

Sexual Risk Behaviors Among the Transgender and Gender Diverse Population: A Concept Analysis

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Abstract: This concept analysis aims to create an understanding of sexual risk behavior (SRB) definitions among transgender and gender diverse (TGD) adults. SRBs are inconsistently defined across research and clinical practice among TGD adults. One major consequence of SRBs is risk of sexually transmitted infections (STI). TGD populations experience a high burden of STIs, but the varied ways in which SRBs are evaluated do not give sufficient information for researchers to examine nuanced predictors and outcomes of SRBs, which are ultimately needed to develop targeted interventions for reduction of risk behaviors. This concept analysis was conducted using Rodgers' evolutionary method which guided the literature search, data analysis, and results. The articles included in this analysis were gathered from PubMed, CINAHL, and Embase. After title and abstract screenings, 95 articles were reviewed in full, and 63 articles were included within this analysis. Consistent antecedents of SRB were socioeconomic status, race, gender, violence, alcohol/drug use, and mental health. Attributes included several ways of defining SRBs such as frequency of condom use and type of partners. The most consistent outcome of SRBs was contraction of STIs and subsequent health problems. Few studies examined mental health outcomes of SRBs. Future research should create a standardized tool for measuring SRBs to inform policy for providing sexual health education to TGD populations, which will ultimately decrease disparities in STIs.

Keywords: transgender care, sexual risk behavior, sexual health

Background

Sexual risk behaviors (SRB) is a term describing sexual behaviors that can lead to unwanted outcomes, such as sexually transmitted infections (STIs) or pregnancy. Yet, the exact behaviors assessed and included in this definition vary in research studies and clinical practice across populations. Transgender and gender diverse (TGD) adults are those who have a gender identity that is different from their sex assigned at birth. The purpose of this concept analysis is to clarify the definition of sexual risk behaviors among the TGD population.

One factor potentially exacerbating the lack of consensus on SRBs is that TGD status is inconsistently assessed across research and clinical venues. Traditional demographic questionnaires administered often fail to inquire about sexual and gender minority (SGM) status.¹ SGM is an umbrella term used to describe people who are lesbian, gay, bisexual, and/or TGD. In 2016, the National Institutes of Health designated the SGM population as a health disparity population due to the underrepresentation in research alongside high rates of negative health outcomes. In 2011, the Joint Commission estimated that 0.3% of the American population identified as TGD, but a more recent survey of 118,803 American high schoolers estimated that nearly 2% identified as TGD and another 2% stated they were unsure if they were TGD.² Many Western countries have become more accepting of TGD populations, especially among younger generations. Therefore, national estimates likely are underreporting the prevalence of the TGD population, both due to insufficient measurement of SGM status broadly and as the result of a cultural shift. As such, given the higher STI prevalence among TGD populations compared to other SGM populations, as well as unique risk factors faced by TGD populations, and the increase in prevalence of people reporting TGD identity, understanding SRBs in this population is important.^{3,4} More accurate, evidence-based guidance leads to tailored interventions for TGD sexual health outcomes in preventative and intervention care.

The definitions of SRB vary widely from study to study, and in some cases transgender identity is included as a SRB.⁵ It is important to distinguish behaviors from identities for an accurate assessment of risk behavior. Including transgender identity as a SRB prevents researchers from accurately assessing potential differences in SRB between TGD and cisgender populations. For example, Shannon et al measured incidence rates of an anal STI in HIV-negative cisgender women and HIV-negative transgender women and unexpectedly found that the rates were equivalent.⁶ The same study also found that transgender women with HIV had double the incidence of anal STIs compared to cisgender men who have sex with men (MSM) with HIV. Thus, measuring population identity alone is not enough to accurately gauge the behaviors that may put an individual at an increased risk for STIs. Inquiring about specific behaviors, such as condomless receptive anal intercourse (CRAI), better captures the risk of STI transmission as it is a direct cause of transmission. To improve understanding, studies should assess the types of sexual behavior in cisgender and transgender people to determine the underlying behavior's STI transmission rates. As discussed in the results section, many studies use their own questions to explore sexual risk behaviors, which precludes accurate comparison. Assessing both SGM status (specifically TGD) and SRBs is important for understanding SRBs in TGD populations. This article highlights the need for a standardized screening tool to assess SRB among TGD populations.

The aim of this article is to highlight the concept of SRB among TGD populations. In research and clinical practice, SRB has been defined and assessed using limited, inconsistent approaches. SRBs among TGD populations need to be operationalized on a spectrum to allow for differentiation between risk levels of various behaviors. Developing a comprehensive operationalized definition of the concept of SRBs among TGD populations will facilitate better understanding of its antecedents and outcomes, which will inform future prevention and intervention strategies. TGD populations are underrepresented in research despite evidence of higher prevalence of certain STIs, even compared to other SGM. Thus, the TGD population serves as a good starting population to explore SRB. This concept analysis was completed using Rodgers' evolutionary concept analysis.⁷

Methods

The Rodgers' evolutionary concept analysis method was chosen to define the term SRB, specifically in TGD populations. Rodgers' evolutionary method allows for a dynamic definition which is crucial for this term as risk varies by subpopulation and region. The steps for Rodgers' concept analysis are to: (a) identify the concept and associated terms, (b) select a realm for data collection, (c) collect data to identify attributes of the concept, (d) analyze the characteristics of the concept from the data, (e) identify an exemplar, and (f) identify a hypothesis and implications for further development.⁷

From July 11–August 5, 2022, literature was searched in PubMed, CINAHL, and Embase using Medical Subject Heading (MeSH) for TGD populations. The search strategy was “(Transgender Persons [MeSH]) AND high sexual risk OR SRB OR unsafe sex”. Terms were adapted according to each database's requirements. Inclusion criteria included full-text articles published at any time of qualitative, quantitative, or mixed methods studies written in English with results reporting SRB among TGD samples. Exclusion criteria included articles that did not assess SRB (often only reported HIV/STI incidence), studies in which all participants were living with HIV, or articles examining SRB among SGM populations but did not isolate a TGD category (eg, included cisgender MSM and transgender women together as one category, limiting the ability to assess TGD as a unique population).

In total, 200 articles were found from the initial search strategy. One other article was included because it fit inclusion criteria yet did not appear in the final search. Duplicates were removed. The title and abstract of 193 articles were reviewed for inclusion and exclusion criteria. There were 95 articles reviewed in full for inclusion and exclusion criteria and 32 were removed. From this, 63 articles remained and were included in this concept analysis. [Figure 1](#) provides the PRISMA diagram with a breakdown of reasons for exclusions. [Table 1](#) includes a summary of results from these 63 articles.

The methodological quality of the articles varied widely in this concept analysis. There were 62 studies included, excluding the systematic review. Of those, 14 (23%) studies had sample sizes under 100. (Sizes ranged from 12 to 2136 participants, with a median of 191). Among the 3 studies with >1000 participants, one was an entirely online study. Cisgender comparisons were made in only 17 (27%) studies. Third, comparisons of different SRBs across TGD groups

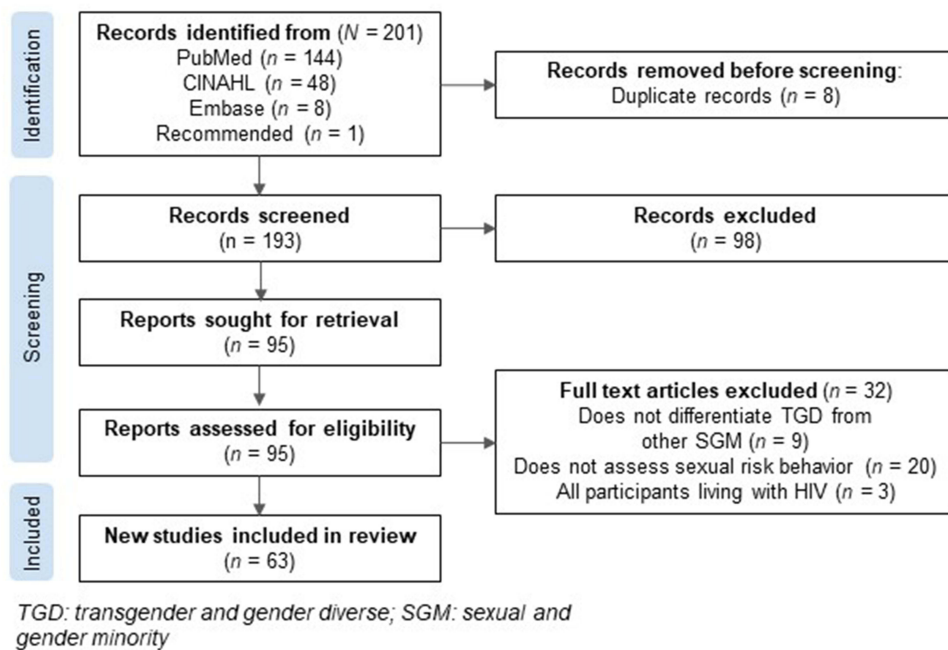


Figure 1 Prisma Flowchart.

(eg, transgender men compared to transgender women) were only measured in 8 (13%) studies. Fourth, only 7 (11%) studies were longitudinal.

Results

Concept and Associated Terms

SRB has been used throughout the scientific and medical literature as a “catch-all” term for behaviors associated with increased incidences of HIV and other STIs. Yet, there are some behaviors that are not sexual that have a risk of HIV transmission, such as sharing needles. Such behaviors are not included within this concept analysis. Surrogate terms are words used interchangeably with SRB. Surrogate terms include: “high risk sexual behavior”, “sexually risky behavior”, and “unsafe sex”. In the following sections antecedents, attributes, and outcomes are discussed, with main findings illustrated in Figure 2.

Antecedents

All the studies within this review assessed sociodemographic factors and other factors among TGD populations, but some did not examine what factors were predictive of SRBs (eg, they only examined these factors descriptively or as predictors of STIs). Among those studies that did examine predictors of SRBs, these Antecedents to increased SRBs among TGD populations included sociodemographic factors, personal identities, medical gender affirmation, violence, substance use, and mental health.

Socioeconomic status (SES) and related factors were identified antecedents of SRB among TGD populations such that those with more financial pressure participate in more SRBs. For example, TGD adults who reported an unstable housing status were over four times more likely to report inconsistent condom use.⁵⁶ Studies found that among transgender women, those who reported employment outside of transactional sex (ie, trading sex for housing or drugs) reported fewer partners, and those who were more reliant on income from transactional sex (as opposed to alternate means of income) engaged in more SRBs.^{38,59} Decreased ability to negotiate condom use due to financial necessity resulted in more SRBs (ie, those who needed the money more were more likely to engage in condomless sex) as transactional partners often will pay more for more SRBs.^{15,39} However, transgender women report four times more condom use with transactional or casual sex partners compared to intimate partners.⁶⁷

Table 1 Results of Literature Review for Sexual Risk Behaviors in TGD (N=63)

Source	Type of Study	Antecedents	Attributes	Outcomes
Alvarado et al (2020) ⁸	QT	Forced sex predicted unprotected sex in TGW; psychosocial conditions higher in TGW, but NOT an antecedent for SRBs, as compared to MSM	Condom use by partner type (transactional, regular, occasional); transactional sex (12 mo)	
Antebi-Gruszka et al (2020) ⁹	QT	Low STI/HIV testing among TGM compared to cisgender MSM	Condomless anal intercourse with HIV-unknown or HIV-different status	
Ayer et al. (2021) ¹⁰	QT		Partner type, partner exclusivity, knowledge of partner HIV status, concurrent drug and/or alcohol use	
Becasen et al. (2019) ¹¹	Systematic Review	Depression, prior abuse	Varied among studies	Depression
Benotsch, Zimmerman, Cathers, Heck et al (2016) ¹²	QT	Use of internet to find sexual partners associated with increased SRB in TGD; TGW concurrent alcohol use predicted SRB	Frequency of protected/unprotected vaginal/anal intercourse (3 mo); number of oral/vaginal/anal sex partners (3 mo); transactional sex (3 mo); concurrent drug/alcohol use (3 mo)	
Benotsch, Zimmerman, Cathers, Pierce et al (2016) ¹³	QT	Nonmedical prescription drug use	Frequency of unprotected vaginal/anal sex (3 mo); number of partners (3 mo); transactional sex; concurrent drug and/or alcohol use; knowledge of partner HIV status	
Bhatta (2014) ¹⁴	QT	Alcohol misuse in TGW	Number of and type of partner (6 mo); dichotomized CAI (6 mo); concurrent alcohol use	
Bianchi et al (2014) ¹⁵	QL	Positive relationship between perceived risk of HIV transmission and condom use	Open-ended: What are the risks associated with HIV among sex workers and their clients in Bogotá?	
Budhwani et al (2017) ¹⁶	QT	Violence negatively associated with condom use	Partner type; condom use frequency (12 mo)	
Bungener et al (2020) ¹⁷	QT	One year after affirming surgeries, young TGD adults reported significant increases in all types of sexual activities, except for romantic relationships and anal sex, compared to immediately before surgeries	Active/receptive masturbation, vaginal, anal, oral sex. Participants indicate if experienced behaviors before and/or after surgery	
Cai et al (2016) ¹⁸	QT	Higher education level associated with condom use during anal sex; use of HIV prevention services (last 6 mo) associated with less CRAI; unknown personal HIV status associated with CRAI	Partner type (1 mo); CRAI (1 mo)	

Chakrapani et al (2017)¹⁹	QT	Depression, alcohol misuse	Partner type (1 mo); dichotomized anal condom use (1 mo)	
Chhim et al (2017)²⁰	QT	Unknown HIV stats negatively associated with condom use during last sex	Condom use (last sex); partner type; consistency of condom use (3 mo); number of partners (3 mo)	
Crosby et al (2018)³	QT	Compared to young black MSM, young black TGW who have sex with men reported increased receptive anal sex; Partner type and SES compared but no association examined with STI or SRB	11 SRB items (3 mo) related to anal sex (receptive and insertive), oral sex, sex with new partners, and condom use. Also examined partner type (eg, sex work)	Higher rates of pharyngeal Chlamydia and gonorrhea in TGW
Dadasovich et al (2017)²¹	MM	Gender affirming testosterone associated with increased libido	Three most recent partners (6 mo); frequency of oral, vaginal, anal sex by partner; condom use by partner	
Drückler et al (2020)²²	MM	TGW sex workers reported significantly more substance use than MSM sex workers	Condomless oral/anal sex with transactional partners (6 mo); Concurrent drug/alcohol use (6 mo); Open-ended: work-related sexual (risk) behavior, substance use, and reasons for substance use during working time	
Feldman et al (2014)²³	MM	Alcohol and/or drug use associated with decreased condom use, sex assigned at birth (TGW 1.85 times more likely to report unprotected sex than TGM); for TGW income predicted unprotected sex; for TGM sex with men predicted unsafe sex; Gay sexual orientation predicted casual sex	Knowledge of partner HIV status; number and type of partner (3 mo); concurrent drug and/or alcohol use; Open ended questions: Describe most recent sexual relationship or encounter in the male or female role; how did your attempts to conform to what a woman or man is supposed to look and be like affect your HIV risk?; if applicable, how have hormones affected your sex life?; how has sex made you feel affirmed, desired, or wanted as a woman, man, or other gender?	
Gama et al (2018)²⁴	QT	Transactional sex: dislike of condoms, partner refusal, or increased pay predicted condomless sex; in non-transactional sex: risk perception, cost of condoms, dislike of condoms predicted condomless sex	Condom use by partner type (12 mo); forced sex (12 mo); condom failure (6 mo); HIV tested (12 mo/ever); current and past HIV/STI status; ever use health services to obtain HIV info.	
Gass et al (2021)²⁵	QT		Partner type; unprotected penetrative sex; concurrent drug/alcohol use	

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Table 1 (Continued).

Source	Type of Study	Antecedents	Attributes	Outcomes
Golub et al (2010)²⁶	QT	Religious beliefs/behaviors predicted increased SRBs; social support and religious stress-related growth predicted decreased SRBs. Interaction between religious beliefs/behaviors and social support: SRB least likely among individuals with high levels of social support but low levels of religious behaviors/beliefs	Partner type; number of partners; type of sex (3 mo)	
Hearld et al (2019)²⁷	QT	Among TGW, sex under influence of alcohol predicted sex work, CRAI, increased number of partners, verbal abuse, discrimination, and stigma	Partner type (ie, sex work); HIV tested (12 mo); CRAI (1 mo); number of partners (6 mo); alcohol use during sexual activity (1 mo)	
Holder et al (2019)²⁸	QT		CRAI (12 mo); number and type of partner (12 mo)	
Horvath et al (2014)²⁹	QT	Rurality not predictive of SRB; did not compare TGW to TGM on mental health, substance use, SRBs, or association with SRBs. Only reported “noticeably high” rates of unprotected sex in TGW (μ 44%) compared to TGM (μ 19%)	Partner type (3 mo); unprotected penetrative sex (3 mo)	
Hotton et al (2013)³⁰	QT	Greater exposure to life stress, alcohol, and drug use, and avoidant coping predicted SRB; association between life stress and SRB partially explained by drug use (β .08)	Male partner type; CRAI (3 mo)	
Jalali Nadoushan et al (2021)³¹	QT	Gender; anal sex significantly higher in TGW than TGM	Anal or oral sex, using condoms, and having sex with a sex worker (6 mo)	
Kerr-Corrêa et al (2017)³²	MM	Alcohol associated with unprotected sex	Age of first sex, partner type; HIV tested: dichotomized condom use	
Khan et al (2022)³³	Long QT	Incarceration predicts multiple partners in black TGW (ARR=1.77)	Number of partners (6 mo); transactional sex (6 mo)	
LeeVann et al (2022)⁴	Long QT	Gender predicts SRB (condom use, number of partners) and STI testing, but not STI incidence	Number and type of male partners with whom they had anal sex (12 mo); condom use during the last sex with a casual male partner and regular male partner; condomless anal sex with any of their reported male partners	

Long et al (2019) ³⁴	QT	TGW reported more condom use at last sex (aPR=1.20), more transactional sex (aPR=1.96), more receptive sex (aPR=1.31) and less insertive sex (aPR=0.84) than MSM	Partner number and type (6 mo); condom use; STI diagnosis (ever)	
McFarland (2017) ³⁵	QT		Number of sexual acts by type, per partner by gender; number for which condoms were used (6 mo). receptive sex was penetration of vagina or anus by partner, without defining what was used for penetration; insertive sex was taken as however respondent defined it	
Moriarty et al (2019) ³⁶	QT	Among TGW with CRAI in the past 6 mo, migration status and younger age associated with rectal STIs; did not examine AN association with SRBs	Number and partner type (client, casual, anonymous, stable) (1 mo); CRAI; role (insertive or receptive) and condom use by last 3 partners; concurrent drug/alcohol use	SRBs not associated with STIs
Murphy et al (2020) ³⁷	QT		Partner type (last 3 partners); receptive anal intercourse, condom use, and concurrent drug/alcohol use for last sex with each partner	
Nemoto et al (2014) ³⁸	QT	Lower self-esteem, self-efficacy associated with CRAI with primary partners; higher economic pressure, low social support and low self-efficacy associated with CRAI with casual partners; greater transphobia, economic pressure, low social-support, self-efficacy, and self-esteem associated with CRAI with transactional partners	Transactional sex (ever); STI diagnosis (12 mo); condom use	
Nemoto et al (2016) ³⁹	QL	Working in a bar/club predictive of wearing condoms compared to working in streets	Open-ended questions on life as sex worker, sexual behaviors with customers and private partners, substance use	
Nuttbrock & Hwang (2017) ⁴⁰	Long QT	Hispanic (OR=9.98) and Black (OR=3.43) TGD participants had more transactional sex than White participants; Hispanic (OR=1.89) and Black (OR=1.86) participants reported more CRAI; foreign-born participants had higher odds of transactional sex (OR=2.80) and CRAI (OR=2.03); higher education (OR=0.73) and current employment (OR=0.18) associated with less transactional sex	Partner type (6 mo); transactional sex (6 mo); condom use during receptive anal intercourse (6 mo)	Transactional sex associated with increased rate of STI/HIV infection (HR=6.30)

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Table 1 (Continued).

Source	Type of Study	Antecedents	Attributes	Outcomes
Ongwande et al (2018) ⁴¹	QT	TGW reported more receptive anal intercourse than cis MSM	Age of first sex;; type of sex; partner type and gender; condom use (6 mo)	
Parsons et al (2018) ⁴²		Among TGW SRB higher among women of color; those with annual income < \$20,000); those receiving income assistance; partnered participants; heterosexual/straight women (compared to LGBTQ); those with ≤high school education	Sum of number of condomless penetrative sex events with casual or main partner of discordant or unknown HIV status (2 mo)	
Phanuphak et al (2018) ⁴³	Long QT		Dichotomized condom use (3 mo); Number of partner (3 mo)	
Pletta et al (2020) ⁴⁴	QT	TGM who have sex with cis men or TGW had higher odd of using protective barrier compared to TGM who had TGM or cis women as partners (OR=11.37)	Performing/receiving hand penetration in genital/anal sex; performing/receiving oral sex; receiving genital-genital sex; barrier use	
Pletta et al (2022) ⁴⁵		TGM in casual sexual partnerships had 6.56 times odds of SRB with unknown STI/HIV status vs those in monogamous relationships. Compared to participants with cis female sex partner, those with TGD or cis male sex partners had higher odds of SRB with partner of unknown STI/HIV status (TGM: aOR=2.83; TGW: aOR=3.30; cis male: aOR=2.30). No individual-level covariates (age, race, non-binary identity, STI/HIV history, number sexual partners in past year) significantly associated with SRBs	For each sexual partner, TGM participants were asked: "Has this partner ever been diagnosed (by a physician, nurse, or other medical provider) with any of the following STIs? HIV, human papillomavirus, or herpes simplex virus. Response options included "yes", "no", "I do not know", and "prefer not to respond" for each STI. Partner type and gender (12 mo)	
Poteat et al (2021) ⁴⁶	Long QT	TGW sex workers reported more condomless sex with intimate partners (39%) compared with transactional partners (8%)	Partner type; age of first transactional sex; number of transactional sex partners (3 mo); ever met transactional sex partner online	More transactional partners (RR=1.70) and recent arrest (aRR=1.77) associated with more STIs

Reback et al (2014) ⁴⁷	QT	TGW who self-reported being HIV-negative more likely to report recent oral and anal sex with non-transactional male partners; unprotected anal intercourse with non-transactional partners did not differ by HIV status; HIV-negative TGW reported significantly more oral and anal sex with transactional partners than HIV+ TGW; HIV+ TGW more likely to report CRAI with transactional partners	Recall of whether participant had engaged in any oral and/or anal sex with transactional and non-transactional male partners (1 mo); dichotomized anal condom use by partner type (1 mo)	
Reisner et al (2015) ⁴⁸	QT	TGW reported more casual sex partners and transactional sex than TGM; Young TGM had increased odds of SRB when they reported a casual partner (OR=3.38); Young TGM who reported current alcohol use had increased odds of SRBs (OR=3.06)	Partner type; condomless anal/vaginal sex; use of gender-affirming hormones; transactional sex (ever)	
Reisner et al (2016) ⁴⁹	QT	TGM who had socially transitioned reported more sexual partners and less sex with cis men than those who had not; anxiety, depression diagnosis predicted SRB;	Number of partners (6 mo); ever STI diagnosis; condomless sex with a cis male (last sex)	
Reisner et al (2014) ⁵⁰	QT	History of suicide attempt and current alcohol misuse associated with increased SRB; Individuals who reported sex with only men more likely to report increased SRB than those who had sex with men and women; Gender did not influence SRB; TGD of color had decreased odds of SRB compared to white TGD (OR=0.18).	Condomless/condom failure sex with a cis male (3 mo); partner type	
Richter et al (2013) ⁵¹	QT	TGD sex workers more likely to have unprotected sex with the last 2 transactional partners than cis women sex workers (AOR=2.4)	Type of sex, condom use, alcohol use (last two transactional sex);	
Rood et al (2018) ⁵²	QT	Expecting rejection ($\beta=0.08$) and experiencing gender-related discrimination ($\beta=0.49$) associated with reporting SRBs	Partner type; condom use	
Satcher et al (2017) ⁵³	QT		Partner type, knowledge of HIV status (last three partners); Condom use and role during anal/vaginal/oral sex (by partner); concurrent drug and/or alcohol use (by partner)	

(Continued)

Table 1 (Continued).

Source	Type of Study	Antecedents	Attributes	Outcomes
Scheim et al (2017) ⁵⁴	QT	Childhood sexual assault (APR=14.03), less education (APR=2.74), primarily attracted to men (APR=5.54) and living full-time in gender identity (APR=5.20) associated with increased SRBs; Testosterone use not associated with SRB	Partner type, condomless receptive vaginal/anal sex (12 mo); knowledge of partner HIV status	
Seekaew et al (2019) ⁵⁵	QT	Perception of HIV risk	Condom use and number of partners (6 mo)	
Sevelius et al (2009) ⁵⁶	QT	Unstable housing associated with inconsistent condom use (OR=4.40) and transactional sex; Stimulant use associated with SRBs (OR=4.47); gender affirming surgery did not predict SRB	Partner type; condom consistency	
Smith et al (2021) ⁵⁷	QT	Compared with cis MSM, TGW reported higher numbers of male sexual partners, more likely to have had transactional sex with a male partner; more likely to report receptive anal intercourse, twice as likely to report CRAI, less likely to report insertive anal intercourse with male partners, and more likely to experience forced sex; number of transactional and non-transactional female sexual partners did not differ by gender	Number of partners (3 mo), type of sex (anal, vaginal), if it was insertive or receptive, and if condoms were used, forced sex (12 mo), transactional sex (12 mo)	
Truong et al (2021) ⁵⁸	QT	TGW reported more seroadaptive behaviors than MSM	Seroadaptive behaviors: serosorting (belief partner is HIV-negative); seropositioning (always use condoms with HIV-unknown or HIV+ partners)	
Turner et al (2017) ⁵⁹	Long QT	Young TGW with less income reported more CRAI (aOR=0.55); gender discrimination: young TGW with more gender-based discrimination reported more CRAI (aOR=1.70); partner type: young TGW with serious relationship reported more CRAI (aOR=1.89); drug use: those with drug use reported more CRAI (aOR=2.01)	CRAI (6 mo)	
Uthappa et al (2018) ⁶⁰	QT	Gender: TGW more likely to report SRBs than cis MSM; TGW more likely to engage in sex work	Insertive/receptive sex; number of partners (3 mo); transactional sex; frequency of anal sex (by condom use); concurrent use of alcohol/drugs; STI symptoms (12 mo); perception of HIV infection; willingness to discuss HIV/STI with partners	

Valente et al (2021) ⁶¹	Long QT	Gender-based stigma was associated with increased SRB (aIRR=1.18), psychological distress partially mediated the association between gender-based discrimination and SRBs (aIRR=1.03); poor social support was associated with fewer SRBs (aIRR=0.40)	Condomless anal/vaginal sex (4 mo)	
Verre et al (2014) ⁶²	QT		Condomless anal sex	
Wickersham et al (2017) ⁶³	QT		Condom use frequency receptive/insertive vaginal/anal sex	
Wilson, Chen, Arayasirikul, Wenzel et al (2015) ⁶⁴	QT		Unprotected receptive sex (6 mo)	
Wilson, Chen, Arayasirikul, Fisher et al (2015) ⁶⁵	QT		Condomless anal sex (6 mo); partner type; condomless sex with IV drug use partner; HIV status of primary partner; STI diagnosis (6 mo)	
Wilson, Jin et al (2015) ⁶⁶	QT		Condomless anal sex (6 mo); partner type; condomless sex with IV drug use partner; HIV status of primary partner; STI diagnosis (6 mo)	
Wilson et al (2014) ⁶⁷	QT	TGW reported decreased SRBs with casual (aOR=0.23) and transactional partners (aOR=0.20) compared to primary partners	Partner type; unprotected anal sex	
Yadegarfar et al (2013) ⁶⁸	QT		Number of partners; anal sex (by condom use); HIV/STI tested (ever); knowledge of partner HIV/STI status; concurrent use of alcohol	Number of partners had no effect on depression; increased risk for suicidal ideation

Abbreviations: AN, antecedent; aOR, adjusted odds ratio; ARR, adjusted risk ratio; APR, adjusted prevalence ratio; cis, cisgender; CRAI, condomless receptive anal intercourse; long, longitudinal; MM, mixed methods; MSM, men who have sex with men; mo, month; OR, odds ratio; QL, qualitative; QT, quantitative; STI, sexually transmitted infection; TGD, transgender and gender diverse; TGM, transgender men; TGW, transgender women; SRB, sexual risk behavior.

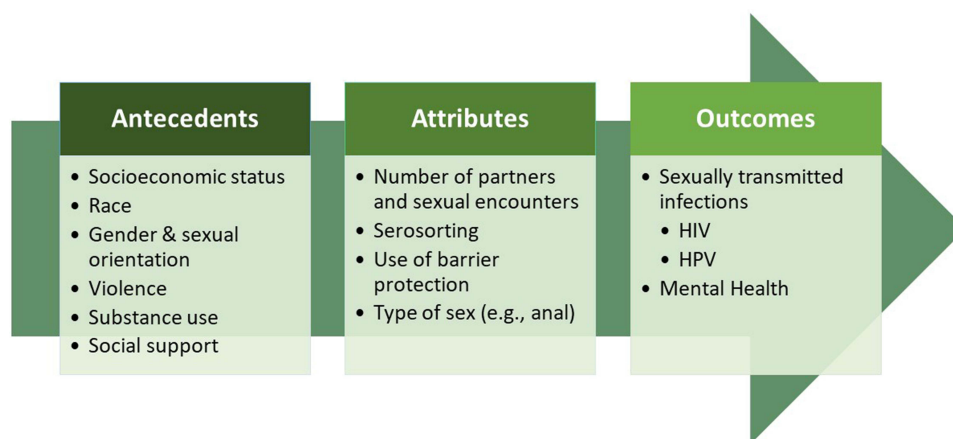


Figure 2 Antecedents, Attributes, and Outcomes of Sexual Risk Behaviors.

There is an established association between level of education and health literacy in the broader population.⁶⁹ There may be an association between level of education and understanding of SRBs. Several studies in this review found TGD people who have more formal education report fewer SRBs.^{18,40,42,54} One study found that TGD adults who perceive a lower risk of outcomes of SRBs were less concerned with the negative outcomes of STIs, thus they were willing to engage in more risk behaviors.⁵⁵

Minority races and ethnicities have also been found to be associated with SRB.⁶⁵ In a prospective study of 199 TGD adults, Nuttbrock and Hwahng (2017) found that Hispanic (Odds Ratio [OR]=1.89) and Black (OR=1.86) TGD adults reported more CRAI compared to non-Hispanic, White TGD adults. Similarly, in a cross-sectional study of 60 Floridians, Holder et al found that non-Hispanic Black TGD participants reported more CRAI and lower understanding of HIV prevention compared to Latina TGD participants.²⁸ Another study noted that Latina transgender women reported more concurrent use of drugs and/or alcohol during their most recent sexual encounter than White transgender women, but unstable housing and stimulant use were much stronger predictors of inconsistent condom use than ethnicity in this study.⁵⁶ These racial and ethnic differences in SRBs likely stem from structural and social barriers that minoritized persons experience which cause disparities in health. For example, in the study by Nuttbrock and Hwahng minority race and Hispanic ethnicity were highly correlated with lower education and lower employment.⁴⁰

Personal identity, such as gender and sexual orientation, were also predictors of SRB. In general, studies suggest TGD populations report more SRBs than other SGM populations; however, TGD who participate in transactional sex may take more protective steps than other SGM populations who have transactional sex. Transactional sex includes sexual behaviors in exchange for money, housing, or substances. Transactional sex often involves behaviors that increase the risk of transmission of STIs, which is described further in the attributes section. Transgender women reported significantly more engagement in transactional sex than MSM.^{3,8,34} During transactional sex, TGD adults were 2.4 times more likely to report not using condoms compared to cisgender women, but TGD were more likely to use condoms compared to cisgender MSM.⁵¹ During sex with any partner type, transgender women reported more receptive anal sex both with and without condoms compared to MSM. Although transgender women reported more frequent SRBs than transgender men, gay transgender men reported more casual sex than other TGD populations.^{23,29} In a pilot study, Reisner et al found transgender men who had socially transitioned had more sexual partners than transgender men who had not socially transitioned.⁷⁰ One qualitative assessment revealed that gay transgender men enter a culture where casual sex is the norm, but they are infrequently taught how to apprise their unique risk factors in this setting.²¹ In fact, as an example of navigating such difficulty, some transgender men falsely believed that gender-affirming hormone therapy would prevent pregnancy.

The effect of medical gender affirmation therapies, such as gender-affirming hormone therapy or gender affirmation surgery, on SRB was mixed. Among TGD who had gender affirming surgeries, a study in Amsterdam found increased

rates of oral and vaginal sex after surgery compared to before surgery in the sample of 18–25-year-old TGD adults.¹⁷ However, Sevelius et al did not find an association between surgery and SRBs in their sample of 153 transgender women aged 18–45+.⁵⁶ Likewise, Reisner et al did not find an association between SRB and gender affirming surgeries among transgender men.⁵⁰ Dadasovich et al. found increased libido, but not necessarily increased SRB among transgender men following testosterone use.²¹ Two other studies explicitly found no increase in SRB associated with testosterone use.^{50,54} Chhim et al did not assess hormone use and SRBs, although they did find that transgender women who had injected hormones had a higher incidence of HIV than those who did not.²⁰ These results may be mixed because of the various types of sex measured (eg, including oral sex or not).

Multiple forms of violence were predictors of SRBs among TGD adults. Unsurprisingly, sexual abuse (eg, forced sex) was a predictor of some aspects of SRB, such as less frequent condom use.^{8,11,24,37,49} The increased SRBs may be more reflective of the individual's stolen autonomy during the incident(s) rather than their general sexual behaviors. Smith et al reported transgender women experienced significantly more sexual violence than MSM.⁵⁷ Furthermore, history of childhood sexual assault was a predictor of SRBs among TGD adults.⁵⁴ One study found gender-based discrimination was associated with more SRBs.⁵² TGD adults report a high rate of discrimination and violence because of their gender or presentation.⁵⁹ Hearld et al found those who reported gender-based discrimination were over twice as likely to report concurrent alcohol use and sex, possibly compounding risk.²⁷ Interestingly, incarceration was found to be a predictor of SRB.³³

Substance use was another demonstrated antecedent of SRBs among TGD adults. Alcohol misuse (often defined as drinking every day or drinking four or more drinks in one sitting) was frequently associated with increased SRBs among TGD adults.^{19,30,49} Additionally, concurrent alcohol and/or drug use and sex were associated with increased SRBs such as condomless sex in this population.^{13,30,32,48,50} Hearld et al found discrimination was associated with concurrent use of alcohol and sex and furthermore found that use of alcohol during sex was a predictor of engaging in condomless sex.²⁷ Stimulant use in the past year predicted concurrent alcohol and sex among TGD adults.^{54,56} The correlation between concurrent alcohol use and SRBs has been reported in many populations but there is evidence that TGD adults may use alcohol as a coping device for increased stress at double the rate of other SGM populations.¹⁹ One study in Brazil found that alcohol dependence was 15% in the TGD sample, which is slightly higher than the 12% reported among the general public.³² A study in Peru found that one in three transgender women had an alcohol dependence compared to one in five MSM.³⁴ Among TGD adults, alcohol use could be a widespread modifiable behavior impacting SRBs.

Final antecedents of SRBs among TGD adults are mental health and psychosocial factors. A study of transgender men found that over half had a current depression diagnosis and that a history of a suicide attempt was associated with SRB.⁵⁰ Two studies found depression to be a predictor of increased SRBs among TGD populations.^{19,49} Low self-esteem or low self-efficacy were also associated with increased SRBs among TGD adults.³⁸ Protective antecedents were assessed less than risk factors that predicted SRB. Two studies reported increased social support was associated with fewer SRBs in transgender women.^{26,38} Among transgender women, religious stress-related growth was associated with decreased SRBs, while religious beliefs and behaviors predicted increased SRBs.²⁶ This finding with religious belief/behaviors was tempered by a significant interaction with social support that showed that SRBs were least likely among individuals with high levels of social support but low levels of religious behaviors/beliefs.²⁶ A more recent study did not find social support to predict SRBs among TGD adults in general.²⁵

Attributes

The literature in [Table 1](#) revealed three primary Attributes of SRB: (a) number of partners and number of sexual acts (eg, how many times an individual has sex with a partner), (b) risk reduction behavior primarily as use of barrier protection (or lack thereof), and (c) type of sex (eg, vaginal, anal). For all STIs, including HIV, an increased number of partners increases the chance of transmission. Barrier protection, when used properly, decreases risk of STI transmission.⁷¹ Risk of STI transmission varies by type of sex and STI. For example, risk of HIV transmission is higher in anal intercourse than oral sex because it is spread via bodily fluid (eg, blood, semen), as anal tissue is thinner and weaker, whereas HPV is spread via skin-to-skin contact.⁷¹

The studies in this search varied greatly in what behaviors were assessed (eg, oral, anal, vaginal, insertion of hands), categories of sexual partners (eg, transactional, casual, intimate, primary), and in how the data were stratified and

presented. Dichotomized SRB variables could not be compared across studies in many cases as the inclusion criteria for SRB were different between studies. Some studies organized use of protection based upon frequency, such as always or not always¹⁶ while others dichotomized barrier use into always or frequently use vs sometimes or never use.³ One study dichotomized SRB into categories of any use of barrier or never use of barrier.⁴⁴

The means by which use of barrier protection was assessed varied among studies. While two studies may collect similar assessments of consistency of condom use, they may assess different recall periods. For example, one study assessed SRB in the last month¹⁸ and a second assessed the same data but asked participants to recall over the last 12 months.¹⁹ Since most of these studies were cross-sectional but did not assess sexual history in a consistent time frame, the ability to form a comprehensive assessment of condom use among TGD adults is limited.

Furthermore, some studies only assessed condom use for anal sex, even among samples of TGD adults who were assigned female at birth.⁹ This narrow assessment leaves a gap in literature about use of barrier protection among TGD adults who partake in vaginal sex. While inserting a penis into a mucous membrane carries a higher risk of transmission of most STIs, there remains a risk of transmission of STIs that are spread via bodily contact (eg, HPV) during types of sex that do not have penile insertion. Very few studies assessed types of sex that did not involve penile insertion.³⁵

Some studies also explored risk reduction beyond condom use. One example of risk reduction is seroadaptive behavior, which is a means of risk assessment for HIV transmission and has been understudied in the TGD population.⁵⁸ The same study explains that seroadaptive behavior includes serosorting (ie, sex with the belief that one's partner is HIV-negative) and seropositioning (ie, always use condoms with HIV-unknown or HIV-positive partners). In other words, seroadaptive behavior involves assessing a potential partner's HIV status and always using condoms if their HIV status is different or unknown. Several studies assessed serosorting.^{10,13,23,53} Truong et al was the only study that assessed serosorting and found that transgender women practiced the technique more than cisgender MSM.⁵⁸ This type of assessment could prove to be very useful given that many transgender adults who participate in transactional sex report a higher consistency of condom use with transactional partners compared to use with intimate partners.⁴⁶

Studies categorized partner type in multiple ways as well. Sometimes it was categorized as transactional or not,²⁷ while other times categories were client, casual, anonymous, or stable.³⁶ Some studies did not assess partner type.³⁸ Transactional sex predicts increased partners.²⁷ Studies that do not distinguish between transactional sex and non-transactional sex may contribute to a falsely high prevalence of STIs among TGD who do not have transactional partners.

One unique factor to consider when assessing SRB among TGD populations is genital reconstruction. Genital reconstruction involves surgical reconstruction of the penis to look and function like a vagina or vice versa. Less than 15% of TGD adults have undergone genital reconstruction surgery.⁷² Since this is a small percentage of a small population, there is a gap in the literature regarding outcomes of SRBs in individuals who have undergone these types of surgeries. Some studies took this into account. For example, one study explicitly reported how SRBs among transgender women with a neovagina were assessed⁶³ and another included only transmasculine adults who retained a cervix.⁴⁴ Most of the studies included did not specify if any TGD adults had genital reconstruction surgery. A standardized tool is necessary for researchers and clinicians to understand and assess SRB among TGD populations. Ideally, the tool would assess behaviors independent of sex assigned at birth, which will allow for analysis of behaviors of those who have undergone gender affirming surgeries.

The lack of a clear definition of SRBs both clinically and in research fails to acknowledge that some behaviors carry more risk of certain STI transmission compared to others. For example, CRAI carries a higher risk of HIV transmission than oral or vaginal intercourse due to anal mucosa being thinner than the oral or vaginal mucosa.⁷¹ While TGD identity itself is not a risk behavior, this analysis found that this population participates in certain SRBs at higher rates than the general population. There is also a difference among TGD subpopulations' participation in SRBs. In a national sample of TGD young adults, one in two transgender women report transactional sex compared to one in four transgender men.⁷³ The SRBs of other TGD subpopulations are varied and better tools are needed to provide a clear picture of their SRBs. The definition of SRB should not conflate populations and behaviors because as mentioned earlier, there is variation in

behavior among a population. In other words, just because a specific population may be more likely to engage in a behavior, the underlying behavior itself is the risk factor and mechanism of STI risk.

Outcomes

Outcomes of SRB among TGD population include STIs and psychosocial factors. STIs are the most prevalent outcome found in the results of this review. However, most ($n=58$; 93%) studies included in this analysis did not directly assess outcomes of SRBs among TGD adults, as noted in Table 1. Most studies examined attributes/predictors of SRBs, and some examined how these attributes were associated with STI rates, but few examined the underlying sexual behavior mechanisms. Also, most of these studies were cross-sectional with the intent to characterize SRBs within a sample, and therefore they did not examine associations between SRBs and outcomes. A systematic review found that depression was both a predictor and outcome of SRB, suggesting a cyclic relationship.¹¹ An original research article found that depression was not a outcome of SRB, but suicidal ideation was.⁶⁸ Further work is needed to understand the relationship between SRBs and psychosocial factors.

TGD includes a variety of identities and some of the research presented in this article shows the difference in behaviors and potential outcomes among TGD subpopulations. For example, studies showed how gay transgender men were more likely to participate in casual sex compared to the general population of transgender men, yet often underestimated risks.^{21,23} When researchers inquired why transgender men underestimate their risk of pregnancy, they found that transgender men had a misconception that gender affirming hormones (ie, testosterone) prevents pregnancy.²³ Transgender women reported higher rates of HIV compared to transgender men.¹² The outcomes of SRB also varied by geographical location.^{9,18,53} For example, within the United States, the South has a higher prevalence of HIV, yet among one sample of TGD adults, only half had ever been tested for HIV, compared to three-quarters from other areas of the country.⁹

Discussion

This concept analysis sought to elucidate how current literature measured and defined SRBs among TGD adults. The results revealed three primary attributes of SRB: number of partners and sexual acts, use of barrier protection, and type of sex, though not all studies comprehensively assessed all three attributes. Consistent antecedents of SRB were SES, race, personal gender identity, violence, alcohol/drug use, and mental health. Further research is needed to determine the mechanisms whereby race and ethnicity and social determinants of health predict increased SRBs among TGD. Like other minoritized populations, TGD people face both structural and social barriers which impact health outcomes. Overall, results showed that SRBs in this population are inconsistently defined, making it difficult to fully understand antecedents and outcomes. Additionally, it can be difficult to compare studies when the same variable is measured in various ways (eg, condom use as a percentage in the past three months or condom use as a binary category at last intercourse). The search was done without a librarian and thus may have yielded limited results.

Although sexual behavior combined with alcohol and other drugs has been conceptualized as a SRB, a refined definition of SRBs focusing only on the direct behaviors may better elucidate the pathways whereby antecedents lead to behaviors among TGD. Within our conceptual model, alcohol use (even concurrent alcohol use) is best described as an antecedent of SRB, rather than an attribute, as it temporally precedes risky behaviors. Myopia theory posits that alcohol inhibits one's ability to evaluate impelling and inhibiting cues, but does not affect arousal.⁷⁴ Further testing of this conceptual model is needed among this specific population.

Another factor commonly found to be an antecedent and/or SRB among other populations is age at first sex.⁷⁵ Only two articles reported data on age at first sex.^{41,43} While they did report that transgender women had sex earlier than cisgender MSM, one study did not explore if there was an association between age at first sex and any other factor while the other study combined MSM and transgender women in their regression analysis. Similar to substance use, we conceptualize these factors as antecedents, and recommend that future studies measure these factors to better understand which specific SRBs they predict among TGD.

Our search showed most studies only examined antecedents of SRBs, and fewer studies specifically examined the association between SRBs and outcomes, which is evident by the blank cells in [Table 1](#). Of the studies that did examine outcomes, the majority focused on STIs. Literature in SGM populations has presented more outcomes of SRB such as pregnancy, mental health, and psychosocial effects. No studies in this analysis examined pregnancy as a possible outcome of SRB among TGD. This is an important topic for future studies, particularly among TGD who have sex with partners who produce sperm and/or have an intact uterus. Future studies are needed to understand conception risk among TGD, particularly given that hormone therapy can impact fertility. Although only one study in this analysis directly assessed mental health as an outcome, broader SGM literature supports that negative mental health can be an outcome of SRB.⁷⁶ Therefore, psychosocial effects of SRBs may be bidirectional, as our analysis noted that low self-esteem predicted SRB and vice versa.^{11,38} Future studies should examine more psychosocial, reproductive, and mental health variables as both antecedents and outcomes of SRB.

There are several additional limitations to the articles found in this analysis. First, none of the studies specifically examined which behaviors are predictors of which STIs, limiting the ability to draw conclusions on specificity between specific behaviors and physical outcomes. Second, several studies had small sample sizes, limiting generalizability. Third, while the relationship between CRAI and HIV is well understood, the sexual behaviors associated with other types of STIs is less understood. Fourth, much of TGD literature is an amalgamation of TGD people who do and do not participate in transactional sex which limits interpretation. The increased rates of transactional sex among TGD adults (compared to cisgender adults) may significantly skew the data towards increased SRBs among TGD adults. Transactional sex predicts increased partners which is associated with increased STI diagnoses, including HIV.^{39,40,46}

A final limitation is that two-thirds ($n=44$; 70%) of the studies assessed SRB among only transgender women, no other TGD participants. Most of those focused on HIV transmission. HIV can lead to negative health outcomes and transgender women do experience a high burden of it, but the narrow focus on transgender women can obscure the risks of other TGD populations. Antebi-Gruszka et al found transgender MSM may experience outcomes of SRB at rates more similar to cisgender MSM than to the general population.⁹ Thus, future work focusing on the SRBs of transgender men or other TGD populations is appropriate.

Conclusion

SRB in TGD adults is a concept that has three primary attributes: number of sexual partners, type of sex, and use of protective barriers. There are various antecedents predicting positive or negative changes in these factors, such as simultaneous use of alcohol, transactional sex, social support, financial pressure, or experience of violence. Outcomes of SRB among TGD adults vary. Most literature focused on STI transmission, but some studies also pointed out mental wellness. Methodological limitations from this concept analysis suggest future research is needed to better assess SRBs and outcomes among TGD, and compare antecedents, behaviors, and outcomes between TGD and non-TGD participants.

Future research is necessary to create targeted interventions for TGD adults to reduce the risk of transmission of STIs. A tool to accurately assess risk is necessary to inform subsequent interventions by risk behavior rather than by population. Future work should also assess the difference in SRBs among TGD adults who have transactional partners in comparison to those who do not.

We propose that it is necessary to develop a tool to assess and categorize SRB like those already common within the field of nursing. An example of such is a fall assessment tool, which uses patient behaviors (eg, oriented to own ability) to categorize patients into high, moderate, and low risk. A high fall risk patient will require preventative measures, such as a bed alarm, which are not necessary for a low fall risk patient. In the same fashion, researchers should develop a tool for SRB. The tool should provide suggestions for policy based on categorization of risk. [Table 2](#) provides examples of items to be used in a SRB assessment tool. Example domains include type and number of partners, type of sex, and preventive protection. Such a tool will allow researchers to examine SRBs underlying differences in STIs (and other negative outcomes). Using such a tool in research studies allows for robust and comprehensive methods to measure specific sexual behaviors, resulting in research that does not conflate gender identity and sexual behaviors. For clinical

Table 2 Proposed Domains and Questions for TGD Sexual Risk Behavior Assessment

Topic	Example Question	Example Response Options
Gender Identity	What is your gender identity?	Man, Woman, Nonbinary, Prefer to describe ____
Sex at Birth	What is your sex assigned at birth?	Male, Female, Intersex
Partners	How many partners have you had in the past year/ since last visit?	Branching logic questions on number of partners, monogamy status, length of relationship
Transactional Sex	Have you ever exchanged sex to meet your needs (money, food, housing)	Yes, No
Type of Sex	What type of sexual behaviors have you participated in since “past year/since last visit”? (select all that apply)	Penile-vaginal sex, Penile-anal sex, Genital/anal-oral sex, Hand/Other objects-genital sex, Hand/Other objects-anal sex, Other describe ____; when applicable sub-questions for: Receptive, Insertive Active, Both
Preventive Protection	What type of preventative protection do you utilize? (select all that apply)	Branching logic questions with list of prevention measures (eg, condoms, hormonal birth control, STI testing before sex, spermicide) and consistency of use (eg, 0% of the time to 100% of the time)
Prior STI Diagnoses	Have you or your partner(s) ever been tested for and diagnosed with an STI?	Branching logic questions with list of STIs and date of diagnosis for self and partner(s)
Concurrent Substance Use	Have you used alcohol or other drugs either before or during sex in the last year? (select all that apply)	Alcohol, Sexual enhancement medications (eg, Viagra, poppers), Other drugs (marijuana, club drugs such as MDMA, K, etc.), Other ____

Notes: Time frame of questions dependent on study aims and clinical needs.

Abbreviation: TGD, Transgender and gender diverse.

use, this tool would provide pertinent prevention practices to TGD patients. For example, high risk individuals may need education on PrEP, while those in a medium risk category may need HPV skin-to-skin contact transmission education. It’s likely that a tool to assess SRBs among TGD predicates tailored interventions. The creation of such a tool requires feedback from the TGD population.

Disclosure

The authors report no conflicts of interest in this work.

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