	2 (2.4)	
Race			χ^2 (df=5)=4.707, <i>p</i> =.453
Black/African American	33 (33.3)	21 (25.6)	
White	63 (63.7)	54 (65.9)	
Asian	2 (2.0)	1 (1.2)	
American Indian/Alaska Native	0 (0.0)	1 (1.2)	
Native Hawaiian/Pacific Islander	0 (0.0)	1 (1.2)	
Other	0 (0.0)	1 (1.2)	
Missing	1 (1.0)	3 (3.7)	

Demographic Characteristics	SREHC Intervention (n=99)	GAPS Control (n=82)	Significance tests comparing the two groups and <i>p</i> values	
Relationship Status			$\chi^2(df=3)=1.447, p=.695$	
Single	72 (72.7)	57 (69.5)		
Partner	24 (24.3)	22 (26.9)		
Married	3 (3.0)	2 (2.4)		
Divorced/Separated	0 (0.0)	1 (1.2)		

Baseline Sexual Attitudes, Intentions, & Behaviors		SREHC Intervention (n=99)	GAPS Control (n=82)	Significance tests comparing the two groups and <i>p</i> value
Feelings about having sex in the next 3 months at baseline		n(%)	n(%)	
Very bad idea		23 (23.2)	19 (23.5)	$\chi^2(df=4)=1.324, p=.857$
Bad idea		5 (5.1)	7 (8.6)	
Neither good nor bad idea		20 (20.2)	18 (22.2)	
Good idea		22 (22.2)	17 (21.0)	
Very good idea		29 (29.3)	20 (24.7)	
Likelihood of having sex in the next 3 months at baseline				$\chi^2(df=4)=4.940, p=.294$
Very unlikely		26 (26.2)	26 (32.1)	
Unlikely		13 (13.1)	5 (6.2)	
Neither likely nor unlikely		6 (6.1)	10 (12.3)	
Likely		16 (16.2)	11 (13.6)	
Very likely		38 (38.4)	29 (35.8)	
Feelings about using condoms if having sex in the next 3 months at baseline				$\chi^2(df=4)=5.210, p=.266$
Very bad idea		6 (6.1)	8 (9.9)	
Bad idea		2 (2.0)	5 (6.1)	
Neither good nor bad idea		10 (10.2)	13 (16.1)	
Good idea		17 (17.4)	10 (12.3)	
Very good idea		63 (64.3)	45 (55.6)	
Likelihood of using condoms if having sex in the next 3 months at baseline				$\chi^2(df=4)=.700, p=.951$
Very unlikely		17 (17.3)	13 (16.1)	

Baseline Sexual Attitudes, Intentions, & Behaviors	SREHC Intervention (n=99)	GAPS Control (n=82)	Significance tests comparing the two groups and <i>p</i> value
	n(%)	n(%)	
Unlikely	6 (6.1)	4 (4.9)	
Neither likely nor unlikely	9 (9.2)	9 (11.1)	
Likely	15 (15.3)	10 (12.3)	
Very likely	51 (52.1)	45 (55.6)	
Sexual activity at baseline			
Ever had oral sex	72 (72.7)	54 (65.9)	$\chi^2(df=1)=1.002, p=.317$
Ever had vaginal sex	67 (67.7)	50 (61.0)	$\chi^2(df=1)=.881, p=.348$
Ever had anal sex	22 (22.2)	14 (17.1)	$\chi^2(df=1)=.746, p=.388$
Number of lifetime sexual partners at baseline among sexually active participants	SREHC = 78	GAPS = 56	$\chi^2(df=5)=2.206, p=.820$
1	16 (20.5)	11 (19.7)	
2	7 (9.0)	9 (16.1)	
3	11 (14.8)	7 (12.5)	
4	6 (7.7)	6 (10.7)	
5	10 (12.8)	5 (8.9)	
6 or more	26 (33.3)	18 (32.1)	
Missing	2 (2.6)	0	
Baseline contraceptive use among (vaginal) sexually active participants	SREHC = 67	GAPS = 50	$\chi^2(df=5)=6.866, p=.231$
None	5 (7.4)	4 (8.0)	
Condoms only	26 (38.8)	13 (26.0)	
Hormonal methods only	14 (20.9)	15 (30.0)	
Withdrawal + some other method	17 (25.4)	8 (16.0)	
Hormonal methods and condoms	4 (6.0)	7 (14.0)	
Not sure	0 (0.0)	1 (2.0)	
Missing	1 (1.5)	2 (4.0)	

Table 2

Correlations among Outcomes

	Feelings about having sex in next 3 months	Likelihood of having sex in next 3 months	Feelings about using a condom if having sex in next 3 months	Likelihood of using a condom if having sex in next 3 months	Had oral, vaginal, and/or anal sex in past 3 months
Feelings about having sex in next 3 months	1	$r = .788$ $p = <.001$	$r = -.080$ $p = .364$	$r = -.237$ $p = .006$	$r = .084$ $p = .357$
Likelihood of having sex in next 3 months		1	$r = -.088$ $p = .316$	$r = -.227$ $p = .009$	$r = .091$ $p = .317$
Feelings about using a condom if having sex in next 3 months			1	$r = .751$ $p = <.001$	$r = -.014$ $p = .876$
Likelihood of using a condom if having sex in next 3 months				1	$r = -.087$ $p = .339$
Had oral, vaginal, and/or anal sex in past 3 months					1

Note. Bold numbers are statistically significant.

Table 3
Linear Mixed Models Results for Attitudes, Intentions, and Behaviors Related to Sexual Activity

Model	Attitudes			Intentions			Behaviors		
	Estimate (SE)	t (df)	p	Estimate (SE)	t (df)	p	Estimate (SE)	t (df)	p
<i>Engaging in Sex</i>									
Age	.08 (.02)	3.6 (282)	< .001	.07 (.02)	3.4 (283)	< .001			
Gender	-.13 (.10)	-1.3 (282)	.21	-.12 (.10)	-1.2 (283)	.20			
Race	-.01 (.10)	-.12 (282)	.91	-.05 (.10)	-.51 (283)	.61			
Attitudes	.73 (.04)	20.4 (282)	< .001	.81 (.03)	26.7 (283)	< .001			
Time	.01 (.01)	1.2 (161)	.22	.03 (.01)	3.3 (161)	.001			
Group	.11 (.10)	1.1 (282)	.26	.13 (.09)	1.4 (283)	.18			
<i>Condom Use</i>									
Age	.06 (.02)	2.67 (280)	.01	.02 (.03)	.73 (280)	.47			
Gender	-.002 (.11)	-.02 (280)	.99	.02 (.13)	.17 (280)	.87			
Race	.33 (.12)	2.75 (280)	.01	.08 (.13)	.59 (280)	.56			
Attitudes	.57 (.05)	12.24 (280)	< .001	.65 (.04)	15.6 (280)	< .001			
Time	.02 (.01)	2.43 (160)	.02	.02 (.01)	2.1 (160)	.04			
Group	-.10 (.11)	-.87 (280)	.38	-.31 (.13)	-2.4 (280)	.02			
<i>Genital Activity</i>									
Age							-.76 (.15)	-5.22 (519)	< .001
Gender							.98 (.67)	1.45 (519)	.15
Race							-2.6 (.75)	-3.55 (519)	< .001
Time							--	0.0 (519)	1.0
Group							.16 (.64)	.25 (519)	.81

Note. Interaction between time by group was not significant for any of the reported models. Results are for reduced models. Reference Groups: Gender=man, Race=White, Group= SREHC, Behaviors=no genital activity