A multisite, longitudinal study of risk factors for incarceration and impact on mental health and substance use among young transgender women in the USA

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ABSTRACT

Background Transgender women are disproportionately incarcerated in the US relative to the general population. A dearth of research has explored the factors that predict incarceration among transgender women or the longitudinal impact of incarceration on the health of this population.

Methods Between 2012 and 2015, 221 transgender women ages 16–29 from Boston, MA and Chicago, IL were prospectively assessed at baseline, 4, 8 and 12 months. Mixed effects models were used to identify risk factors for incarceration and examine whether incarceration predicts somatic, anxiety and depressive symptoms, illicit drug use, and binge drinking over time, controlling for baseline psychiatric and substance use disorders.

Results Overall, 38% experienced incarceration, before (33%) and during (18%) the study period. Significant independent predictors of recent incarceration included sex work, recent homelessness, school dropout and number of times incarcerated prior to enrollment while recent incarceration significantly predicted somatic symptoms and illicit drug use over time.

Conclusions Incarceration burden is high in young transgender women. Both structural and individual risk factors predict incarceration and poor health, suggesting the need for multilevel interventions to prevent incarceration and support young transgender women during incarceration and upon release.

Keywords incarceration, mental health, substance use, transgender

Introduction

Transgender women, individuals with a feminine or female gender identity or expression who were assigned a male birth sex, are disproportionately incarcerated in the US relative to the general population.¹ Estimates suggest that 21% of transgender women are incarcerated in their lifetime,² compared

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to <3% of the US general population.³ Once incarcerated, transgender women are typically housed in sex-segregated facilities according to their genitalia; thus, transgender women who have not had gender confirmation surgery are placed in male facilities where they are at risk for verbal, physical and sexual assault.^{2,4–7} While the traumatic experiences of incarcerated transgender women have been documented, less is known about the factors that predict incarceration among transgender women or the longitudinal impact of incarceration on the health of this population.

One factor that is considered to be a driving force behind the high prevalence of incarceration among transgender women is stigma. Transgender women experience pervasive stigma due to their gender non-conforming identity and/or expression.⁸ Understanding the experiences of young transgender women (ages 16–29) is particularly important, as exposure to transgender stigma often begins early in life. Indeed, school bullying is common among transgender youth, with 36% of a national study of transgender individuals reporting having to leave school because of gender identity-based harassment.² Stigma is also considered a driving force behind the high prevalence of unemployment and homelessness among transgender individuals,⁸ with national studies of transgender adults indicating a prevalence of unemployment as high as 14–15% and a prevalence of lifetime homelessness as high as 19–30%.⁸ In the absence of necessary resources, some transgender women turn to street economies, such as sex work, for economic survival.^{2,4,9–12} Prior cross-sectional research documents an association between lifetime incarceration and educational attainment, low socio-economic status, sex work and homelessness;² however, no longitudinal research has examined whether these factors increase young transgender women's risk for incarceration over time.

Even less is known about the health impact of incarceration for young transgender women. Cross-sectional studies find that incarceration is associated with lifetime suicidality and substance use to cope with mistreatment among adult transgender women;^{5,13} however, no studies to date have examined the prospective relationship between recent incarceration and mental health symptoms and substance use among this population. Incarcerated transgender women experience a high prevalence of harassment and assault^{2,4–7,14}—forms of victimization associated with depression, anxiety, somatic symptoms, post-traumatic stress disorder (PTSD), suicidality and substance use in transgender samples with and without incarceration histories.^{5,8,15,16} Given the high burden of poor mental health and substance use that young transgender women already experience due to the stigma associated with their gender identity/expression,⁸ longitudinal research that controls for existing mental health and substance-related diagnoses is needed in

order to examine the unique impact of incarceration on the emergence of these outcomes in this population.

In light of the dearth of longitudinal research exploring risk factors for incarceration and the relationship between incarceration and the health of young transgender women, the present study analyzed data from a prospective cohort of young transgender women to: (i) characterize their incarceration histories; (ii) identify risk factors for incarceration over time; and (iii) examine whether past incarceration predicts current mental health symptoms and substance use over time, controlling for baseline mental health and substance dependence diagnoses. Findings may help to identify multilevel risk factors that can be targeted in future interventions to prevent incarceration and improve the health of young transgender women upon release.

Method

Sample

Between 2012 and 2015, 300 young transgender women from Chicago, IL (51%) and Boston, MA (49%) were enrolled in LifeSkills, a multisite study testing the efficacy of a group-delivered HIV-prevention intervention. Participants were recruited using non-probability sampling strategies grounded in community-based participatory research principles.¹⁷ Eligible participants were: (i) between age 16 and 29; (ii) assigned a male birth sex and self-identified as a woman, transgender woman, or on the trans-feminine spectrum; (iii) English-speaking; and (iv) self-reported sexual risk behavior. This study was approved by the Institutional Review Boards of Fenway Health and Lurie Children's Hospital of Chicago.

Following informed consent, participants completed questionnaires via computer-assisted self-interviewing (CASI) and testing for HIV and other sexually transmitted infections. After this baseline visit, participants were randomized to receive either a 6-session group-based intervention, a time-matched control intervention focused on nutrition, or a standard-of-care condition that included HIV testing and counseling. Participants then returned for follow-up assessments after 4, 8 and 12 months. Only participants who were randomized (67 not randomized) and who returned for at least one follow-up visit (12 randomized, no follow-up) were included in the analytic sample ($n = 221$).

Measures

Incarceration predictors and outcomes

Number of times incarcerated—lifetime. At baseline, participants were asked to indicate the number of times they had been incarcerated in their lifetime.

Incarcerated—past 4 months: Participants were asked if they had been to jail or prison in the past 4 months (yes/no) at baseline and all follow-up visits. The Intraclass Correlation Coefficient (ICC) was 0.23, indicating that ~23% of the variance in incarceration over time was attributable to between-subjects characteristics and 77% was attributable to within-subjects change over time.

Mental health and substance use outcomes

Mental health: The 18-item brief symptom inventory (BSI)¹⁸ was used to assess past-week somatic (alpha = 0.87; ICC = 0.43), anxiety (alpha = 0.92; ICC = 0.40) and depressive symptoms (alpha = 0.90; ICC = 0.40) at all visits.

Substance use: Illicit drug use was assessed at all visits by asking participants whether they had used any of the following in the past 4 months: alcohol, marijuana, cocaine, crack, heroin, ecstasy, GHB, LSD, crystal methamphetamine, amphetamine, poppers, other. Participants reporting using one or more drug other than alcohol or marijuana were coded as having engaged in illicit drug use (yes/no; ICC = 0.43). Binge drinking was assessed by asking participants whether they had consumed five or more alcohol drinks over a few hours in the past 4 months (yes/no; ICC = 0.39).

Descriptive variables and structural- and individual-level covariates

Demographics: Age was assessed in years at baseline. Participants were asked to indicate their primary race/ethnicity: White; Black/African American; Spanish/Hispanic/Latina; Asian; American Indian/Alaskan Native; Native Hawaiian or other Pacific Islander; other race/ethnicity. Participants with a race/ethnicity other than White were coded as being a person of color (yes/no). Participants were asked if they were current students (yes/no), whether they had ever dropped out of school (yes/no) and, if yes, the reason for dropping out (open-ended responses coded as: harassment/issues related to being transgender; family issues; caught up in street life; cost; transportation issues; unstable housing; and other life challenges). Participants were asked if they were employed (yes/no) and, if yes, full or part-time. Participants were also asked if they were currently engaged in sex work (yes/no). HIV status was assessed via rapid HIV testing at baseline (positive/negative). Health insurance was assessed as no insurance, public insurance (e.g. Medicaid) or private insurance.

Medical gender affirmation: Participants were asked if they had used hormones and/or had one or more type of surgery (e.g. breast augmentation; facial or neck surgery [nose job, cheek implants, forehead lift]; vaginal surgery [vaginoplasty] or laser therapy (yes/no)).¹⁹

*Mental health and substance dependence diagnoses:*²⁰ Current PTSD, alcohol dependence and drug dependence diagnoses (all yes/no) were assessed at baseline with the Mini International Neuropsychiatric Interview (MINI) Version 6,²¹ a structured diagnostic interview assessing mental health and substance dependence according to the Diagnostic and Statistical Manual-IV-TR²² and International Classification of Diseases-10²³ diagnostic criteria.

Homelessness: At baseline participants were asked if they had been homeless in their lifetime (yes/no).¹⁹ Participants were also asked if they had been homeless in the past 4 months at all visits (ICC = 0.36).

Criminal justice involvement: Participants were asked the offense with which they were charged when last arrested [open-ended responses coded as: drugs; alcohol (DUI); disorderly conduct, disturbing the peace; loitering, trespassing; theft; sex work; assault, domestic violence; or another charge]. At baseline participants were asked if they had been to jail or prison in their lifetime (yes/no) and whether they were housed with men, women, transgender women or single cell/isolation when last incarcerated.

Statistical analysis

Statistical analyses were conducted in SAS 9.4. To reduce potential bias resulting from missing data, multiple imputation with a fully conditional specification was used.²⁴ All subsequent analyses were conducted with Proc MIANALYZE using the imputed data.

Means and frequencies were calculated to describe participant characteristics at baseline and homelessness and incarceration history over time. Bivariate and multivariable mixed effect logistic regressions were conducted using PROC GLIMMIX to examine the association between participant characteristics and past 4-month incarceration. Variables with a *P*-value <0.10 were included in the multivariable model, which additionally adjusted for study site and randomization condition. Mixed effects regressions were calculated using PROC MIXED for continuous mental health outcomes (betas reported) and PROC GLIMMIX with a logit link for binary substance use outcomes (odds ratios reported) to examine whether number of times incarcerated in lifetime and past 4-month incarceration predicted current somatic symptoms, anxiety symptoms, depressive symptoms, illicit drug use and binge drinking. To isolate the independent associations between incarceration and mental health symptoms and substance use outcomes, all multivariable mental health and substance use models controlled for variables hypothesized to be associated with the independent and dependent variables: study site, randomization condition, race, medical

gender affirmation and baseline PTSD diagnosis. PTSD was used as the control variable for all mental health outcomes given the overlap between PTSD, somatization, depression and anxiety symptoms and that transgender women—with and without incarceration histories—are at high risk for PTSD. The drug use model also controlled for baseline drug dependence, while the binge drinking model controlled for baseline alcohol dependence. All mixed effects models included a compound symmetry covariance matrix, which was selected based on model fit (i.e. lowest Akaike information criterion).

Results

Table 1 describes the sample characteristics. Participants' mean age at baseline was 23.3 (SD = 3.5) and the sample was racially/ethnically diverse (48.9% Black, 11.8% Latina, 24.4% White, 15.0% other minority race/ethnicity). More than a third of the sample had dropped out of school (38.5%), with the most common reason being harassment/issues related to being transgender (16.3%). Nearly a quarter of the sample (24.0%) was employed at baseline and 27.2% engaged in sex work. The majority of participants (79.2%) had medically affirmed their gender. At baseline, 8.6% of the sample had a current PTSD diagnosis, 13.6% had a drug dependence diagnosis, and 10.0% had an alcohol dependence diagnosis. Nearly half (48.4%) had been homeless in their lifetime and 37.1% experienced homelessness over the study period.

Overall, 38.0% of the sample ($n = 84$) was incarcerated before or during the study period. Nearly a third of the sample had been incarcerated (32.6%) prior to enrollment, with most (55.6%) participants reporting an incarceration history totaling <1 month and an average of 3.3 (SD = 2.1) incarceration experiences in their lifetime. Among those with an incarceration history, most participants (79.2%) were last housed in a correctional institution with men. The most common criminal charge at last arrest was theft (9.5%), followed by assault/domestic violence (8.6%), and sex work (7.7%). Overall, 40 participants were incarcerated during the study period with the prevalence of past 4-month incarceration decreasing over time (8.6% at baseline, 7.2% at 4 months and 5.2% at 8 and 12 months).

Table 2 presents associations between participant socio-demographics and past 4 month incarceration. In the multivariable model dropping out of school (referent: staying in school; aOR = 1.95; 95% CI = 1.04–3.71), sex work (referent: no sex work; aOR = 2.63; 95% CI = 1.34–5.14), past 4-month homelessness (referent: not homeless; aOR = 2.08; 95% CI = 1.12–3.88), and number of times incarcerated prior to enrollment (aOR = 1.21, 95% CI = 1.11–1.33) each

positively predicted past 4-month incarceration at each time point.

Tables 3 and 4 report findings from the multivariable models examining the association between past incarceration and current mental health symptoms and substance use. In separate adjusted models, past 4-month incarceration significantly predicted somatic symptoms (aBeta = 3.65; 95% CI = 0.74–6.56) and illicit drug use (referent: no illicit drug use; aOR = 2.19; 95% CI = 1.18–4.05) over time. Incarceration did not predict anxiety symptoms, depressive symptoms and binge drinking over time.

Discussion

Main findings

To our knowledge, this study represents the first longitudinal investigation of risk factors for incarceration and the impact of incarceration on the mental health and substance use of young transgender women. Drawing upon four waves of data over a 12-month period, results established that dropping out of school, sex work, homelessness and number of times incarcerated significantly predicted incarceration over time. Additionally, recent incarceration predicted somatic symptoms and illicit drug use prospectively even after controlling for baseline mental health and substance dependence diagnoses. Findings support the urgent need to prevent incarceration among young transgender women and develop interventions to reduce the mental health and substance use sequelae of incarceration among this at-risk population.

What is already known on this topic and what this study adds

Transgender women in this sample experienced challenges in multiple life domains that increased their risk for incarceration. Nearly 40% had dropped out of school prior to enrollment, with the most commonly cited reasons including harassment due to being transgender, family issues, cost and other life challenges. Extending prior cross-sectional research linking low educational attainment to lifetime incarceration for adult transgender women,⁵ dropping out of school significantly predicted being incarcerated over the study period. Prior sex work was also found to be a strong predictor of incarceration over follow-up and more than a quarter of the young transgender sampled reported relying on sex work for income, consistent with previous national cross-sectional research.⁵ Participants also reported a high burden of homelessness with nearly half the sample reporting homelessness in their lifetime and 37.1% reporting homelessness over the study period. Moreover, recent

Table 1 Baseline characteristics and homelessness and incarceration experiences over time in a sample of 221 young transgender women, ages 16–29 from Boston ($n = 108$) and Chicago ($n = 113$)

Age	Mean	SD
Range (16–29)	23.3	3.5
Race	<i>N</i>	%
White	54	24.4
Person of Color	167	75.6
Black	108	48.9
Latina	26	11.8
Asian	6	2.7
American Indian/Alaskan Native	3	1.4
Native Hawaiian or Other Pacific Islander	2	0.9
Other minority race/ethnicity	22	10.0
Student—current		
No	153	69.2
Yes	68	30.8
Dropped out of school		
No	136	61.5
Yes	85	38.5
Employed—current		
No	168	76.0
Yes	53	24.0
Full-time	34	15.4
Part-time	19	8.6
Reason for dropping out		
Harassment/issues related to being transgender	36	16.3
Family issues	12	5.4
Caught up in street life (drug dealing, sex work)	5	2.3
Cost	6	2.7
Transportation issues	5	2.3
Unstable housing	3	1.4
Other life challenges	18	8.1
Sex work—current		
No	161	72.9
Yes	60	27.1
Health insurance		
None	56	25.3
Public	127	57.5
Private	38	17.2
HIV positive		
No	176	79.6
Yes	44	19.9
Medically affirmed gender ^a		
No	46	20.8
Yes	175	79.2
Hormones	150	67.9
Surgery	45	20.4
PTSD diagnosis—current		
No	202	91.4

Continued

Table 1 Continued

Yes	19	8.6
Drug dependence diagnosis—current		
No	191	86.4
Yes	30	13.6
Alcohol dependence diagnosis—current		
No	199	90.0
Yes	22	10.0
Homeless—lifetime		
No	114	51.6
Yes	107	48.4
Homeless over study period		
No	139	62.9
Yes	82	37.1
Homeless past 4 months ^b		
Baseline (Time 0)	47	21.3
4 Month (Time 1)	48	21.7
8 Month (Time 2)	34	15.4
12 Month (Time 3)	40	18.1
Criminal charge(s)—last arrest		
Never arrested	97	43.9
Drugs	13	5.9
Alcohol (DUI)	2	0.9
Disorderly conduct, disturbing the peace	5	2.3
Loitering, trespassing	9	4.1
Traffic violation	7	3.2
Theft (shoplifting, robbery)	21	9.5
Sex work	17	7.7
Interpersonal violence (assault, domestic violence)	19	8.6
Other charge	31	14.0
Incarcerated—lifetime		
No	149	67.4
Yes	72	32.6
Correctional housing—last incarceration ($n = 72$)		
Housed with men	57	79.2
Housed with women	2	2.8
Housed with transgender women	3	4.2
Single cell/isolation	10	13.9
Number of times incarcerated—lifetime ($n = 72$)	Mean	SD
Range (1–15)	3.3	2.1
Incarcerated over study period	<i>N</i>	%
No	181	81.9
Yes	40	18.1
Incarcerated—past 4 months ^b		
Baseline (Time 0)	19	8.6
4 Month (Time 1)	16	7.2
8 Month (Time 2)	13	5.9
12 Month (Time 3)	13	5.9

^aMedical gender affirmation includes any use of hormones and/or surgery to affirm one's gender.

^bAll variables were assessed at baseline (fixed), except for homeless—past 4 months and incarcerated—past 4 months, which were assessed at baseline, 4, 8 and 12 months (time varying).

Table 2 Bivariate and multivariable mixed effects analyses examining factors associated with past 4-month incarceration over time in a sample of young transgender women, ages 16–29, from Boston and Chicago ($n = 221$)

<i>Outcome 1: Incarcerated—past 4 months</i>						
	<i>Bivariate</i>			<i>Multivariable</i>		
	<i>OR</i>	<i>95% CI</i>	<i>P-value</i>	<i>aOR</i>	<i>95% CI</i>	<i>P-value</i>
Age						
Continuous	0.95	0.86–1.05	0.28	–	–	–
Race						
White	Ref	–	–	–	–	–
Person of color	1.99	0.78–5.07	0.15	–	–	–
Dropped out of school						
No	Ref	–	–	Ref	–	–
Yes	2.46	1.25–4.85	0.01	1.95	1.04–3.71	0.04
Employed—current						
No	Ref	–	–	Ref	–	–
Yes	0.39	0.14–1.14	0.08	0.54	0.21–1.40	0.20
Sex Work—current						
No	Ref	–	–	Ref	–	–
Yes	4.30	2.20–8.42	<0.001	2.63	1.34–5.14	0.01
Health insurance						
None	Ref	–	–	–	–	–
Public	1.03	0.48–2.22	0.94	–	–	–
Private	0.53	0.15–1.80	0.31	–	–	–
HIV positive						
No	Ref	–	–	–	–	–
Yes	2.07	0.99–4.31	0.05	1.22	0.61–2.46	0.57
Medically affirmed gender						
No	Ref	–	–	–	–	–
Yes	1.20	0.57–2.53	0.63	–	–	–
PTSD diagnosis—current						
No	Ref	–	–	–	–	–
Yes	1.85	0.39–8.86	0.44	–	–	–
Drug dependence diagnosis—current						
No	Ref	–	–	–	–	–
Yes	0.99	0.36–2.67	0.98	–	–	–
Alcohol dependence diagnosis—current						
No	Ref	–	–	–	–	–
Yes	0.62	0.16–2.37	0.49	–	–	–
Homeless—past 4 months						
No	Ref	–	–	Ref	–	–
Yes	2.52	1.38–4.62	0.003	2.08	1.12–3.88	0.02
Number of times incarcerated—lifetime						
Continuous	1.30	1.19–1.42	<0.001	1.21	1.11–1.33	<0.001

Note. All variables were assessed at baseline (fixed), except for homeless—past 4 months (predictor) and incarcerated—past 4 months (outcome), which were assessed at baseline, 4, 8 and 12 months (time varying). Variables significant at $P < 0.10$ were included in the multivariable model. CI = confidence interval; aOR = adjusted odds ratio, adjusted for study site and condition. Proc Mi Analyze combined the imputed data and Proc Glimmix was used with a binary distribution and logistic link function. Bolded P -values = significant at $P < 0.05$.

homelessness positively predicted being incarcerated over a 12-month period—a finding that extends prior cross-sectional research linking lifetime homelessness to lifetime incarceration in transgender samples.^{2,4} Participants also frequently reported being arrested for income-motivated criminal acts such as sex work or theft, which further supports prior research linking lack of access to necessary resources as a key driver of incarceration among transgender individuals.^{2,4,5} While the present study establishes the temporal ordering of these risk factors, longitudinal, mixed methods research that explores patterns and risk factors for school dropout, sex work and homelessness, together with incarceration will allow for a more complete understanding of the reciprocal influences of these incarceration risks.

Participants also reported a high burden of incarceration, with more than one in three (38.0%) incarcerated before or during the study period and an average of 3.3 incarceration experiences before age 30. One of the primary drivers of incarceration over the study period was prior incarceration. Indeed, as the number of times participants had been incarcerated prior to enrollment increased so did the odds of having been recently incarcerated at each follow-up visit. These findings are consistent with the national recidivism rate in the general population, which shows that 76.6% of individuals released from prison will be incarcerated within 5 years of release.²⁵ Faced with the stigma of a criminal record, diminished social ties, and challenges finding employment, many formerly incarcerated individuals return to financially motivated criminal activities, which increases their risk for re-incarceration.²⁶ Transgender individuals may be more likely to experience these risk factors for re-incarceration given the added stigma of being transgender.^{2,4,8} Additional research is needed to understand the unique challenges of re-entry that contribute to recidivism among young transgender women as well as sources of resilience in order to inform interventions to prevent the cycle of incarceration among this at-risk population.

The present study also documented the relationship between past incarceration and elevated mental health symptoms over time among the young transgender women sampled. Specifically, prospective analyses showed that past 4-month incarceration predicted current somatic symptoms across follow-up, over and above the number of times participants were incarcerated prior to enrollment and poor mental health at baseline. Research suggests that correctional settings are highly stressful environments for transgender women,^{1,14} the majority of whom are housed in male prisons as evidenced here and supported by prior research.¹ Incarcerated transgender women are at risk for multiple forms of victimization, experiences that have been cross-sectionally linked to poor mental health in transgender samples with and without incarceration histories.^{5,8,27}

Table 3 Bivariate and multivariable mixed effect models examining the association between number of times incarcerated in lifetime and past 4-month incarceration and mental health symptoms over time in a sample of young transgender women, ages 16–29, from Boston and Chicago ($n = 221$)

	Outcome 2: Somatic symptoms					Outcome 3: Anxiety symptoms					Outcome 4: Depressive symptoms							
	Bivariate		Multivariable			Bivariate		Multivariable			Bivariate		Multivariable					
	aBeta	95% CI	P-value	aBeta	95% CI	P-value	aBeta	95% CI	P-value	aBeta	95% CI	P-value	aBeta	95% CI	P-value			
Number of times incarcerated—lifetime																		
Continuous	0.55	0.05–1.06	0.03	0.48	–0.05–1.00	0.08	0.44	–0.11–0.99	0.12	0.41	–0.15–0.97	0.15	0.12	–0.40–0.64	0.66	0.17	–0.37–0.70	0.55
Incarcerated—past 4 months																		
No	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–
Yes	4.16	1.33–7.00	0.004	3.65	0.74–6.56	0.01	3.13	–0.08 to 6.34	0.06	2.91	–0.37 to 6.19	0.08	0.51	–2.90 to 3.93	0.77	0.30	–3.19 to 3.80	0.86

Note: Number of times incarcerated was assessed at baseline (fixed). Incarcerated—past 4 months and Outcomes 2–4 were assessed at 4, 8, and 12 months (time-varying). CI = confidence interval; aBeta = adjusted Beta. All models adjusted for study site, condition, race, medical gender affirmation, PTSD diagnosis, and past 4-month homelessness. All models used Proc Mi Analyze with the imputed data and Proc Mixed with a compound symmetry covariance matrix. Bolded *P*-values = significant at $P < 0.05$.

While recent incarceration did not significantly predict anxiety or depressive symptoms at each time point, the increased risk for physical manifestations of poor mental health observed among recently incarcerated participants is consistent with prior research in cisgender (i.e. non-transgender) populations.^{28–30} Incarcerated and formerly incarcerated individuals living in urban environments may be motivated to conceal their emotions as emotional vulnerability is a sign of weakness in these settings and can increase risk for victimization.^{28–30} Moreover, research with transgender and cisgender samples finds that individuals who have been victimized may use avoidant coping behaviors such as trying to suppress traumatic memories, though avoidance is often ineffective as it may increase risk for poor health including somatic manifestations of mental health symptoms.^{16,31,32} Thus, the stress of incarceration may have contributed to the elevated somatic symptoms of poor mental health observed among the participants who had recently been incarcerated, relative to those who had not. While suppressing one's emotions may be protective in the short term, somatic manifestations of poor mental health may not be diagnosed as having a psychological origin, which can lead to improper treatment.³¹ A broad range of mental health outcomes, including physical manifestations of poor mental health, should be assessed in clinical work with transgender women with incarceration histories so that appropriate therapies can be provided.

Finally, the present study found that incarceration positively predicted illicit drug use, even after accounting for drug dependence at baseline. Young transgender women who have been incarcerated may use substances following release from prison to cope with the psychological impact of their incarceration experience, the tumultuous task of re-entry and/or the added stigma of having a criminal record.^{5,26,33,34} No statistically significant association was observed between incarceration and binge drinking. It is possible that transgender women with an incarceration history are more likely to have social networks that use illicit drugs rather than alcohol and these networks can pose a risk for illicit drug use for individuals recently released from prison.^{26,33} More research is needed to examine the mechanisms through which incarceration impacts substance use behaviors for young transgender women.

Intervention implications

Multilevel interventions are needed to address the psychosocial sequelae of incarceration for young transgender women. Structural efforts to prevent the disproportionate rates of incarceration observed among this population include protections against gender identity-based discrimination in schools, employment, housing, and public spaces.⁸ School-based efforts must also be made to identify at-risk transgender youth and

Table 4 Bivariate and multivariable mixed effects models examining the association between number of times incarcerated in lifetime and past 4-month incarceration and substance use over time in a sample of young transgender women, ages 16–29, from Boston and Chicago ($n = 221$)

	Outcome 5: illicit drug use						Outcome 6: Binge drinking					
	Bivariate			Multivariable			Bivariate			Multivariable		
	aOR	95% CI	P-value	aOR	95% CI	P-value	aOR	95% CI	P-value	aOR	95% CI	P-value
Number of times incarcerated—lifetime												
Continuous	1.09	1.00–1.19	0.06	1.08	0.98–1.20	0.12	1.04	0.95–1.13	0.40	1.06	0.97–1.17	0.21
Incarcerated—past 4 months												
No	Ref	–	–	Ref	–	–	Ref	–	–	Ref	–	–
Yes	2.07	1.20–3.58	0.01	2.19	1.18–4.05	0.01	0.61	0.33–1.16	0.13	0.60	0.32–1.16	0.13

Note. Number of times incarcerated was assessed at baseline (fixed). Incarcerated—past 4 months and Outcomes 5–6 were assessed at 4, 8 and 12 months (time-varying). CI = confidence interval; aOR = adjusted odds ratio. All models adjusted for study site, condition, race, medical gender affirmation, PTSD diagnosis and past 4-month homelessness. The multivariable model for outcome 5 adjusted for drug dependence diagnosis at baseline and the multivariable model for Outcome 6 adjusted for alcohol dependence diagnosis at baseline. All models used Proc Mi Analyze with the imputed data and Proc Glimmix was used with a binary distribution and logistic link function. Bolded P -values = significant at $P < 0.05$.

provide them with the support needed to safely complete their education and manage life challenges (e.g. family issues, poverty, homelessness) in order to prevent incarceration. Transgender cultural competence training³⁵ for police, lawyers, judges, and those working in correctional settings (e.g. custody staff and healthcare providers) can help to reduce the high prevalence of incarceration and ensure that transgender women who become incarcerated are treated with respect and dignity. The enforcement of the Prison Rape Elimination Act³⁶ in prisons and changes to correctional housing policies that allow transgender women to be housed in facilities that align with their gender identity (e.g. female facilities) could also help to reduce the high incidence of victimization among this population. Additionally, transgender women who are released from prison should have access to trauma-informed therapy/counseling to help them cope with the experiences of incarceration; housing, drug treatment services and other re-entry services should be made available to reduce recidivism.^{34,37} Finally, interventions that provide transgender women with skills to secure employment, assist them in identifying job opportunities, and train employers in transgender cultural competencies, could help to reduce many transgender women's need to engage in illegal economies, prevent the cycle of incarceration, and ultimately improve the health of this vulnerable population.

Limitations of this study

Potential limitations warrant attention. First, findings are drawn from a sample of young transgender women from Chicago and Boston; thus, findings may not be generalizable to older

transgender women or those from other geographic regions. Additionally, participants were enrolled in an HIV-prevention trial targeting sexual risk reduction. While the analyses controlled for randomized condition, and there were no differences in incarceration history by condition, participation in any of three treatment conditions may have attenuated the relationship between incarceration and the health of transgender women in our sample. Additionally, while the present study took steps to reduce social desirability bias (e.g. use of CASI), all measures were based on self-report. Finally, while the prospective design allowed for the temporal ordering of predictors and outcomes, it cannot establish causality. Future research using qualitative methods, such as life history interviews,³⁸ represents an ethical and feasible way to continue investigating the causal ordering of life experiences up to and following incarceration across the lifecourse.

This is the first longitudinal study to examine the risk factors for incarceration and the predictive role of incarceration in the mental health and substance use behaviors of young transgender women. Our results document school dropout, sex work, homelessness, and prior incarceration as key drivers of recent incarceration and show that recent incarceration predicts somatic symptoms and illicit drug use over time for young transgender women. Findings highlight the need to understand the aspects of incarceration that uniquely predict poor health in this population. Individual (e.g. therapy/counseling), interpersonal (e.g. employer, provider and correctional staff training), and structural (e.g. policy changes) interventions are needed to prevent incarceration and support transgender women while incarcerated and upon release.

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Conflicts of interest

The author's have no conflicts of interest to disclose.

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