Sexual Activity and Substance Use Among Adolescents and Young Adults Receiving Cancer Treatment: A Report from the PRISM Randomized Controlled Trial

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Purpose: Despite health implications, sexual activity and substance use among adolescents and young adults (AYAs) receiving cancer treatment are understudied.

Methods: AYAs 12–25 years of age participated in a randomized controlled trial testing the efficacy of a resilience intervention. They were fluent in English and either diagnosed with new cancer (NC) or advanced cancer (AC). At baseline and 6 months, participants self-reported sexual activity and substance use. We describe the percentage of AYAs who endorsed each behavior and a count of total behaviors endorsed by each respondent. We describe frequencies by sex/gender (male/female), age (<18/≥18), and disease status (AC/NC).

Results: Participants (*N*=92) were majority white/Caucasian (57%), 12–17 years old (73%), and diagnosed with leukemia/lymphoma (62%); 32% had AC. Responses were not associated with the intervention; hence, we summarized data from the whole cohort. At both time points, median behavior endorsed was 2. At baseline and follow-up, 87% and 81% endorsed at least 1 behavior: 13% and 15% were sexually active, 75% and 73% of whom used birth control inconsistently; and 22% and 22% reported drinking alcohol, 31% and 27% using prescription opioids/sedatives, 19% and 22% using other drugs, and 9% and 7% using tobacco. Young adults engaged in most behaviors more frequently than adolescents (e.g., 48% vs. 12% alcohol at baseline); males engaged in sexual activity more frequently than females (e.g., 20% vs. 5% sexually active at baseline); and AYAs with NC engaged in most behaviors more frequently than those with AC (18% vs. 0% sexually active at baseline).

Conclusion: AYAs engage in sexual activity and substance use during cancer treatment.

Keywords: substance use, sexual health, risk behavior, screening, communication

Introduction

ADOLESCENTS AND YOUNG ADULTS (AYAs) with cancer are at increased risk for negative psychosocial adjustment and physical health outcomes compared to other age groups, in part, due to disruptions in critical developmental processes occurring during this point in the lifespan.^{1–4} Two key understudied components of AYA physical and psychological health are sexual activity and substance use during treatment. Although developmentally normative, these behaviors can lead to a range of negative health outcomes, including sexually transmitted infections (STIs), unintended pregnancy, and substance use disorders. For AYAs with cancer, such

behaviors are additionally concerning due to their potential to interfere with treatment, exacerbate existing health problems, or increase risk for late effects.^{5,6} Despite these concerns, some engagement in sexual activity and/or substance use may also indicate that AYAs are coping well with cancer and continuing to engage in age-typical behaviors. Thus, to support the wellbeing of AYAs in a developmentally appropriate manner, it is critical to understand prevalence and patterns of sexual activity and substance use within this population.

Evidence suggests that across a range of chronic illnesses and conditions, AYAs engage in substance use at similar rates to non-ill peers^{7–9} and may have slightly higher rates of sexual risk behaviors.^{7,9–11} While a larger body of

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literature has examined health risk behaviors among survivors of childhood cancer, only two studies to date have examined these behaviors among AYAs on treatment for cancer. A 2008 study of $N=42$ adolescents on treatment for cancer reported similar rates of current sexual activity compared to non-ill adolescents, although lower rates of lifetime sexual intercourse, early onset sexual intercourse, and substance use before sex.¹² Participants also reported lower rates of substance use compared to norms.¹² In contrast, a 2017 study found that among $N=42$ AYAs with cancer, rates of both sexual activity and substance use were similar to norms.¹³ Given the small sample sizes in these studies and relative dearth of studies in this area, prevalence and patterns of these behaviors among AYAs receiving cancer-directed treatment remain unclear.

To better describe sexual activity and substance use among AYAs receiving cancer treatment, we conducted a *post hoc* analysis of data from a randomized controlled trial (RCT) conducted in an AYA oncology population.^{14–16} Specifically, we aimed to (1) describe prevalence of sexual activity (dating, current sexual activity, and contraception use) and substance use (alcohol, tobacco, illicit drugs, and family and friends' substance use) at baseline and 6-month follow-up and (2) explore whether engagement in these behaviors varied with age, gender, or the presence of advanced cancer (AC).

Materials and Methods

Participants

We recruited participants as part of an RCT testing the efficacy of the Promoting Resilience in Stress Management (PRISM) intervention at Seattle Children's Hospital.^{15,16} Eligible participants were between 12 and 25 years of age, English speaking, and within 1–10 weeks of a new cancer diagnosis and receiving systemic chemotherapy or with any history of AC (defined as progressive, recurrent, or refractory disease). AYAs with cognitive impairments were excluded from the study.

Procedures and intervention

Details of the study procedures have been described elsewhere.^{15,16} Briefly, consecutive AYAs were recruited over a 22-month window from January 2015 to November 2016. Eligible AYAs who provided informed consent or assent with corresponding parent consent (12–17 years-old) were enrolled and randomized 1:1 to PRISM or Usual Care (UC). PRISM is a manualized, skill-based program designed to bolster resilience resources among AYAs with serious illness.¹⁷ Primary findings from this RCT confirmed it was associated with improved patient-reported resilience, distress, quality of life, and other psychosocial outcomes when compared to UC.^{14–16} Regardless of randomization arm, AYAs were asked to complete surveys at the time of enrollment (immediately following randomization) and 6 months later. All study procedures were approved by the local Institutional Review Board.

Measures

Demographic and medical information. Demographic information (sex, age, race, ethnicity, religion, and religiosity) was collected through a survey at each time point.

For sex/gender, participants were given a dichotomous choice of male or female. Medical information was extracted from medical records.

Sexual activity and substance use. The American Medical Association Guidelines for Adolescent Preventative Services (GAPS) survey assesses engagement in sexual behaviors and substance use in AYAs.¹⁸ For the purposes of this project, 13 items were included in study surveys to assess self-reported engagement. Responses were measured on a 5-point Likert scale, with options ranging from 0 (not at all) to 4 (very much). Seven items queried sexual activity in the past month, including dating (*I am dating someone*), being sexually active (*I am currently sexually active*), considering sex (*I am considering having sex*), having sex (*I have had vaginal, anal and/or oral sex*), using birth control (*I use birth control*), and using condoms (*I use condoms to prevent STIs*). Four items queried AYAs own substance use in the past month, including prescription pain and sedative medications (*I have used prescription drugs [opiates, benzodiazepines, sedatives]*), illicit/other drugs (*I have used other drugs [marijuana, cocaine, speed, crack, etc.]*), alcohol use (*I have drunk alcohol*), and tobacco use (*I have smoked cigarettes or chewed tobacco*). Finally, one item queried substance use of friends (*My friends drink alcohol and/or use drugs*) and one item queried substance use of family members (*Someone in my family drinks alcohol or uses drugs*).

Data analysis

For consistency with extant literature describing prevalence of health behaviors, we dichotomized each item *a priori* based on clinical relevance (0=no engagement and 1=engagement). For example, for all items assessing substance use and items assessing dating, having sex, considering sex, current sexual activity, and concerns about STIs, we coded any degree of engagement in the behavior in the past month (i.e., any score, except 0 [*not at all*]) as 1 (engagement) because any amount of engagement may be of interest to providers and inform care. Likewise, for items assessing condom and birth control use (i.e., "I use condoms to prevent STIs" and "I use birth control"), we coded any response, except 5 (*very much*), as 1 (inconsistent condom/birth control use), as any amount of unsafe sexual behavior may be cause for concern.

Prevalence of sexual activity and substance use behaviors was summarized by calculating frequencies and percentages endorsing each behavior at each time point for the overall sample and by subgroups defined by intervention arm (PRISM and UC), age (adolescents [<18] and young adults [≥ 18]), sex/gender (male or female), disease status (AC or new cancer [NC]), race (white or non-white), and self-reported religiousness (somewhat/very religious and not at all/not very religious). For the above-referenced items assessing condom and birth control use, we only calculated frequencies for those who endorsed being sexually active at that time point. Due to the *post hoc* exploratory nature of the analysis and small subsample sizes, we did not test statistical significance of subgroup comparisons. Next, we summed across all self-reported items (i.e., omitting friends/family substance use items) to create a count of total endorsed behaviors for each participant at each time point (possible range: 0–11). Because we did not observe consistent

differences in sexual activity or substance use based on PRISM, only data for the full cohort (rather than by intervention arm) are presented in this study.

Results

Patient demographics

A total of $N=92$ AYAs met eligibility criteria, enrolled on the study, were randomized, and completed baseline surveys.^{15,16} The majority were white (57%), male (57%), and between 12 and 17 years of age (73%), and identified as non-denominational Christian (41%; Table 1). Most AYAs were diagnosed with leukemia or lymphoma (62%); 32% had non-central nervous system (non-CNS) solid tumors and 7% had CNS tumors. Most AYAs (74%) had newly diagnosed cancers at the time of enrollment. Seventy-four AYAs completed follow-up surveys. Information regarding attrition and corresponding missing data is described elsewhere.^{15,19}

Sexual activity and substance use engagement

At baseline, the median number of total behaviors endorsed was 2 (IQR 1–4), with 87% of AYAs endorsing at least 1 behavior and 30% endorsing 4 or more. At 6-month follow-up, the median number of total behaviors endorsed was 2 (IQR 1–3), with 81% of AYAs endorsing at least 1 behavior and 23% endorsing 4 or more. The most commonly endorsed sexual behaviors were dating and considering

having sex, and substance use behaviors were family members' drinking/drug use and friends' drinking/drug use (frequencies reported below).

Sexual activity. At baseline, 30% of AYAs reported dating, 13% being sexually active, 23% considering having sex, and 18% having had oral, anal, or vaginal sex (Table 2). No participants reported concern about having an STI. Of the 12 respondents who were sexually active in the past month, 75% reported inconsistent birth control use and 54% inconsistent condom use. At follow-up, 20% reported dating, 15% being sexually active, 21% considering having sex, 18% having had oral, anal, or vaginal sex, and 4% concern about having an STI. Of the 11 respondents who were sexually active in the past month, 73% reported inconsistent birth control use and 25% reported inconsistent condom use.

Substance use. At baseline, 31% of AYAs endorsed using prescription opioids/benzodiazepines/sedatives, 19% using illicit/other drugs, 22% drinking alcohol, and 9% using tobacco (Table 3). In addition, 49% reported that their friends drank or used drugs, and 63% reported that their family members drank or used drugs. At follow-up, 27% endorsed using prescription opioids/sedatives, 22% using illicit/other drugs, 22% drinking alcohol, and 7% using tobacco. Also, 53% reported that their friends had drank or used drugs and 55% reported that a family member drank or used drugs.

TABLE 1. SAMPLE CHARACTERISTICS

	n (%)
Demographics	
Female	40 (43)
12–17 years of age at enrollment	67 (73)
18–25 years of age at enrollment	25 (27)
First language other than English	11 (12)
Race	
White/Caucasian	66 (72)
Asian	7 (7)
Black or African American	5 (5)
American Indian or Alaskan Native	5 (5)
Pacific Islander or Native Hawaiian	1 (1)
Other	17 (18)
Ethnicity	
Non-Hispanic	69 (75)
Religion	
Christian (nondenominational)	38 (41)
Christian (Catholic)	12 (13)
Christian (Protestant)	4 (4)
Jewish	2 (2)
Buddhist	2 (2)
Muslim	1 (1)
Hindu	1 (1)
None	21 (23)
Other	6 (7)
Missing	5 (5)
Diagnoses	
Leukemia/lymphoma	57 (62)
CNS	6 (7)
Non-CNS solid tumor	29 (32)
AC at enrollment	24 (26)

AC, advanced cancer; CNS, central nervous system.

Patterns of sexual activity and substance use

Age group. For sexual activity, young adults (≥ 18) endorsed dating, being currently sexually active, considering having sex, and having had sex more frequently than adolescents (<18) at both time points (Table 2). For example, at baseline, 56% of young adults and 20% of adolescents endorsed dating; 32% of young adults and 8% of adolescents reported being currently sexually active; and 48% of young adults and 7% of adolescents endorsed having had vaginal, anal, and/or oral sex. No age-related pattern emerged for inconsistent birth control use, inconsistent condom use, or concerns about STIs. For self-reported substance use, young adults also endorsed all items more frequently than adolescents at both time points. For example, at baseline, 48% of young adults and 12% of adolescents endorsed drinking alcohol; 40% of young adults and 11% of adolescents endorsed using illicit/other drugs; and 20% of young adults and 5% of adolescents endorsed using tobacco. For friends' and family substance use, young adults endorsed friends' drinking/using drugs more frequently than adolescents across both time points (80%–86% vs. 33%–38%, respectively). There was no age-related pattern for frequencies of family members' substance use.

Participant sex/gender. At both time points, males endorsed dating, being currently sexually active, and considering having sex more frequently than females. For example, 20%–23% of males and 5%–6% of females reported being sexually active at both time points. No gender-related patterns emerged regarding the proportion of AYAs who endorsed having had sex, inconsistent birth control or condom use, or concerns about STIs. No gender-related patterns emerged for any substance use behaviors.

TABLE 2. PREVALENCE OF SEXUAL BEHAVIORS

	Baseline (N = 92)	6 Months (N = 74)	Baseline (N = 92)	6 Months (N = 74)
	(%) Endorsed/total	(%) Endorsed/total	(%) Endorsed/total	(%) Endorsed/total
<i>Dating</i>			<i>Inconsistent birth control use^a</i>	
Total	(30) 27/91	(20) 15/74	(75) 9/12	(73) 8/11
Male	(35) 18/51	(24) 10/41	(80) 8/10	(78) 7/9
Female	(23) 9/40	(15) 5/33	(50) 1/2	(50) 1/2
<18	(20) 13/66	(15) 7/46	(80) 4/5	(67) 2/3
≥ 18	(56) 14/25	(29) 8/28	(71) 5/7	(75) 6/8
Non-AC	(33) 22/67	(25) 14/57	(75) 9/12	(73) 8/11
AC	(21) 5/24	(6) 1/17	(0) 0/0	(0) 0/0
Missing (n)	1	0	NA	NA
<i>Currently sexually active</i>			<i>Inconsistent condom use^a</i>	
Total	(13) 12/90	(15) 11/73	(58) 7/12	(73) 3/11
Male	(20) 10/50	(23) 9/40	(60) 6/10	(22) 2/9
Female	(5) 2/40	(6) 2/33	(50) 1/2	(50) 1/2
<18	(8) 5/65	(7) 3/45	(60) 3/5	(67) 2/3
≥ 18	(32) 8/25	(29) 8/28	(57) 4/7	(13) 1/8
Non-AC	(18) 12/66	(20) 11/56	(58) 7/12	(27) 3/11
AC	(0) 0/24	(0) 0/17	(0) 0/0	(0) 0/0
Missing (n)	2	1	NA	NA
<i>Considered having sex</i>			<i>Concerned about STIs</i>	
Total	(23) 21/90	(21) 15/73	(0) 0/91	(4) 3/74
Male	(36) 17/50	(28) 11/40	(0) 0/51	(2) 1/41
Female	(10) 4/40	(12) 4/33	(0) 0/40	(6) 2/33
<18	(15) 10/65	(7) 3/45	(0) 0/66	(7) 3/46
≥ 18	(44) 11/25	(43) 12/28	(0) 0/25	(0) 0/28
Non-AC	(29) 19/66	(23) 13/56	(0) 0/67	(5) 3/57
AC	(8) 2/24	(12) 2/17	(0) 0/24	(0) 0/17
Missing (n)	2	1	1	0
<i>Had vaginal, anal, and/or oral sex</i>				
Total	(18) 16/90	(18) 13/74		
Male	(16) 8/50	(22) 9/41		
Female	(20) 8/40	(12) 4/33		
<18	(7) 4/61	(11) 5/46		
≥ 18	(48) 12/25	(29) 8/28		
Non-AC	(20) 13/66	(23) 13/57		
AC	(13) 3/24	(0) 0/17		
Missing (n)	2	0		

^aOnly including participants who endorsed being currently sexually active at the corresponding time point.
NA, not applicable; STIs, sexually transmitted infections.

Disease status. At both time points, AYAs with AC reported engaging in sexual activity less frequently than AYAs with NC. For example, at baseline, 8% of AYAs with AC and 29% of AYAs with NC endorsed considering having sex. No AYA with AC reported being currently sexually active at either baseline or follow-up. AYAs with AC reported drinking and illicit/other drug use less frequently than AYAs with NC. For example, at baseline, 13% of AYAs with AC and 26% of AYAs with NC endorsed drinking alcohol; and 8% of AYAs with AC and 26% of AYAs with NC reported using illicit/other drugs. No pattern emerged based on disease status for prescription opioid/sedative use, tobacco use, friends' substance use, or family members' substance use.

Other parameters. Prevalence of sexual activity and substance use did not consistently differ by race (white, non-white) or religiousness (somewhat/very religious and not at all/not very religious).

Discussion

In this descriptive analysis of sexual activity and substance use among AYAs with cancer, we found that the majority of AYAs (>80%) endorsed at least one behavior and >20% endorsed four or more. Approximately one in three AYAs reported dating and one in five reported being sexually active at baseline and 6 months later; of those who were sexually

TABLE 3. PREVALENCE OF SUBSTANCE USE BEHAVIORS

	Baseline (N=92)	6 Months (N=74)	Baseline (N=92)	6 Months (N=74)
	(%) Endorsed/total	(%) Endorsed/total	(%) Endorsed/total	(%) Endorsed/total
<i>Used Rx drugs</i>		<i>Used tobacco</i>		
Total	(31) 27/88	(27) 20/73	(9) 8/90	(7) 5/74
Male	(39) 19/49	(25) 10/40	(10) 5/50	(7) 3/41
Female	(21) 8/39	(30) 10/33	(8) 3/40	(6) 2/33
<18	(27) 17/64	(22) 10/45	(5) 3/65	(2) 1/46
≥ 18	(42) 10/24	(36) 10/28	(20) 5/25	(14) 4/28
Non-AC	(13) 19/67	(27) 15/56	(11) 7/66	(5) 3/57
AC	(38) 8/21	(29) 5/17	(4) 1/24	(12) 2/17
Missing (n)	4	1	2	0
<i>Used other drugs</i>		<i>Friend(s) drank or used drugs</i>		
Total	(19) 17/91	(22) 16/72	(49) 44/89	(53) 39/74
Male	(22) 11/51	(31) 12/39	(46) 23/50	(49) 20/41
Female	(15) 6/40	(12) 4/33	(54) 21/39	(58) 19/33
<18	(11) 7/66	(7) 3/44	(38) 24/64	(33) 15/46
≥ 18	(40) 10/25	(46) 13/28	(80) 20/25	(86) 24/28
Non-AC	(26) 15/57	(25) 14/55	(53) 35/66	(56) 32/57
AC	(8) 2/24	(12) 2/17	(39) 9/23	(41) 7/17
Missing (n)	1	2	3	0
<i>Drank alcohol</i>		<i>Family member(s) drank or used drugs</i>		
Total	(22) 20/90	(22) 16/74	(63) 55/88	(55) 40/73
Male	(20) 10/50	(27) 11/41	(63) 31/49	(54) 22/41
Female	(25) 10/40	(18) 5/28	(62) 24/39	(56) 18/32
<18	(12) 8/65	(11) 5/46	(62) 39/63	(49) 22/45
≥ 18	(48) 12/25	(39) 11/28	(64) 16/25	(64) 18/28
Non-AC	(26) 17/66	(25) 14/57	(62) 40/65	(58) 33/57
AC	(13) 3/24	(12) 2/17	(65) 15/23	(44) 7/16
Missing (n)	2	0	4	1

active, most reported inconsistent birth control/condom use. Similarly, we found that ~1 in 5 AYAs reported substance use, including drinking alcohol or using illicit/other drugs, although fewer than 1 in 10 reported tobacco use.

Frequencies of sexual behaviors in this study were lower than those reported in prior studies of adolescents¹² and AYAs with cancer.¹³ However, no prior studies included AYAs with AC, which may account for these differences. More than half of sexually active participants reported inconsistent condom/birth control use, which is similar to frequencies reported in prior work.¹³ Frequencies of substance use behaviors were similar to a previous study of AYAs on treatment,^{13,20} although were higher than those reported by another.¹² However, this discrepancy may be explained by the large proportion of young adults in our sample. As expected based on typical samples, sexual activity and substance use were more frequent among young adults than adolescents,²¹ sexual activity was more frequent among males than females,²⁰ and substance use was similar between males and females.²⁰ Notably, over half of AYAs endorsed friend(s) drinking or using drugs. Peers' substance use is a strong predictor of substance use engagement among adolescents,^{22–24} suggesting that AYAs with substance-using peers may be at higher risk for using themselves. In addition, adolescents often underreport substance use due to social desirability bias and/or perceived lack of confidentiality²⁵—

an effect that may be especially pronounced among AYAs with cancer due to the additional risk substance use confers during cancer treatment. Thus, high rates of peer substance use suggest that some AYAs with cancer may be engaging in more substance use than reported.

Findings suggested that AYAs with AC engage in substantially less sexual activity and somewhat less substance use than AYAs with NC, with the exception of prescription drug use at baseline. Notably, no AYAs with AC endorsed being sexually active at either time point. This suggests that duration or intensity of treatment may affect opportunities or willingness to engage in sexual activity and/or substance use. However, it should also be noted that AYAs with AC were also more likely to have been previously advised by providers to avoid these behaviors during treatment, which may account for observed differences between AC and NC subgroups at baseline. In addition, this may have also influenced their willingness to accurately report engagement.

Findings from this study underscore the importance of integrating sexual health and substance use screening and communication standards into clinical care. To do so effectively, it is critical for providers to consider both the physical and psychosocial health implications of these behaviors when assigning valence. Regarding sexual behavior, high rates of inconsistent birth control/condom use are concerning, given the increased risks associated with STIs or pregnancy while

receiving treatment,^{5,6} suggesting that sexual health education should be better integrated into care. Indeed, prior work has suggested that AYAs do not receive sufficient sexual health information,⁵ and that some incorrectly assume they are infertile,²⁶ which may contribute to engagement in risky sex practices. However, it is important to consider that exploring sexuality and romantic relationships is developmentally normative, and in some cases is a healthy aspect of psychosocial development.²⁷ Thus, screening for risky sexual behaviors is needed, as well as providing sexual health information in a manner that empowers AYAs to use safer sex practices without assuming they will be abstinent during treatment.

As a substantial subset of AYAs endorsed alcohol and drug use, screening for substance use and communicating about the potential complications and health risks associated with substance use during treatment are also critical. However, while any degree of substance use may be concerning from a health perspective, some use may indicate positive psychosocial adaptation. As adolescents are substantially more likely to engage in substance use in peer contexts,^{28,29} in some cases, endorsing substance use may indicate that an AYA is continuing to interact and engage with peers during treatment, which may have important implications for long-term psychosocial wellbeing.^{4,30} In terms of screening, it may be useful for providers to inquire about the degree of engagement or circumstances in which behaviors take place (i.e., with peers or alone) to differentiate between those engaging in lower risk, developmentally expected behavior versus those taking more concerning risks. Indeed, these results indicate a subset of this population may engage in multiple risk behaviors warranting cause for concern. Regarding communication, it may be useful for providers to assume that some AYAs may engage in substance use regardless of the potential risks. These individuals may benefit from a thoughtful discussion about how to do so in a manner that will minimize negative health effects when compounded with cancer treatment.

Critically, providers must consider individual and family context when discussing sexual health and substance use with AYAs. Awareness of family values regarding these behaviors is necessary to effectively navigate such conversations, as some caregivers may feel offended or betrayed if such topics are discussed without their permission; furthermore, AYAs from families with more conservative values surrounding these topics may be especially reluctant to initiate these discussions or ask questions due to concerns about confidentiality. Thus, providers must be able to walk the precarious line of acknowledging family values, while respecting AYAs autonomy and providing them with necessary health information. Providers should also be cognizant of diversity, particularly when discussing issues surrounding sexual health, and use respectful language that does not assume or pressure AYAs to disclose sexual orientation.

Strengths of this study include a racially diverse sample and inclusion of AYAs with AC. However, limitations to findings should be considered. First, this was a secondary analysis and we were not powered to examine subgroup differences using inferential statistics. Thus, results are intended to be descriptive in nature. We cannot conclude if any observed group difference reflects a statistically significant effect. In addition, due to this limitation and a lack of comparable normative data, we were unable to statistically compare rates in this sample to national norms. Second, to

query participant sex/gender, our demographic questionnaires only provided dichotomous response options (male or female) and did not assess sexual orientation. AYAs were thus not able to self-identify their gender identity or sexual orientation; those who identified as other than “male” or “female” may have felt uncomfortable responding, and we cannot determine if engagement was different for AYAs who identify as lesbian, gay, bisexual, transgender, or queer. Future research will benefit from providing open-ended response options for these questions. Third, we did not query whether AYAs had spoken to their providers about sexual health or substance use. Whether or not these conversations occurred may have influenced prevalence of engagement.

There were a number of limitations related to measurement of sexual activity and substance use. First, as the GAPS measure was not developed for use with AYAs with cancer specifically, items querying prescription drug use do not query if use was as an aspect of treatment. Thus, it is difficult to determine if endorsement of this item should be considered a concerning behavior in this sample. Interestingly, although many AYAs were likely to have been prescribed opiates for pain management, only 27%–31% endorsed this item. Thus, it is unclear whether they were not aware of the nature of their prescribed medications or if they assumed the question was only referring to recreational use of these drugs. Moreover, some AYAs may not have accurately understood which prescription drugs were being referenced, as the examples provided in the question stem used names of generic drug classes (e.g., benzodiazepines and opioids), rather than more widely recognized brand names (e.g., Ativan and Oxycodone). Second, the item assessing birth control use did not specify whether medications were used for contraceptive or other purposes. As many young women in this population are prescribed oral contraceptive pills (OCPs) for menstrual suppression as per clinical standards, it is unclear how respondents interpreted this question. We were also unable to assess whether self-reports of OCP use were accurate as we did not extract this information from medical records.

Together, with extant literature, these findings inform additional clinical and research questions to be addressed by future research. Specifically, trajectories of risky sexual activity and substance use and their association with physical and psychosocial health outcomes through survivorship remain understudied. Addressing this gap is needed to elucidate the long-term impact of these behaviors during treatment, which may provide a clearer understanding of whether and to what degree these behaviors are indicative of risk or resilience. In addition, prospective data on risk behavior among survivors may provide novel insights regarding how having experienced a life-threatening illness as an AYA affects long-term health behavior and risk cognition.

In conclusion, our results demonstrate that AYAs engage in sexual activity and substance use during cancer treatment, with the majority endorsing at least 1 behavior, and frequencies of dating, sexually activity, drug use, and alcohol use, each ranging from 20% to 30% at each time point. Findings underscore the need to integrate sexual health and substance use screening and communication standards into clinical care, particularly pertaining to safe sex practices and risk associated with substance use during treatment, and inform future research examining both the positive and negative physical and psychosocial health sequelae of these

behaviors. At present, our results confirm prior findings indicating that AYAs with cancer continue to behave in a developmentally expected manner by experimenting with sexuality and substance use and suggest that clinicians must be consistently prepared to explore and address these needs.

Author Disclosure Statement

No competing financial interests exist.

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