
Multi-City Assessment of Lifetime Pregnancy Involvement among Street Youth, Ukraine

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ABSTRACT *Although street youth are at increased risk of lifetime pregnancy involvement (LPI), or ever becoming or getting someone pregnant, no reports to date describe the epidemiology of LPI among systematically sampled street youth from multiple cities outside of North America. The purpose of our assessment was to describe the prevalence of and risk factors associated with LPI among street youth from three Ukrainian cities. We used modified time–location sampling to conduct a cross-sectional assessment in Odesa, Kyiv, and Donetsk that included citywide mapping of 91 public venue locations frequented by street youth, random selection of 74 sites, and interviewing all eligible and consenting street youth aged 15–24 years found at sampled sites (n=929). Characteristics of youth and prevalence of LPI overall and by demographic, social, sexual, and substance use risk factors, were estimated separately for males and females. Adjusted odds ratios (AORs) were calculated with multivariable logistic regression and effect modification by gender was examined. Most (96.6%) eligible youth consented to participate. LPI was reported for 41.7% of females (93/223) and 23.5% of males (166/706). For females, LPI was significantly elevated and highest (>70%) among those initiating sexual activity at ≤12 years and for those reporting lifetime anal sex and exchanging sex for goods. For males, LPI was significantly elevated and highest (>40%) among those who reported lifetime anal sex and history of a sexually transmitted infection. Overall, risk factors associated with LPI were similar for females and males. Among the total sample (females and males combined), significant independent risk factors with AORs ≥2.5 included female gender, being aged 20–24 years, having five to six total adverse childhood experiences, initiating sex at age ≤12 or 13–14 years, lifetime anal sex, most recent sex act unprotected, and lifetime exchange of sex for goods. Among street youth with LPI (n=259), the most recent LPI event was reported to be unintended by 63.3% and to have ended in abortion by 43.2%. In conclusion, our assessment documented high rates of LPI among Ukrainian street youth who, given the potential for negative outcomes and the challenges of raising a child on the streets, are in need of community-based pregnancy prevention programs and services. Promising preventive strategies are discussed, which are likely applicable to other urban populations of street-based youth as well.*

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INTRODUCTION

As many as 100 million young people are living as street youth worldwide^{1,2}, their existence affecting urban areas in every continent and likely to escalate as the global urban population is expected to more than double by 2050.³ In Soviet time, orphaned and abandoned youth were kept off of the streets through networks of government-funded, residential, child-care institutions, coupled with strict control and punishment of runaways. After the dissolution of the Soviet Union, the presence of street youth in Ukraine increased dramatically after political transitions left the health and social sectors underfunded and neglected; it is estimated that up to 300,000 street youth currently reside in Ukraine.⁴ Street youth are a heterogeneous population who spend varying amounts of time on the streets and who may or may not have contact with family members or a permanent place of residence. Street youth share common life experiences and barriers to services that increase their likelihood of negative health outcomes (e.g., frostbite, tuberculosis, violence, depression) and death.⁵⁻⁷ High rates of substance use, victimization, and risky sexual behaviors among street youth^{5,8,9} also place them at increased risk for sexually transmitted infections (STIs), human immunodeficiency virus (HIV), and pregnancy.^{5,6}

Lifetime pregnancy involvement (LPI), or ever being or getting someone pregnant, among teen and older street youth poses public health challenges. Beyond the well-documented negative consequences associated with teenage pregnancy,¹⁰ street youth in general are not prepared physically, emotionally, or economically to care for a child and often lack supportive relationships, stable housing and food, and access to prenatal and pediatric services. Even if services are available, street youth are often vulnerable to harassment and exploitation by law enforcement, which might contribute to potential avoidance of government-supported services associated with authority. Pregnant street youth may also be at increased risk for adverse birth outcomes, including low birth weight and preterm birth; previous literature has shown higher rates of these negative outcomes among homeless teens and women,¹¹ although receipt of quality antenatal care might buffer these risks.¹² Street youth exhibit high levels of mental disturbances, including major depressive disorder and suicide ideation,^{9,13} and because previous psychopathology is a risk factor for poor mental functioning postpartum,¹⁴ pregnant females on the street may experience exacerbated depression and thoughts of suicide after delivery. Substance-using street youth may be more likely to abuse their children and lose parenting rights.^{15,16} Children born into street living suffer tremendous adversity, including poor physical health, mental and behavioral problems, developmental delays, as well as social stigma and the potential for family separation.¹⁷ Official registration of birth—which is critical for access to government-supported services, including medical care and school enrollment—may be unavailable. Although street youth face a multitude of health risks, some of which can be life-threatening, studies of health issues important to street youth have found pregnancy to be one of the most common health concerns.^{18,19} Among shelter-based females in their teens, pregnancy ranked higher than HIV/AIDS as an important health problem.¹⁸

Findings from the USA have documented that street youth have higher rates of LPI than nonstreet youth populations including those residing in shelters and households.^{9,20} Rates of LPI among runaway, homeless, or street-based youth in

North America have ranged from 10% to 50%,^{9,20–23} with significant risk factors for pregnancy being minority ethnicity, homelessness for longer periods of time, and history of familial abuse.^{20,22,23} To our knowledge, there are no published reports estimating the prevalence of pregnancy among multi-city samples of street youth outside of North America. We previously reported the HIV seroprevalence among street youth in three geographically diverse cities in Ukraine;²⁴ here, we describe the prevalence and risk factors associated with LPI among this multi-city sample of Ukrainian street youth.

METHODS

Overview

Data from this report were collected as part of a rapid assessment of HIV seroprevalence conducted in May–December 2008 among street youth in three Ukrainian cities: Odesa, Kyiv, and Donetsk. The methods for this assessment have been described in detail previously²⁴ but are briefly summarized here. In each city, the assessment consisted of two phases. First, we developed a sampling frame of public venue locations known to be frequented by street youth, with random selection of study sites, using an adaptation of time–location sampling methodology.²⁵ The public venues were identified and evaluated by experienced outreach workers serving street youth from local nongovernmental and faith-based organizations, and included sites such as metro stops, fast-food restaurants, and recreation areas. Second, we implemented an interviewer-administered survey, as well as HIV counseling and testing, with consenting, eligible youth found at each randomly selected study site, conducted by two mobile teams of outreach workers, social workers, and nurses. Project staff were highly experienced in working with street youth populations and participated in standardized training addressing approaches to discussing sensitive topics with street youth.

Target Population

The target population for our assessment was street and out-of-school youth aged 15–24 years and residing in Kyiv, Odesa, and Donetsk. For younger youth aged 15–17 years (Ukrainian minors), eligibility criteria included being found at a street venue without a parent, and one of the following: living part-time or full-time on the street, being out of family care, self-identifying as “street youth” or “street kid,” or attending school irregularly or not at all. For older youth aged 18–24 years, eligibility criteria included living part-time or full-time on the street or self-identifying as “street youth” or “street kid.” These criteria were developed in collaboration with local and donor organizations serving street youth populations and were used to capture a broad spectrum of youth spending time on the streets. We excluded those who previously had participated in our assessment, were unable to provide informed consent, or were suspected by staff to pose a potential threat to self or to the project team.

Measures

We estimated the prevalence of LPI for both males and females using the question “How many times have you ever been pregnant or gotten someone pregnant?” Response options included zero times, one time, two or more times, and not sure. For this analysis, LPI was defined as ever being pregnant or getting someone

pregnant ≥ 1 time. For those youth who indicated that they were unsure (males, $n=29$; females, $n=1$) or had missing data (males, $n=2$), LPI was assumed to be never; results were similar when these youth were excluded during sensitivity analyses. The social risk factors we examined included exposure to adverse childhood experiences (ACEs) before the age of 15 years, which were measured using modified questions from the ACE study.^{26,27} Several ACEs were ascertained including living with a substance-using, mentally ill, or criminal household member, having a parent who was divorced or separated, witnessing intimate partner violence, and experiencing emotional, physical, or sexual abuse. ACEs were considered individually and as part of a composite score. Other social, sexual, and substance-use risk factors that we considered were measured using questions adapted from our previous assessments with street youth.⁸

Data Analysis

Chi-square tests, with stratification by gender, were computed to compare the distributions of LPI by demographic, social, sexual, and substance-use risk factors, with $p < 0.05$ defined as statistically significant. Because the risk characteristics associated with LPI did not greatly differ by gender, we used logistic regression to estimate unadjusted and adjusted odds ratios (ORs and AORs) and 95% confidence intervals for all significant risk characteristics associated with LPI in chi-square analyses, for males and females combined. Although examination for effect modification by gender in multivariable models revealed that the magnitude of effect for several risk characteristics was stronger for females than males (e.g., total ACEs, lifetime anal sex, most recent sex act unprotected), we elected to report findings for males and females together because the direction of effect was consistent. Effect modification by gender resulting in contrary effects (i.e., risk effect for one gender group and protective effect for the other, or significant effect for one gender group and non-significant effect for the other) was detected for two risk characteristics, and therefore, gender-specific point estimates are reported for these factors.

In multivariable modeling, due to multicollinearity among several of the risk characteristics of interest and the desire to understand the importance of each type of factor adjusted for the others, separate models were built for testing the significance of demographic, social, sexual, and substance-use risk factors. For example, when testing the significance of social risk factors, each social risk factor of interest (e.g., time on streets, total ACEs) was entered separately into a model adjusting for select variables from the other blocks of risk factors (i.e., demographic, sexual, and substance-use blocks). To determine which variable or variables from a given block would be adjusted for when testing the influence of the other blocks of risk factors, we considered those that had the greatest magnitude of effect in unadjusted analyses and were not too highly correlated with other selected variables. Both gender and age were adjusted for from the demographic block; time on streets and total ACEs were adjusted for from the social block; age at first sex dichotomized as < 15 years (yes, no) was adjusted for from the sexual block; and lifetime injection drug use was adjusted for from the substance-use block. All analyses were conducted using the software package SAS-callable SUDAAN (Research Triangle Institute, Research Triangle Park, NC, USA) to account for intracluster homogeneity within sampled sites.

Ethical Considerations

The protocol was reviewed for ethical considerations by the Centers for Disease Control and Prevention and the Ukrainian Ministry of Family, Youth, and Sports,

and was determined to be exempt from Institutional Review Board evaluation due to its focus on public health practice.

RESULTS

Citywide mapping identified 91 public venue locations frequented by street youth, of which 74 were randomly sampled. Of 1,043 youth approached for participation, 92.1% met eligibility criteria, and 96.6% of those eligible agreed to participate.

Among the 929 street youth participants, the majority were male and aged 20–24 years (Table 1). Many had social risk factors including spending >3 years on the streets and having no one to turn to for help. Many youth also reported ACEs; nearly two-thirds experienced one to four total ACEs and a quarter experienced five to six. Sexual activity and use of some type of drug were also common. Of the risk characteristics examined, the following were significantly more prevalent among males than females: aged 20–24 years, spending >3 years on the streets, having lived with someone during childhood who went to prison, lifetime anal sex, having ≥ 6 sex partners in the past year, and lifetime use of any drug, injection drugs, or needle sharing. For females, the following risk characteristics were significantly more common than for males: having parents who were separated or divorced during childhood, experiencing emotional, physical, or sexual abuse during childhood, lifetime exchange of sex for goods, and lifetime sexual victimization. The distribution of total ACEs did not significantly differ between males and females.

In our study population, LPI was reported for 41.7% of females and 23.5% of males ($p < 0.05$; Table 2). For females, LPI was significantly elevated and $\geq 70\%$ for those initiating sexual activity at ≤ 12 years, and for those reporting lifetime anal sex or exchanging sex for goods; $\geq 60\%$ for those aged 20–24 years, who reported ≥ 6 sex partners in the past year, most recent sex act unprotected and STI history; and $\geq 50\%$ for those who reported five to six total ACEs, and lifetime histories of oral sex, sexual victimization, injection drug use, or needle sharing. Among males, LPI was significantly elevated and $\geq 40\%$ for those who reported lifetime anal sex and STI history; and $\geq 30\%$ for those aged 20–24 years, who reported spending time on the streets for >3 years, lifetime oral sex, ≥ 6 sex partners in the past year, most recent sex act unprotected, and lifetime injection drug use or needle sharing. For both females and males, there was a statistically significant gradient effect (p for trend ≤ 0.05) of age at first sex on the prevalence of LPI, with LPI generally increasing as age at first sex decreased. Among females only, the prevalence of LPI significantly increased (p for trend ≤ 0.05) as the total number of ACEs increased.

In multivariable logistic regression modeling conducted among the total sample of street youth, demographic and social characteristics independently associated with LPI included female gender (AOR=3.6), being aged 20–24 years (AOR=4.8), spending >3 years on the streets (AOR=1.8), and having experienced one to four (AOR=2.3) and five to six (AOR=2.5) total ACEs (Table 3). Having no one to turn to for help was only significant for females (AOR=2.4). Also, the odds of LPI increased incrementally for street youth who initiated sex at age 15–17 (AOR=2.3), 13–14 (AOR=2.5), and ≤ 12 years (AOR=4.7), compared with those who had never had sex or initiated sex at age 18–24 years. Many other sexual risk factors were also independently associated with LPI, including lifetime anal (AOR=3.0) and oral sex (AOR=2.2), ≥ 6 sex partners in the past year (AOR=2.0), most recent sex act unprotected (AOR=2.9), lifetime exchange of sex for goods (AOR=3.5), and STI history (AOR=2.1). Lifetime sexual victimization was associated with increased

TABLE 1 Characteristics of street youth participants, stratified by gender—Ukraine, 2008

	Males	Females		Total
	N=706	N=223		N=929
	n (%)	n (%)	P ^a	n (%)
Demographic and social risk factors				
Age 20–24 years	394 (55.8)	100 (44.8)	<0.0005	494 (53.2)
Ever lived in a shelter or orphanage	248 (35.1)	76 (34.1)	0.77	324 (34.9)
Time on streets >3 years	444 (62.9)	109 (48.9)	<0.0005	553 (59.5)
Have no one to turn to for help	207 (29.3)	54 (24.2)	0.14	261 (28.1)
Adverse childhood experiences ^b				
Lived with alcoholic or someone who used illegal drugs	455 (64.4)	138 (61.9)	0.49	593 (63.8)
Lived with someone who was depressed/mentally ill or attempted suicide	267 (37.8)	81 (36.3)	0.69	348 (37.5)
Lived with someone who went to prison	312 (44.2)	70 (31.4)	<0.001	382 (41.1)
Parents were separated/divorced	403 (57.1)	152 (68.2)	<0.005	555 (59.7)
Witnessed intimate partner violence	375 (53.1)	130 (58.3)	0.18	505 (54.4)
Experienced abuse ^c	344 (48.7)	129 (57.9)	<0.05	473 (50.9)
Total adverse childhood experiences ^b				
0	68 (9.6)	24 (10.8)	0.37	92 (9.9)
1–4	467 (66.2)	136 (61.0)		603 (64.9)
5–6	171 (24.2)	63 (28.3)		234 (25.2)
Sexual risk factors				
Ever had sex	647 (91.9)	205 (91.9)	0.99	852 (91.9)
Age at first sex				
≤12	79 (11.2)	28 (12.56)	0.63	107 (11.5)
13–14	239 (34.0)	68 (30.5)		307 (33.1)
15–17	287 (40.8)	90 (40.4)		377 (40.7)
18–24	42 (6.0)	19 (8.5)		61 (6.6)
Never had sex	57 (8.1)	18 (8.1)		75 (8.1)
Lifetime anal sex	196 (27.8)	32 (14.4)	<0.0001	228 (24.5)
Lifetime oral sex	300 (42.5)	79 (35.4)	0.06	379 (40.8)
Past year ≥6 opposite sex partners	219 (31.2)	47 (21.1)	<0.01	266 (28.7)
Most recent sex act unprotected	322 (45.7)	116 (52.3)	0.09	438 (47.3)
Lifetime exchange of sex for goods ^d	18 (2.6)	25 (11.2)	<0.0001	43 (4.6)
Lifetime STI diagnosis	78 (11.1)	33 (14.8)	0.13	111 (12.0)
Lifetime sexual victimization ^e	18 (2.6)	65 (29.2)	<0.0001	83 (9.0)
Substance use risk factors				
Lifetime use of any drug	543 (76.9)	137 (61.4)	<0.0001	680 (73.2)
Lifetime injection drug use	257 (36.4)	56 (25.1)	<0.005	313 (33.7)
Lifetime needle sharing	171 (24.2)	35 (15.7)	<0.01	206 (22.2)

^aChi-square test comparing the distribution of characteristics among males and females

^bBefore age 15

^cEmotional, physical, or sexual abuse

^dIncluding drugs, money, food, clothes, shelter, or other goods

^eBased on question: "Have you ever been forced to have sex?"

odds of LPI only for females (AOR=2.1). No substance use behaviors were significantly associated with LPI after adjustment for covariates.

TABLE 2 Prevalence of LPI among street youth, overall and by youth characteristics, stratified by gender—Ukraine, 2008

	% LPI		
	Males	Females	Total
	<i>n/n</i> (%)	<i>n/n</i> (%)	<i>n/n</i> (%)
Overall	166/706 (23.5)	93/223 (41.7)	259/929 (27.9)
Demographic and social risk factors			
Age			
15–19 years	27/312 (8.7)	33/123 (26.8)	60/435 (13.8)
20–24 years	139/394 (35.3)*	60/100 (60.0)*	199/494 (40.3)*
Ever lived in a shelter or orphanage			
No	103/458 (22.5)	59/147 (40.1)	162/605 (26.8)
Yes	63/248 (25.4)	34/76 (44.7)	97/324 (30.0)
Time on streets			
≤3 years	33/262 (12.6)	39/114 (34.2)	72/376 (19.2)
>3 years	133/444 (30.0)*	54/109 (49.5)*	187/553 (33.8)*
Have someone to turn to for help			
No	57/207 (27.5)	31/54 (57.4)	88/261 (33.7)
Yes	109/499 (21.8)	62/169 (36.7)*	171/668 (25.6)*
Total adverse childhood experiences ^a			
0	10/68 (14.7)	6/24 (25.0)	16/92 (17.4)
1–4	112/467 (24.0)	52/136 (38.2)	164/603 (27.2)
5–6	44/171 (25.7)	35/63 (55.6)**	79/234 (33.8)**
Sexual risk factors			
Age at first sex			
≤12	23/79 (29.1)	20/28 (71.4)	43/107 (40.2)
13–14	67/239 (28.0)	24/68 (35.3)	91/307 (29.6)
15–17	67/287 (23.3)	42/90 (46.7)	109/377 (28.9)
18–24	9/42 (21.4)	7/19 (36.8)	16/61 (26.2)
Never had sex	0/57 (0.0)**	0/18 (0.0)**	0/75 (0.0)**
Lifetime anal sex			
No	83/510 (16.3)	68/191 (35.6)	151/701 (21.5)
Yes	83/196 (42.4)*	25/32 (78.1)*	108/228 (47.4)*
Lifetime oral sex			
No	60/406 (14.8)	46/144 (31.9)	106/550 (19.3)
Yes	106/300 (35.3)*	47/79 (59.5)*	153/379 (40.4)*
Past year ≥6 opposite sex partners			
No	93/484 (19.2)	64/176 (36.4)	157/660 (23.8)
Yes	72/219 (32.9)*	29/47 (61.7)*	101/266 (38.0)*
Most recent sex act unprotected			
No	55/382 (14.4)	20/106 (18.9)	75/488 (15.4)
Yes	111/322 (34.5)*	72/116 (62.1)*	183/438 (41.8)*
Lifetime exchange of sex for goods ^b			
No	160/686 (23.3)	74/198 (37.4)	234/884 (26.5)
Yes	6/18 (33.3)	19/25 (76.0)*	25/43 (58.1)*
Lifetime STI diagnosis			
No	133/628 (21.2)	73/190 (38.4)	206/818 (25.2)
Yes	33/78 (42.3)*	20/33 (60.6)*	53/111 (47.8)*
Lifetime sexual victimization ^c			
No	163/686 (23.8)	55/158 (34.8)	218/844 (25.8)
Yes	3/18 (16.7)	38/65 (58.5)*	41/83 (49.4)*

TABLE 2 (continued)

	% LPI		
	Males	Females	Total
	<i>n/n</i> (%)	<i>n/n</i> (%)	<i>n/n</i> (%)
Overall	166/706 (23.5)	93/223 (41.7)	259/929 (27.9)
Substance-use risk factors			
Lifetime use of any drug			
No	24/163 (14.7)	34/86 (39.5)	58/249 (23.3)
Yes	142/543 (26.2)*	59/137 (43.1)	201/680 (29.6)
Lifetime injection drug use			
No	87/449 (19.4)	63/167 (37.7)	150/616 (24.4)
Yes	79/257 (30.7)*	30/56 (53.6)*	109/313 (34.8)*
Lifetime needle sharing			
No	114/535 (21.3)	73/188 (38.8)	187/723 (25.9)
Yes	52/171 (30.4)*	20/35 (57.1)*	72/206 (35.0)*

LPI, ever been pregnant or gotten someone pregnant

^aBefore age 15

^bIncluding drugs, money, food, clothes, shelter, or other goods

^cBased on question: "Have you ever been forced to have sex?"

* $P < 0.05$, statistically different based on chi-square test comparing the distributions of lifetime pregnancy by youth characteristics, conducted separately for males, females, and the total sample of youth

** $P < 0.05$ for trend

Among those street youth who reported LPI ($n=259$), nearly half had been pregnant or gotten someone pregnant ≥ 2 times, with no significant differences between males and females (Table 4). The most recent pregnancy was reported to be unintended by 63.3% of youth and to have resulted in the following outcomes: miscarriage or fetal death (13.9%), induced abortion (43.2%), live birth (36.4%), or do not know/missing (6.6%); only one child was reported to have been relinquished (data not shown). Although the majority of street youth with LPI were aged 20–24 years, more than one third of females with LPI were teenagers and pregnancy reported by older youth may have occurred during the teen years. Regarding current living situation, nearly one-fifth of street youth with LPI reported having no place to live or reported living with a partner and/or children. More than one quarter of street youth with LPI reported current injection drug use and about one-fifth reported being drunk ≥ 10 times in the past month or tested HIV positive.

DISCUSSION

This first report of LPI (i.e., ever being or getting someone pregnant) among a multi-city sample of street youth in Ukraine found that four of ten female and two of ten male Ukrainian street youth aged 15–24 years had ever been pregnant or gotten someone pregnant, with a considerable prevalence of repeat pregnancy involvement among those with at least one LPI event (45.2%). Rates of LPI were particularly high for certain subgroups of youth, exceeding 70% among females and 40% among males. For both genders, the prevalence of LPI generally increased as age at first sex decreased. We found that independent risk factors for LPI were mostly similar for males and females and included demographic, social, and sexual risk

TABLE 3 Odds of LPI among street youth—Ukraine, 2008

	LPI	
	Total (N=929)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographic risk factors^e		
Female gender	2.33 (1.96, 2.76)*	3.61 (2.87, 4.55)*
Age 20–24 years	4.22 (3.38, 5.26)*	4.77 (3.72, 6.12)*
Social risk factors^f		
Time on streets >3 years	2.16 (1.80, 2.58)*	1.77 (1.44, 2.17)*
Have no one to turn to for help		
Females ^a	2.33 (1.62, 3.34)*	2.44 (1.64, 3.65)*
Males ^a	1.36 (1.12, 1.65)*	1.23 (0.95, 1.59)
Total adverse childhood experiences^b		
0	1.00	1.00
1–4	1.77 (1.23, 2.57)*	2.33 (1.66, 3.25)*
5–6	2.42 (1.73, 3.40)*	2.51 (1.77, 3.57)*
Sexual risk factors^g		
Age at first sex		
≤12	5.04 (3.66, 6.94)*	4.70 (3.36, 6.58)*
13–14	3.16 (2.38, 4.19)*	2.52 (1.92, 3.32)*
15–17	3.05 (2.33, 3.99)*	2.28 (1.79, 2.91)*
18–24 or never had sex	1.00	1.00
Lifetime anal sex	3.28 (2.61, 4.12)*	3.03 (2.40, 3.84)*
Lifetime oral sex	2.84 (2.33, 3.45)*	2.15 (1.73, 2.67)*
Past year ≥6 opposite sex partners	1.96 (1.61, 2.39)*	1.96 (1.57, 2.44)*
Most recent sex act unprotected	3.95 (3.36, 4.65)*	2.90 (2.39, 3.53)*
Lifetime exchange of sex for goods ^c	3.86 (2.72, 5.47)*	3.52 (2.39, 5.18)*
Lifetime STI diagnosis	2.71 (1.98, 3.72)*	2.11 (1.45, 3.06)*
Lifetime sexual victimization^d		
Females ^a	2.64 (1.97, 3.53)*	2.06 (1.46, 2.91)*
Males ^a	0.64 (0.30, 1.36)	0.48 (0.23, 1.01)
Substance-use risk factors^h		
Lifetime use of any drug	1.38 (1.10, 1.73)*	1.10 (0.80, 1.53)
Lifetime injection drug use	1.66 (1.26, 2.19)*	1.16 (0.84, 1.59)
Lifetime needle sharing	1.54 (1.24, 1.92)*	1.03 (0.82, 1.30)

LPI, ever been pregnant or gotten someone pregnant

^aGender-specific point estimates reported due to significant effect modification resulting in contrary effects^bBefore age 15^cIncluding drugs, money, food, clothes, shelter, or other goods^dBased on question: "Have you ever been forced to have sex?"^eAdjusted for gender (for age), age (for gender), time on streets, total adverse childhood experiences, age at first sex (dichotomized), lifetime STI diagnosis, and lifetime injection drug use^fAdjusted for gender, age, age at first sex (dichotomized), lifetime STI diagnosis, and lifetime injection drug use^gAdjusted for gender, age, time on streets, total adverse childhood experiences, and lifetime injection drug use^hAdjusted for gender, age, time on streets, total adverse childhood experiences, age at first sex (dichotomized), and lifetime STI diagnosis

*P<0.05

factors. Drug use was not significantly associated with LPI after adjustment for confounders. Although the majority of most recent LPI events among street youth

TABLE 4 Characteristics of street youth participants with LPI (*n*=259), stratified by gender—Ukraine, 2008

	Street Youth with LPI			
	Males	Females	<i>P</i> ^a	Total
	<i>N</i> =166	<i>N</i> =93		<i>N</i> =259
	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)
Pregnancy characteristics				
Lifetime ≥2 pregnancies	78 (47.0)	39 (41.9)	0.43	117 (45.2)
Unintended last pregnancy	109 (65.7)	55 (59.1)	0.30	164 (63.3)
Pregnancy outcome of most recent pregnancy				
Miscarriage or fetal death	19 (11.5)	17 (18.3)	0.27	36 (13.9)
Induced abortion	74 (44.6)	38 (40.9)		112 (43.2)
Live birth	60 (36.1)	34 (36.6)		94 (36.4)
Don't know or missing	13 (7.8)	4 (4.30)		17 (6.6)
Demographic and social characteristics				
Age 20–24 years	139 (83.7)	60 (64.5)	<0.0005	199 (76.8)
No place to live	33 (19.9)	18 (19.4)	0.92	51 (19.7)
Lives with partner and/or children	31 (18.7)	24 (25.8)	0.18	55 (21.2)
Sexual and substance use characteristics				
Most recent sex act unprotected	111 (66.9)	72 (78.3)	0.05	183 (70.9)
Current ^b injection drug use	48 (28.9)	21 (22.6)	0.27	69 (26.7)
Current ^b needle sharing	24 (14.5)	6 (6.5)	0.05	30 (11.6)
Drunk ≥10 days in past month	33 (19.9)	12 (12.9)	0.16	45 (17.4)
HIV positive	33 (19.9)	26 (28.0)	0.14	59 (22.8)

LPI, ever been pregnant or gotten someone pregnant

^aChi-square test comparing the distribution of characteristics among males and females

^bPast 30 days

were reported to be unintended and nearly half ended in abortion, more than one in three pregnancies resulted in a live birth.

Although our overall rate of LPI was within the range documented by other studies,^{8,9,20–23} LPI rates for males and for females with certain risky sexual behaviors were higher than those previously reported. For example, the rates of LPI among females with histories of sex exchange (76%) and STI (61%) observed in our assessment are higher than rates from previous reports (2–43% and 6–45%, respectively).^{22,23} Furthermore, most of the earlier research exploring LPI among street and homeless youth has been conducted among females only.^{18,20,22,23,28} Although three studies have included males,^{8,9,21} the only one to report LPI separately by gender found 10% LPI in a small sample of 50 males.⁹ We found a higher prevalence of LPI in our sample of 706 male street youth (24%), which is likely an underestimate given that male knowledge of partner pregnancy may be incomplete, especially in the setting of multiple partners.

Although exposure to traumatic events during childhood, such as abuse, neglect, and being raised in a single-parent household, have previously been linked to increased rates of risky sexual behaviors and LPI among runaway and shelter-based youth,^{22,23,29} to our knowledge, ours is the first report to examine the impact of cumulative exposure to abuse and family dysfunction as measured by ACEs. We found increasing odds of LPI as ACEs increased, underscoring the need to prevent

negative childhood experiences and for programs to mitigate the long-term consequences of childhood family dysfunction. Of note, although the distribution of total ACEs did not significantly differ between males and females, the magnitude of influence of total ACEs on LPI was greater for females, as more than one-half of females who reported five to six ACEs experienced LPI compared with one-fourth of males.

Younger age at sexual initiation has been found to be related to LPI among minority youth populations in the USA;³⁰ however, the only previous study examining this relationship among street youth found no difference in the mean age of first voluntary intercourse among females with or without LPI.²² In our assessment, we found high rates of LPI among street youth having an early sexual debut, with nearly three-quarters (71.4%) of females who initiated sexual activity at ≤ 12 years reporting LPI; the odds of LPI for females and males also increased significantly and incrementally as the age at sexual debut decreased. Although we did not assess the intent of first sex, it has been suggested that distinguishing between voluntary and involuntary sex at debut may be important among homeless youth and that sex among the youngest age categories most likely reflects forced sex.⁹

Although pregnancy involvement among teen and older street youth introduces additional challenges to life and survival on the streets, there is evidence to suggest that some pregnancies among this vulnerable population are intended. For example, it has been suggested that pregnancy among troubled youth, including those on the streets, may be welcomed as a time for positive change.^{31,32} In our assessment, we found that four of ten females and three of ten males reported that their most recent LPI was intended. This finding might reflect inclusion of older age (20–24 years) street youth in our sample or the desire of youth to use pregnancy as a way to improve one's life trajectory, as at least two qualitative studies have reported that pregnancy motivated homeless youth to secure housing.^{28,33}

Limitations of our assessment included our inability to establish the temporal relationship between the many exposure variables we considered and LPI, given that our data were cross-sectional and timing of LPI was not assessed. In the event that LPI preceded some of the characteristics examined, we may have overestimated the odds associated with these characteristics. Furthermore, data were based on youth self-report and, therefore, subject to recall and social desirability bias. In the event that sensitive sexual and drug-use behaviors were under-ascertained by self-report, we may have underestimated the odds associated with these characteristics. In addition, misclassification bias in our outcome variable may have occurred, particularly for males, who may not have known that they impregnated a sexual partner. Last, because pregnancy involvement among older and married/partnered street youth may be acceptable, even though not ideal due to their poor health and social environments as well as engagement in risky sexual and substance-use behaviors, future studies addressing LPI among street youth populations may be strengthened by the inclusion of data regarding marital and/or steady partner status currently and at the time of pregnancy involvement. Despite these limitations, our assessment was conducted among a systematically drawn sample from multiple cities; these characteristics, coupled with high participation rates, enhance the validity and generalizability of findings.

Universal access to sexual and reproductive health services, including access to high-quality family planning services, has been recognized as a basic right of individuals;³⁴ nevertheless, our findings highlight the need for community-based

pregnancy prevention programs and services for street youth in Ukraine. As many youth in Ukraine are excluded from state-sponsored services including medical care without permission from a parent or guardian and without documentation of residency status, promoting legal access to medical services including contraceptives, independent of parental consent and documentation of residency, is especially critical for street youth who may be orphaned or have little-to-no parental contact and often lack registration documents. Furthermore, promoting use of longer-acting reversible contraceptives (e.g., intrauterine devices, contraceptive implants, and injectables) for female youth who are medically eligible^{35,36} may prevent unintended pregnancy among this vulnerable population, since these methods are less user-dependent and provide maximum efficacy.^{37,38} These methods, however, are costly and may not be readily available to street youth. Wider availability of condoms, as well as efforts to promote their use, remains important strategies to prevent both unintended pregnancy and STIs among street youth populations.

Programs for street youth in Ukraine should incorporate strategies to reduce high-risk sexual behaviors that may lead to LPI, lessen the psychological trauma from familial dysfunction including abuse during childhood, and enhance protective factors such as self-esteem and social involvement.³⁹ Because street youth often display clustering of sexual risk behaviors and past STI diagnosis was found to be associated with LPI in our assessment as well as in previous literature,^{22,23} efforts to integrate family planning into existing STI/HIV programs are essential. For example, youth diagnosed with an STI or seeking STI/HIV testing should be screened and counseled for risk of unintended pregnancy and provided proper education, medical supplies, and skills to practice effective contraception, in addition condoms to prevent disease. Potential benefits of integrating these services have been previously described and include increasing uptake of health services and prevention of unintended pregnancies, STIs including HIV, as well as of mother-to-child transmission of HIV and infant abandonment among HIV-infected females.^{40,41} A recent review of programs linking family planning and HIV services found that integration was generally feasible and effective.⁴⁰ For street youth in Ukraine, community-based programs utilizing skilled outreach workers are critical to successfully reach and serve this high-risk and transient youth population. Fortunately, there are several existing evidence-based HIV prevention programs for homeless youth^{42,43} that could be easily adapted to integrate pregnancy prevention, as most already aim to reduce HIV-related sexual behaviors (e.g., reduction of multiple sex partners or unprotected sex) that also reduce pregnancy risk. To reduce psychological harm from exposure to traumatic events, including childhood abuse or maltreatment, several intervention models have been implemented with children and adolescents and evaluated, with individual and group cognitive-behavioral therapy having the strongest evidence of success.⁴⁴ These intervention approaches should be considered for adaptation and use with Ukrainian street youth. Last, because pregnancy, childbearing, and childrearing among Ukrainian street youth are somber realities, there is a need for increased access to antenatal and pediatric services for street-based youth, as well as for shelters, drop-in centers, and other programs serving these youth to be equipped to serve families including children. Although these strategies to reduce LPI and increase access to services for street youth are based on our findings from Ukraine, given the common experiences and barriers to services faced by street youth worldwide, these recommendations are likely applicable to other urban populations of street-based youth as well.

DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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