Factors Associated with Pregnancy among Incarcerated African American Adolescent Girls

Simone C. Gray, Kristin Holmes, and Denise R. Bradford

ABSTRACT *The purpose of this study was to examine the social and behavioral factors associated with pregnancy history among a sample of African American adolescent girls recruited from a short-term juvenile detention center in order to better understand the needs of this vulnerable population. Data were collected from a sample of 188 detained African American, 13–17-year-old girls in Atlanta, Georgia, who participated in a larger HIV prevention study. An audio computer-assisted self-interviewing survey was completed by participants to obtain information on socioecological factors to include individual, parental/familial, sexual risk, psychosocial, and substance use factors. Among the 188 participants, 25.5 % reported a history of pregnancy. A multivariable logistic regression model showed that girls with a history of pregnancy were more likely to live in a household receiving government aid, use hormonal contraceptives at last sex, participate in sex trading, have casual sex partners, have condomless sex in the past 90 days, and have a history of physical abuse. Girls with no history of pregnancy were more likely to have been incarcerated at least twice and to have previously used alcohol. Detention-based interventions and pregnancy prevention programs for this vulnerable population may benefit by addressing factors related to sexual behavior and development, substance use, individual background, and psychosocial health.*

KEYWORDS *African American, Adolescent pregnancy, Risk factors, Detention, Sexual behaviors*

INTRODUCTION

African Americans are disproportionately represented in juvenile detention facilities in the USA.¹ In 2010, 33 % of juvenile court arrests were African American compared to the 17 % of adolescents represented in the US population who are African American.^{2, 3} The juvenile arrest rate of blacks in 2010 was 9130.6 per 100,000, more than double the juvenile arrest rate of whites at 4242.5 per 100,000.⁴ According to the Office of Juvenile Justice and Delinquency Prevention, adolescent girls account for 29 % of the total number of juvenile arrests with an overrepresentation of African American girls in juvenile detention facilities.¹

Several articles have reported on the extreme vulnerability of detained adolescents.^{5–7} Adolescents in juvenile detention facilities have high rates of emotional,

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physical, and sexual abuse, mental illness, substance abuse, and violent behavior.⁸⁻¹⁰ Studies also suggest that detained adolescents bear a disproportionate burden of health risk factors associated with limited access to primary care and delayed treatment of healthcare problems.¹¹ Consequently, with increased rates of high-risk sexual behaviors, detained adolescent girls have demonstrated high rates of STIs and an increased risk of pregnancy.¹¹⁻¹⁵

Studies have shown that detained girls have higher levels of pregnancy rates relative to their non-detained peers.¹¹ A 1999 study among detained girls 12-18 years reported that 37 % had a history of pregnancy.¹⁶ In comparison, approximately 13 % of high-school girls participating in a nationally representative survey of US high school students reported a history of pregnancy.¹⁷ Further, detained African American girls, who are overrepresented in juvenile detention, may have higher levels of pregnancy compared to other detained girls.¹⁸ In a 2011 study among 1190 female juvenile offenders 11-18 years, African American girls were also almost three times as likely as white girls to report a history of pregnancy.¹⁹

Risk factors for adolescent pregnancies in the detained population, particularly in the USA, are still relatively unexplored. A 2007 study on pregnancy history in 256 detained adolescent females in Dutch detention centers showed that pregnancy history was associated with a combination of sexual risk behaviors including any of the following items: no condom use at last intercourse, no or insufficient use of contraception at last intercourse, substance use at last intercourse, or a history of STDs.¹⁵ Based on the study design and the creation of a composite factor for sexual risk behaviors, it is impossible to determine which of these individual sexual risk factors is associated with pregnancy history.

Pregnancy risk factors have been explored in other at-risk adolescent populations, including runaway or homeless females and those diagnosed with psychological disorders.²⁰⁻²² One such study on pregnancy history in adolescent street youth in Montreal, Canada, showed that pregnancy history was primarily associated with sexual abuse.²¹ Other factors including age, contact with governmental services such as foster or group homes, amount of time spent homeless, and age they ran away or were kicked out were seen to be higher in adolescents who were ever pregnant when compared to their never-pregnant homeless peers.²¹ Many of the risk factors associated with pregnancy in previous studies of adolescent populations are highly prevalent among detained adolescents, suggesting that detained adolescent females are at an increased risk of experiencing pregnancy.²³

Adolescent pregnancy carries large economic, social, and public health implications for society. This study examines the social and behavioral factors associated with pregnancy history among a sample of African American adolescent girls recruited from a short-term juvenile detention center in Atlanta, GA.

METHODS

Participants

Participants in this study were enrolled in an HIV/STI prevention trial for African American adolescent girls in a short-term juvenile detention facility in Atlanta, GA, from March 2011 to February 2012.²⁴ The prevention trial was developed using previously existing techniques for African American girls as well as information provided by adolescent girls with a history of detention in Georgia.²⁴ Eligible participants were unmarried, 13-17-year-old girls who self-identified as African

American and reported a history of vaginal intercourse. Girls who were pregnant, Wards of the State of Georgia, or would be released to a restricted location such as a group home were considered ineligible. Of the 393 girls screened, 188 were enrolled in the study. Primary reasons for ineligibility included no vaginal intercourse (45 %), release to a restricted location (10 %), and pregnant at baseline (9 %). Written informed assent was obtained from adolescents and verbal consent was obtained from parents/guardians prior to study participation. While at the detention facility, an audio computer-assisted self-interview (ACASI) was used to collect baseline data on sociodemographics, sexual history, and psychosocial constructs associated with sexual risk behaviors. The Emory University Institutional Review Board approved all study protocols; staff from the Centers for Diseases Control and Prevention did not have contact with study participants. For further details on the study methods, refer to DiClemente et al.²⁴

Outcome

Pregnancy History. Participants with a positive response to the question, “Have you ever been pregnant before (be sure to count abortions or miscarriages)?” (yes/no) were categorized as having a history of pregnancy.

Individual Factors Participants’ self-reported demographic characteristics included age, household receipt of governmental assistance (welfare, food stamps, Women, Infant and Children or housing subsidies) in the past 12 months, and the number of times they had been previously incarcerated in a detention center. *Incarceration history* was determined based on the response to the “number of times the participant has ever been locked up.” Responses of two or more were categorized as reporting being locked up two or more times.

Parental/Familial Factors Parental/familial factors included whether participants lived with one or both of their parents, whether an immediate family member had ever been incarcerated, whether there was a male figure in their life while growing up and whether they received family support.^{20, 22, 25}

Live with parent(s) was based on the question “Who do you live with?” Those who responded that they were living with either or both parents were classified as living with parent(s). Other options included another relative, group home, boyfriend, or other situations.

Family member incarceration history was based on a positive response to the question, “Has anyone in your immediate family (mom, dad, sister, or brother) ever been in jail or prison (locked up)?” (yes/no).

Male figure was based on the questions, “Was your father part of your life while growing up?” (yes/no), and “If not, was there another male figure (like a stepfather, grandfather, or uncle) who was part of your life while growing up?” (yes/no). Those who responded yes to either question were considered to have a male figure in their life.

Family support was assessed based on the question, “I get the emotional help and support I need from my family.” Responses ranged from 1 = *strongly disagree* to 5 = *strongly agree*. Those who responded with *agree* or *strongly agree* were considered to have family support in their life.

Sexual Risk Behaviors Sexual risk behaviors included early sexual debut, pregnancy coercion, casual sex partners, use of hormonal contraceptives at last

sex, sex trading, having multiple vaginal sex partners, having four or more lifetime sexual partners, having condomless sex, and a history of STIs.^{21, 22, 26}

Early sexual debut was defined as having vaginal intercourse before age 14; the median age of the sample.

Pregnancy coercion was measured with a nine-item scale of questions pertaining to experiences of pregnancy coercion or birth control sabotage.²⁶ An example question was, "Has your partner ever: told you not to use any birth control (like the pill, shot, ring, etc.)?" (yes/no). A positive response to at least one of the items constituted a history of pregnancy coercion.

Casual sex partners. Participants with a positive response to the question, "Do you currently have a casual sex partner(s)?" (yes/no) were categorized as having casual sex partners.

Hormonal contraceptives. Participants reporting use of "pills or depo" the last time they had sex were categorized as using hormonal contraceptives.

Sex trade participant was measured with the question, "In the past 90 days, have you exchanged or traded vaginal, anal, or oral sex for drugs, money, food, or a place to stay?" (yes/no).

Multiple sex partners. Participants reporting having vaginal sex with more than one male partner in the past 90 days were categorized as having multiple sex partners.

Condomless sex was defined as having at least one episode of vaginal intercourse without a condom in the past 90 days.

STI history. Participants with a positive response to the question, "Have you ever had a positive STD test result?" (yes/no) were categorized as having a previous STD diagnosis.

Psychosocial Factors Psychosocial factors included elevated depressive symptoms, post-traumatic stress disorder (PTSD) symptoms, and abuse.^{20, 21, 25}

Depressive symptoms. Depressive symptomology in the past 7 days was measured and scored using the eight-item CES-D scale ($\alpha = 0.91$).²⁷ Participants were asked how frequently during the past week they experienced depressive symptoms with responses on a scale of 1 = *less than one day* to 4 = *5–7 days*. A sample item was "I felt sad." Participants with scores above 15 were categorized as endorsing elevated depressive symptomology.

PTSD symptoms were measured and scored using the PSS-SR 17-item survey.²⁸ Questions were divided into three symptom groups, re-experiencing, avoidance, and arousal symptoms in the past week. Participants who had positive responses for at least one of the re-experiencing questions, at least three of the avoidance questions, and at least two of the arousal questions were categorized as having elevated PTSD symptoms. A sample arousal item included, "Feeling irritable or having fits of anger" with frequency ranging from 0 = *not at all or only one time* to 4 = *five or more times per week/almost always*.

Emotional abuse was assessed with, "Have you ever been emotionally abused?" (yes/no).

Physical abuse was assessed with, "Have you ever been physically abused?" (yes/no).

Sexual abuse was assessed with, "Has anyone ever forced you to have vaginal sex when you didn't want to?" (yes/no).

Substance Use Factors Substance use factors included using alcohol or marijuana at least once during the participant's lifetime.^{15, 20, 25}

Alcohol use was assessed with, “Have you ever had at least one drink of alcohol?” (yes/no).

Marijuana use was assessed with, “Have you ever used marijuana?” (yes/no).

Statistical Methods

Bivariate relationships were explored using chi-square and independent samples *t* tests to compare socio-demographic and behavioral factors among adolescents with and without a history of pregnancy. A multivariable logistic regression model was used to allow an assessment of a combination of factors and their association with pregnancy history among the study population. Variables with a *p* value < 0.10 in the bivariate analysis were considered as candidate variables in the multivariable model.²⁹ Stepwise selection was used to determine the final adjusted models with the cutoff significance as *p* ≤ 0.05. Adjusted odds ratios (AOR) and 95 % confidence intervals were calculated using logistic regression models. Analyses were performed using SAS 9.3 (SAS Institute, Cary, NC).

RESULTS

A total of 188 sexually experienced African American adolescent girls participated in the study. Table 1 reports the baseline characteristics of all the detained adolescent girls. The average age of participants was 15.3 years. Most of the participants were on government aid (71.3 %) and had an immediate family member that was previously incarcerated (69.2 %). Additionally, 58.5 % had condomless sex in the past 90 days, 37.8 % initiated sex before age 13 years, and 54.3 % reported experiencing elevated depressive symptoms. Many participants experienced a history of abuse: 56.4 % experienced emotional abuse, 42.6 % experienced physical abuse, and 23.9 % experienced sexual abuse. Most of the participants used substances with 78.7 % ever using alcohol and 74.5 % ever using marijuana.

Bivariate analyses between the baseline factors and pregnancy history are presented in Table 1. Five factors were statistically different between adolescents with no history of pregnancy and adolescents reporting a history of pregnancy: casual sex partners, hormonal contraceptives at last sex, participating in sex trading, condomless sex in the past 90 days, and alcohol use (*p* < .05). Girls with a history of pregnancy were more likely than girls with no history of pregnancy to have had casual sex partners, used hormonal contraceptives at last sex, participated in sex trading, and had condomless sex in the past 90 days (*p* < .05). Girls with no history of pregnancy were more likely than girls with a history of pregnancy to have ever used alcohol (*p* < .05).

The variables that showed bivariate associations with *p* < 0.10 in Table 1 were included as candidate variables in the multivariable analysis: age, receipt of government aid, being incarcerated at least twice, casual sex partners, hormonal contraceptives at last sex, sex trade participants, condomless sex in the past 90 days, experiencing PTSD symptoms, having a history of physical abuse, and alcohol use. Results of the multivariable model are presented in Table 2. Compared with girls who did not report a history of pregnancy, girls with a history of pregnancy were more likely to be older (AOR, 1.74; 95 % CI, 1.17, 2.60), live in a household receiving government aid (AOR, 3.06; 95 % CI, 1.09, 8.59), have casual sex partners (AOR, 3.06; 95 % CI, 1.32, 7.13), used hormonal contraceptives at last sex (AOR, 3.99; 95 % CI, 1.65, 9.67), participate in sex trading (AOR, 4.38; 95 % CI, 1.16, 16.47), had condomless sex in the past 90 days (AOR, 4.05; 95 % CI, 1.60, 10.24), and experienced physical abuse (AOR, 2.37; 95 % CI, 1.03, 5.44) (Table 2). Girls

TABLE 1 Baselines characteristics among participants, stratified by pregnancy—Atlanta, GA, 2011

	Total (<i>N</i> = 188) <i>n</i> (%)	No pregnancy history (<i>N</i> = 140) <i>n</i> (%)	Pregnancy history (<i>N</i> = 48) <i>n</i> (%)	<i>p</i> value
Individual factors				
Age (mean, SD)	15.3 (1.1)	15.2 (1.1)	15.6 (0.9)	0.064
Government aid	134 (71.3)	95 (67.9)	39 (81.3)	0.077
Incarceration history > 2 times	64 (34.0)	53 (37.9)	11 (22.9)	0.059
Parental/familial factors				
Live with parent(s)	157 (83.5)	114 (81.4)	43 (89.6)	0.189
Family member incarceration history	130 (69.2)	100 (71.4)	30 (62.5)	0.248
Male figure in life	73 (41.7)	51 (38.6)	22 (51.2)	0.148
Family support	107 (56.9)	83 (59.3)	24 (50.0)	0.262
Sexual risk behaviors				
Early sexual debut (<14 years)	71 (37.8)	54 (38.6)	17 (35.4)	0.697
Pregnancy coercion	67 (35.6)	48 (34.3)	19 (39.6)	0.508
Casual sex partners	67 (35.6)	44 (31.4)	23 (47.9)	0.04
Hormonal contraceptives at last sex	49 (26.1)	28 (20.0)	21 (43.8)	0.001
Sex trade participant	14 (7.5)	6 (4.3)	8 (16.7)	0.005
Multiple sex partners in past 90 days	77 (41.0)	57 (40.7)	20 (41.7)	0.908
Four or more lifetime partners	86 (45.7)	62 (44.3)	24 (50.0)	0.493
Condomless sex in the past 90 days	110 (58.5)	73 (52.1)	37 (77.1)	0.003
History of STIs	61 (32.5)	42 (30.0)	19 (39.6)	0.221
Psychosocial factors				
Depressive symptoms	102 (54.3)	73 (52.1)	29 (60.4)	0.321
PTSD symptoms	80 (42.6)	54 (38.6)	26 (54.2)	0.059
Emotional abuse	106 (56.4)	75 (53.6)	31 (64.6)	0.184
Physical abuse	80 (42.6)	54 (38.6)	26 (54.2)	0.059
Sexual abuse	45 (23.9)	33 (23.6)	12 (25.0)	0.841
Substance use factors				
Alcohol use	148 (78.7)	116 (82.9)	32 (66.7)	0.018
Marijuana use	140 (74.5)	106 (75.7)	34 (70.8)	0.503

with a history of pregnancy were less likely than girls who did not report a history of pregnancy to have been previously incarcerated at least twice (AOR, 0.33; 95 % CI, 0.13, 0.83) and to have ever used alcohol (AOR, 0.16; 95 % CI, 0.06, 0.45).

DISCUSSION

This study examined factors associated with pregnancy history among detained African American adolescent girls. The prevalence of pregnancy obtained from our study was 25.5 %, similar to estimates among detained adolescents reported in other studies.^{7, 19} Adolescents with a history of physical abuse had nearly 2.4 times the

TABLE 2 Factors associated with pregnancy history among participants—Atlanta, GA, 2011

Variable	Unadjusted OR (95 % CI)	Adjusted OR (95 % CI)
Age	1.38 (0.99, 1.93)	1.74 (1.17, 2.60)*
Government aid	2.05 (0.92, 4.60)	3.06 (1.09, 8.59)*
Incarceration history ≥ 2 times	0.49 (0.23, 1.04)	0.33 (0.13, 0.83)*
Casual sex partners	2.01 (1.03, 3.92)*	3.06 (1.32, 7.13)*
Hormonal contraceptives at last sex	3.11 (1.54, 6.29)*	3.99 (1.65, 9.67)*
Sex trade participant	4.47 (1.46, 13.63)*	4.38 (1.16, 16.47)*
Condomless sex in past 90 days	3.09 (1.46, 6.54)*	4.05 (1.60, 10.24)*
Alcohol use	0.41 (0.20, 0.87)*	0.16 (0.06, 0.45)*
Physical abuse	1.88 (0.97, 3.65)	2.37 (1.03, 5.44)*

* $p < .05$

odds of having a history of pregnancy than those reporting no history of physical abuse. The literature on the relationship between physical abuse and adolescent pregnancy is conflicting and underlines the need for further study. Adams and East reported a significant difference in physical abuse and adolescent pregnancy among 100 females ages 12–24 years.³⁰ A recent meta-analysis also showed that physical abuse was associated with an increased risk of adolescent pregnancy.³¹ An earlier methodological review concluded that no causal relationship could be determined between childhood maltreatment and adolescent pregnancy.³²

Girls with a history of pregnancy were less likely than girls who did not report a history of pregnancy to have ever used alcohol. Although we make no distinction between girls who had a live birth and those who did not, this finding may be related to the fact that once a girl has a teen pregnancy, and is possibly raising a child, she may be more likely to avoid alcohol. One previous study among adolescent street youth showed no significant relationship between pregnancy and binge drinking or age at first binge drinking.²¹ Another study on adolescent girls in Dutch detention centers showed no relationship between history of pregnancy and alcohol use disorder.¹⁵ Further investigation of the relationship between adolescent pregnancy and alcohol consumption is warranted.

There were several other factors that showed significant associations with adolescent pregnancy in previous studies but not in ours, including family support, early sexual debut, history of STIs, sexual abuse, and mental health.^{20–22} These studies are based on different populations, making comparisons difficult. Few studies on pregnancy exist for the detained African American population and research on the factors associated with pregnancy is necessary for understanding the needs of this vulnerable population.

Many studies on risk factors associated with adolescent pregnancy do not investigate factors associated with pregnancy specific to both incarcerated populations and African American females: a growing population of individuals, vulnerable to an elevated number of negative health outcomes.^{33, 34} One pregnancy prevention study used a behavioral intervention to examine whether girls assigned to a behavioral treatment group relative to usual group care showed decreased pregnancy rates among juvenile justice girls.³⁵ This particular study found significant differences in post-baseline pregnancies between control and experimental groups, supporting the idea that behavioral-based techniques can be effective in reducing pregnancy; however, only 2 % of the study sample in this intervention was African American.

Several limitations to this study need to be considered when interpreting these results. The specific sample of African American girls limits extrapolation of these results to other groups or individuals. The data were also self-reported, and could be subject to report bias based on the sensitive nature of the information being reported. Also, because respondents had to report events that took place months or years ago, recall bias may be a further limitation. Furthermore, due to the study being cross-sectional, we cannot infer causation on the variables of interest. We also do not have information on when the pregnancy occurred, leading to temporality issues between the outcome and the independent variables. This study does contribute to the research on African American juvenile detainees, a vulnerable population that is currently under-studied.

CONCLUSION

This study describes characteristics that distinguish adolescent African American girls in juvenile detention with a history of pregnancy from their never pregnant sexually experienced peers. Multiple risk factors contribute to adolescent pregnancy, including poverty, race, neighborhood environments, and family characteristics and addressing many of these factors are important in understanding the detained population. Effective reproductive health education and intervention programs for these adolescents should recognize this combination of risk factors in adolescents with a history of pregnancy and evaluate appropriate strategies provided in schools and community settings. Focused efforts may need to be made for girls with sexual risk behavior factors such as sex trade participation and engagement in condomless sex as well as mental health treatment of past physical abuse. Programs that strive to improve decision making and responsibility aptitudes may be especially valuable as these particular populations of youth often face numerous difficulties before being admitted to juvenile detention. Additional studies similar to ours would be beneficial in identifying other risk factors in order to engage holistic approaches aimed at pregnancy prevention, particularly in African American adolescent detainees.

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REFERENCES

1. OJJDP. *Statistical briefing book: Office of Juvenile Justice and Delinquency Prevention*. Pittsburgh, PA: National Center for Juvenile Justice; 2012.
2. Sickmund M, Sladky A, Kang W. *Easy access to juvenile court statistics: 1985–2013*. National Center for Juvenile Justice. Available at: <http://www.ojjdp.gov/ojstatbb/ezajcs/asp/selection.asp>. Accessed June 2015.
3. Puzzanchera C, Sladky A, Kang W. *Easy access to juvenile populations: 1990–2013*. Office Juvenile Justice Delinquency Prevention. Available at: http://www.ojjdp.gov/ojstatbb/ezapop/asp/profile_selection.asp. Accessed June 17, 2015.
4. OJJDP. *Juvenile Arrest Rates by Offense, Sex, and Race (1980–2012): National Center for Juvenile Justice*; 2014

5. Robertson AR, St. Lawrence J, Morse DT, Baird-Thomas C, Liew H, Gresham K. The "Healthy Teen Girls Project": comparison of health education and STD risk reduction intervention for incarcerated adolescent females. *Health Educ Behav.* 2011; 38(3): 241–50.
6. Teplin LA, Abram KM, McClelland GM, Mericle AA, Dulcan MK, Washburn JJ. *Psychiatric disorders of youth in detention.* Washington, DC: Office of Juvenile Justice and Delinquency Prevention; 2006.
7. Lederman CS, Dakof GA, Larrea MA, Li H. Characteristics of adolescent females in juvenile detention. *Int J Law Psychiatry.* 2004; 27: 321–37.
8. Mason AW, Zimmerman L, Evans W. Sexual and physical abuse among incarcerated youth: implication for sexual behavior, contraceptive use, and teenage pregnancy. *Child Abuse Negl.* 1998; 22(10): 987–95.
9. Kazdin AE. Adolescent development, mental disorders, and decision making of delinquent youths. In: Grisso T, Schwartz RG, eds. *Youth on trial: a developmental perspective on juvenile justice.* Chicago, IL: University of Chicago Press; 2000: 33–65.
10. Evans WP, Brown R, Killian E. Decision making and perceived postdetention success among incarcerated youth. *Crime Delinq.* 2002; 48(4): 553–67.
11. Golzari M, Hunt SJ, Anoshiravani A. The health status of youth in juvenile detention facilities. *J Adolesc Health.* 2006; 38(6): 776–82.
12. Morris RE, Baker CJ, Huscroft S. Incarcerated youth at risk for HIV infection. In: Diclemente RJ, ed. *Adolescents and AIDS: a generation in jeopardy.* Thousand Oaks, CA: Sage Publications; 1992: 52–70.
13. Katz AR, Lee MV, Ohye RG, Effler PV, Johnson EC, Nishi SM. Prevalence of chlamydial and gonorrheal infections among females in a juvenile detention facility, Honolulu, Hawaii. *J Community Health.* 2004; 29(4): 265–9.
14. Miller WC, Ford CA, Morris M, et al. Prevalence of chlamydial and gonococcal infections among young adults in the United States. *J Am Med Assoc.* 2004; 291(18): 2229–36.
15. Hamerlynck SM, Cohen-Kettenis PT, Vermeiren R, Jansen LM, Bezemer PD, Doreleijers TA. Sexual risk behavior and pregnancy in detained adolescent females: a study in Dutch detention centers. *Child Adolesc Psychiatry Ment Health.* 2007;1(4): 1–7.
16. Williams RA, Hollis HM. Health beliefs and reported symptoms among a sample of incarcerated adolescent females. *J Adolesc Health.* 1999; 24(1): 21–7.
17. Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, Schootman M, Cottler LB, Bierut LJ. Associations between multiple pregnancies and health risk behaviors among U.S. adolescents. *J Adolesc Health.* 2010; 47(6): 600–3.
18. OJJDP. *Statistical briefing book: Office of Juvenile Justice and Delinquency Prevention.* Pittsburgh, PA: National Center for Juvenile Justice; 2011.
19. Khurana A, Cooksey EC, Gavazzi SM. Juvenile delinquency and teenage pregnancy: a comparison of ecological risk profiles among Midwestern and White and Black female juvenile offenders. *Psychol Women Q.* 2011; 35(2): 282–92.
20. Lang DL, Rieckmann T, Diclemente RJ, Crosby RA, Brown LK, Donenberg GR. Multi-level factors associated with pregnancy among urban adolescent women seeking psychological services. *J Urban Health.* 2012; 90(2): 212–23.
21. Haley N, Roy E, Leclerc P, Boudreau J-F, Boivin J-F. Characteristics of adolescent street youth with a history of pregnancy. *N Am Soc Pediatr Adolesc Gynecol.* 2004; 17: 313–20.
22. Zapata LB, Kissin DM, Robbins CL, et al. Multi-city assessment of lifetime pregnancy involvement among street youth, Ukraine. *J Urban Health.* 2011; 88: 779–92.
23. Woodward LJ, Fergusson DM. Early conduct problems and later risk of teenage pregnancy in girls. *Dev Psychopathol.* 1999; 11(1): 127–41.
24. DiClemente RJ, Davis TL, Swartzendruber A, et al. Efficacy of an HIV/STI sexual risk-reduction intervention for African American adolescent girls in juvenile detention centers: a randomized controlled trial. *Women Health.* 2014; 54: 726–49.

25. Thompson SJ, Bender KA, Lewis CM, Watkins R. Runaway and pregnant: risk factors associated with pregnancy in a national sample of runaway/homeless female adolescents. *J Adolesc Health*. 2008; 43: 125–32.
26. Miller E, Decker MR, McCauley HL, et al. Pregnancy coercion, intimate partner violence and unintended pregnancy. *Contraception*. 2010; 81: 316–22.
27. Santor DA, Coyne JC. Shortening the CES-D to improve its ability to detect cases of depression. *Psychol Assess*. 1997; 9(3): 223–43.
28. Foa EB, Riggs DS, Dancu CV, Rothbaum BO. Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *J Trauma Stress*. 1998; 6(4): 459–73.
29. Hosmer DW, Lemeshow SL. *Applied logistic regression*. New York: Wiley; 2000.
30. Adams JA, East PL. Past physical abuse is significantly correlated with pregnancy as an adolescent. *J Pediatr Adolesc Gynecol*. 1999; 12: 133–8.
31. Madigan S, Wade M, RTarabulsy G, Jenkins JM, Shouldice M. Association between abuse history and adolescent pregnancy: a meta-analysis. *J Adolesc Health*. 2014; 55: 151–9.
32. Blinn-Pike L, Berger T, Dixon D, Kuschel D, Kaplan M. Is there a causal link between maltreatment and adolescent pregnancy? A literature review. *Perspect Sex Reprod Health*. 2002; 34: 68–75.
33. Boden JM, Horwood LJ. Self-esteem, risky sexual behavior, and pregnancy in a New Zealand birth cohort. *Arch Sex Behav*. 2006; 35: 549–60.
34. Woodward L, Fergusson DM, Horwood LJ. Risk factors and life processes associated with teenage pregnancy: results of a prospective study from birth to 20 years. *J Marriage Fam*. 2001; 63: 1170–84.
35. Kerr DCR, Leve LD, Chamberlain P. Pregnancy rates among juvenile justice girls in two RCTs of multidimensional treatment foster care. *J Consult Clin Psychol*. 2009; 77(3): 588–93.