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Prevalence and Determinants of Adolescent Pregnancy in Urban, Disadvantaged Settings across Five Cities

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Abstract

Background—The impact of pregnancy on the health and livelihood of adolescents aged 15–19 is substantial. This study explored sociodemographic, behavioral and environmental-level factors associated with adolescent pregnancy across 5 urban disadvantaged settings.

Methods—The Well Being of Adolescents in Vulnerable Environments study used Respondent Driven Sampling (RDS) to recruit males and females from Baltimore (456), Johannesburg (496), Ibadan (449), Delhi (500) and Shanghai(438). RDS-II and post-stratification age weights were used to explore the odds associated with “ever had sex” and “ever pregnant”; adjusted odds of pregnancy and 95% CI were developed by site and gender.

Results—Among the sexually experienced, pregnancy was most common in Baltimore (females 53%, males 25%) and Johannesburg (females 29%, males 22%). Heterosexual experience and therefore pregnancy were rare in Ibadan, Delhi and Shanghai. Current schooling and condom use at first sex decreased the odds of pregnancy among females in Baltimore and Johannesburg participants. Factors associated with higher odds of pregnancy were: early sexual debut (Johannesburg participants, Baltimore females) being raised by someone other than 2 parents (Johannesburg females); alcohol use and binge drinking in the past month (Baltimore participants); greater community violence and poor physical environment (Baltimore males, Johannesburg participants).

Conclusions—The reported prevalence of adolescent pregnancy varies substantially across similarly economically disadvantaged urban settings. These differences are related to large differences in sexual experience, which may be underreported, as well as differences in environmental contexts. Pregnancy risk needs to be understood within the specific context that adolescents reside, with particular attention to neighborhood-level factors.

Keywords

adolescent pregnancy; adolescent sexual activity; sexual risk behaviour; urban neighbourhood disadvantage; sexual debut; family structure; community violence; physical environment

Introduction

Annually, approximately 11% of all births globally occur to adolescents aged 15 to 19 years and 95% of these births occur in developing countries.[1] Adolescent pregnancies have a long lasting impact on the physical and mental health, education and livelihood of young women, men and their families.[2,3] The health impact of teen pregnancies is significant with increased risks of maternal death, illness and disability, including obstetric fistula, preterm delivery, complications of unsafe abortion, sexually transmitted infections, including HIV, and health risks to infants.[2] Early pregnancy has been shown to result in poor social, health and economic outcomes not only for young mothers and fathers[2] but for children of young mothers who typically have poorer educational achievement scores, worse socioemotional outcomes,[4,5] and adverse birth outcomes[1,6] compared to children of older mothers.

An ecological approach to adolescent pregnancy has been proposed to address the individual, environmental and structural correlates of adolescent pregnancy and birth.[7] Access to sexual and reproductive health services can be facilitated at the national, environmental and individual levels. Although studies have shown that poor run-down neighborhoods, and housing instability were associated with higher rates of STIs,[8–10] few have focused on how urban poverty specifically affects adolescent sexual and reproductive health outcomes. Many adolescents today are growing up in a context of rapid urbanization and migration in search of better opportunities, which when combined with underlying poverty and unstable housing, can exacerbate outcomes such as crime, alcohol, drug use and HIV and STIs. Recognizing the unique challenges of urban poverty is critical in order to contextualize the correlates of adolescent pregnancy in this environment and to combat the high sexual and reproductive health risks in this age group.

We have a unique opportunity to examine risk factors for pregnancy among adolescents in five different impoverished city settings where the same methodology was used to explore these domains. We are also able to examine differences by gender. Examination of factors that are similar as well as unique due to national and environmental differences will improve our understanding of the factors driving pregnancy among adolescents in disadvantaged, urban settings in different parts of the world.

Methods

The Well Being of Adolescents in Vulnerable Environments (WAVE) is a global study of adolescents aged 15 to 19 years living in disadvantaged, urban settings in Baltimore, (USA), Johannesburg (South Africa), Ibadan (Nigeria), Delhi (India) and Shanghai, China. All sites recruited approximately 500 adolescents from economically distressed urban settings and in addition, in Shanghai, the participants were migrant adolescents.

All 5 sites used Respondent Driven Sampling (RDS) to recruit participants due to the financial and logistical challenges of conducting population-based surveys in inner-city environments where high levels of migration and low housing stability make the sampling frame unknown (see Decker et. al in this volume for details of methodology). Seed respondents were recruited from diverse venues where adolescents congregate such as youth centers, theaters, parks and churches.. The recruited seed participants were then encouraged to recruit up to three additional eligible individuals from their peer networks. Coupons were distributed to seeds and successive waves of respondents to link participants back to their respective recruiters as well as identify their place in the recruitment chain. This continued until a sample size of 500 was reached in each site. Average network size (degree) was similar for males and females and there was a high gender homophily, indicating a preference for participants to recruit individuals of the same sex. Interviews were conducted using audio-computer assisted self interview (ACASI) with a standardized instrument using validated measures for items including sexual behavior, health seeking behavior, substance use, violence, gender power relations, and family structure. All instruments were administered in English and the local languages at each site (Delhi: Hindi, Ibadan: Yoruba, South Africa: IsiZulu and Sesotho, Shanghai: Mandarin).

Measures

The main outcome of the current study was “ever pregnant”, conceptualized as ever being pregnant (females) or gotten a partner pregnant (males). Pregnancy experience questions were restricted to those reporting that they ever had heterosexual intercourse. Questions on pregnancy outcomes were: ever abortion, whether a birth ever occurred, and number of children ever born.

Social and demographic measures: The age of participants was dichotomized into 15–16 years vs. 17–19 and treated as a continuous measure in the multivariate analysis. Participants were asked if they were currently in school and educational attainment was collapsed into four categories (<8th grade/primary school, some high school, completed high school, some tertiary education but no degree). Other factors assessed were: relative wealth (better than most, same as most, worse than most); family of origin (raised by two parents, including biological, step- or adoptive parents, one parent or by another person including grandmother, sister, other relative, other non-relative); housing stability assessed by whether participants had a regular place to stay, or if they stayed somewhere other than their regular place for more than three nights per week during the last 30 days.

Sexual and other risk measures: age at sexual debut was dichotomized as age 14 or younger vs. age 15 or above.[2] A categorical variable was used to assess number of lifetime sexual

partners (1, 2–4, 5 or more). Other sexual measures assessed were; ever sex with someone of the same gender; ever gave or received sex in exchange for money, shelter, food, drugs or other goods; and unwanted sex during (combined measure of ever being coerced or physically forced to have sex during last 12 months). Contraceptive use at first sex included any form of contraception and excluded condom use which was an additional binary measure to capture consistency of condom use during the last 12 months. Finally, alcohol use was measured both as binary variable (ever vs. never finished any alcoholic bevarage) and further conceptualized as alcohol use during the last 30 days (no drink, less than 5 drinks in a row, binge drinking which was 5 or more drinks in a row).

Environmental Factors: Three scales were used to capture the characteristics of the respondents' environment; physical environment scale with scores ranging from 0–24; perceived fear scale which ranged from 0 to 18 and observation of violence in the past year in one's neighborhood which ranged from 0 to 18 (see Mmari et. al in this volume for details of environment measures).

Statistical analyses

Data were imported into Stata v12.1 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.). RDSII estimators were derived using code developed by Schonlau and Liebau.[11]. All results were adjusted for cluster, RDS weights and post stratification weights for age. Both weighted and un-weighted estimates were calculated; however, only weighted proportions are reported. For more details on RDS and the effects of weighting, see Decker et al in the present volume.

Descriptive statistics were summarized for adolescent sexual and pregnancy experience among males and females by site. Bivariate associations were explored between the proportion ever pregnant and socio-demographic, behavioral, and environmental variables using Pearson's corrected chi-square. Means along with standard errors were calculated for each environmental-level scale. Because of the low prevalence of pregnancy and sexual activity in Ibadan, Delhi and Shanghai, an additional bivariate analysis was conducted to better understand the determinants of ever having had sex by site.

Multivariate logistic regression models were used to assess factors associated with pregnancy in Baltimore and Johannesburg. Model development was a multi-stage process in which variables were entered as three different clusters; model I included socio-demographic factors; model II added environmental factors; and in model III behavioral factors were included. The contribution of different factors within each cluster was explored using Akaike's Information Criterion (AIC), with the lowest AIC value guiding model fit. In this process, factors commonly associated in the literature with adolescent pregnancy (such as current schooling)[12,13] were retained despite not being significant in the bivariate analysis. The goal of model development was to find the best fit by gender and site; thus, four different models were developed adjusting for factors contributing specifically to each model. For all analyses the variable *lifetime sexual partners* was dropped because of large numbers of extreme outliers. All multivariate models among females were restricted to those not currently pregnant as currently pregnant women were less likely to drink alcohol confounding the relationship with alcohol use. Adjusted Odds Ratios (aOR) and associated

95% Confidence Intervals (CI) were then calculated separately for males and females by site.

Results

The final cleaned data set included 2,339 adolescents (Baltimore, N=456, Johannesburg, N=496, Ibadan, N=449, Delhi, N=500 and Shanghai, N=438). Marital status was not included in analyses as all males and 99.9% of females in our study were unmarried. Proportions reporting being sexually experienced ranged from 0.3–17% among female and male adolescents in Delhi to over 75–86% in Baltimore. The proportion ever pregnant ranged from 16% in Shanghai to 53% in Baltimore among sexually experienced females; among sexually experienced males reports of ever impregnating a partner ranged from 11% in Shanghai to 25% in Baltimore. Of females who were ever pregnant, one third reported ever having an induced abortion in Baltimore, 15% in Johannesburg, and 54% in Ibadan (albeit among very small numbers). Male reports of partners experiencing an abortion varied by site to 66% in Baltimore, 62% in Ibadan, 51% in Shanghai, and 45% in Johannesburg. Only three males in Delhi reported a partner having an abortion. The proportion of ever pregnant females reporting a birth ranged from 32% in Johannesburg to 56% in Baltimore; and among similar males, 4% in Delhi to 72% in Ibadan. There were no births reported by females in Shanghai and Delhi nor by males in Shanghai. Of females who reported a birth, most had one child and this was also true for males in Baltimore and Johannesburg as well (Tables 1a and 1b).

Among females in Ibadan and Shanghai, no single factor was associated with ever having (vaginal) sex in both sites, whereas alcohol use was the only factor associated with sexual experience among males in these two cities. Individual-level factors associated with sexual experience included older age (Ibadan participants, females in Shanghai), not being in school (Shanghai participants), and ever-use of alcohol (females in Ibadan, Delhi and all males). Being raised by a single parent or someone other than parents was associated with higher proportion reporting ever sex among males in Ibadan and Shanghai. Unstable housing was associated with a higher proportion of adolescents reporting ever sex among males in Ibadan and participants in Shanghai. Some environmental level factors were associated with a report of ever sex; observed violence in the community (males in Shanghai), perceived fear of being robbed or attacked (males in Shanghai) and poorer physical environment (females in Shanghai) (Tables 2a and b). Bivariate analysis with ever-sex was not possible in Delhi because of the low proportion reporting being sexually experienced.

Many of the characteristics associated with ever having sex among females in Baltimore and Johannesburg were also related to pregnancy and are described subsequently (See Tables 3a and 3b). The missing sections in these tables are for variables that are not possible to compare with ever-sex (age at first sex, number of sexual partners etc) since those participants have never had sex.

Table 4 summarizes the adjusted odds ratios of ever being pregnant among sexually experienced females and males in Baltimore and Johannesburg. Only variables that contributed to each site were included in each model by gender; thus, not all models

included the same variables. The grey areas therefore mean that these variables were not included in the model for that site and sex. Among females in Baltimore, the odds of ever being pregnant were higher with binge drinking (eg. 5 or more drinks in a row) compared to no drinks in the past month (aOR=4.4, CI: 3.52, 5.46). Factors decreasing the odds of pregnancy were currently being in school (aOR=0.1, CI: 0.01, 0.6) and using condoms at first sex (aOR=0.2, CI: 0.05, 0.98). Among females in Johannesburg, factors associated with pregnancy were being raised by a single parent (aOR=18.1, CI: 10.4, 31.5) or by others (aOR=5.7, CI: 1.4, 23.6) compared to being raised by two parents, if the female reported unstable housing (aOR=4.7, CI: 2.5, 8.92) or had a sexual debut at 14 years or younger (aOR=7.4, CI: 3.4, 15.9). The odds of ever being pregnant were also found to increase with more observed neighborhood violence (aOR=1.2, CI: 1.1, 1.3) and, although marginally significant, with greater perceived fear of being robbed or attacked (aOR=1.1, CI: 0.99, 1.1). Factors associated with diminished odds of a pregnancy among females in Johannesburg were currently being in school (aOR=0.1, CI: 0.01, 0.8), using condom at first sex (OR=0.2, CI: 0.08,0.44), and better perception of their physical environment (OR=0.9, CI: 0.8, 0.9).

Among sexually experienced males in Baltimore, the odds of a partner ever being pregnant were higher if they reported binge drinking in the past month (aOR 4.6, CI: 2.4, 9.1) or drinking any alcohol (aOR=2.7, CI: 1.7, 4.3) compared with males who reported no drinks in past month. The odds of impregnating a partner were also higher with more observed violence in the community (aOR=1.1, CI: 1.0, 1.1); and, although marginally significant, also with greater perceived fear of being robbed or attacked (aOR=1.1, CI: 1.0, 1.2). Finally, among sexually experienced males in Johannesburg, the odds of a partner ever being pregnant were higher for incremental increases in his age (aOR=1.5, CI: 1.2, 1.8), an early sexual debut (aOR=5.4, CI: 4.3, 6.7), and ever engaging in transactional sex (aOR=1.7, CI: 1.1, 2.7). Factors associated with decreased odds of a partner ever being pregnant were currently in school (aOR=0.4, CI: 0.4, 0.4), greater perceived fear of being robbed or attacked aOR=0.9, CI: 0.8, 0.9), and better perceived physical environment (aOR=0.9, CI: 0.9, 0.9).

Discussion

The goal of our study was to assess the prevalence of pregnancy and explore associated factors among adolescents across five, resource poor urban settings. Our results show that sexual and pregnancy experiences were highly prevalent among adolescents in Baltimore and Johannesburg – a finding that is consistent with the qualitative phase of the WAVE study.[14] Among Baltimore and Johannesburg participants, school was found to decrease the odds of sexual activity and pregnancy for both males and females, as was condom use at first sex. Some covariates of experiencing a pregnancy were early sexual debut (< 15 years), being raised by single parent or someone other than parent, alcohol use and binge drinking in the past month, and environmental factors such as greater violence in the community and lower scores for physical environment which correlated with unhygienic and crowded neighbourhood with no recreational spaces for adolescents.

In contrast, sexual experience and consequently also pregnancy was rare among adolescents in Ibadan, Delhi and Shanghai. This could be a result of the majority of participants being

unmarried, and possibly that premarital sex in these settings is relatively less common.[2] For example, the legal age at of marriage in China is 20 years for females and 22 years for males, making it unlikely that married adolescents would have been recruited for this study. So too, it is possible that some adolescents underreport premarital sexual activity.[15] In contrast, sexual experience and pregnancy more commonly occur outside the context of marriage in Baltimore and Johannesburg,[3,16,17] and hence the report of pregnancies in these settings was significantly higher. Furthermore, adolescents in Ibadan, Delhi and Shanghai who reported ever having sex were more likely than peers to report not being in school, being raised by a single parent or other adult, binge drinking, and perceiving higher levels of community violence and lack of safety. More research is needed to understand the true prevalence of sexual experience and pregnancy as well as unique vulnerabilities among unmarried adolescents in these settings.

Interestingly, despite varying sexual and pregnancy experiences, reported abortion proportions were high across settings although it is illegal. Almost 60% of unsafe abortions in Africa are among women younger than 25 years and a quarter are adolescents aged 15–19 which might potentially be at higher risk for morbidity and mortality from unsafe abortion.[18,19,19,20]

In our Baltimore sample, half of females (53% weighted) reported ever being pregnant, which is substantially higher than elsewhere in the country.[21] Similarly, in Johannesburg almost a third of the sexually active adolescent females reported a pregnancy (29% weighted), which is well above the South African adolescent pregnancy prevalence of about 12%.[3] Our findings confirm many of the determinants of adolescent pregnancy found in national level studies both in South Africa and the US: school dropout, being raised by a single parent, high levels of substance use, early sexual debut, lack of contraception at first sex and neighborhood crime and violence.[3,22–25]

Pregnancy experienced by a partner was reported by about a quarter of sexually experienced males in Baltimore and Johannesburg. Research has shown that the risk profile of young fathers is similar to adolescent mothers in that they have higher school dropout rates, lower school performance, come from low income households, are less likely to have the resources to support the child,[16] and have higher rates of unemployment and earning potential.[26,27] These conditions suggest that addressing early pregnancies among this population will require attention to both individual as well as contextual factors, with a focus on adolescent males and females.

Our finding that being in school was associated with lower odds of pregnancy is consistent with the literature on schooling as an important protective factor for delaying pregnancy, particularly among girls.[2,12,28,29] Studies have shown that girls who remain in school are less likely to engage in sexual activity and become pregnant[12,30] and if they do engage in sex, they are more likely to use condoms consistently.[7] However, in our study it is not possible to determine the direction of effects because of its cross-sectional nature. Those not in school may have dropped out as a consequence of getting pregnant.

Being raised by a single parent or by someone other than your parents appeared to have the most severe negative impact (higher odds of pregnancy) for females in Johannesburg. This is in line with family structure being a key risk factor for adolescent risk behaviours.[24] Both in the United States[25] and South Africa[3], studies have shown that growing up with an absent father is associated with elevated risk of early sexual activity and adolescent pregnancy.[23] The link between alcohol use and sexual risk behaviours is well documented,[31] and high-consumers of alcohol are seen as a critical target group for HIV as well as pregnancy prevention. In the current study, past month binge drinking was found to increase the odds of pregnancy among males and females in Baltimore, and interestingly the odds were also higher among males reporting any drinking in the past month. Studies in Baltimore have linked high-school drop-out to heavy drinking and highlighted the importance of including education completion as a critical component of alcohol treatment interventions.[32] In urban environments characterized by multiple disadvantages, substance use significantly increases the risk profile of adolescents, and often becomes both a cause as well as escape from the hardships imposed by urban poverty.

Early age of sexual debut was a significant determinant of pregnancy among both males and females in Johannesburg and males in Baltimore – a finding consistent with other studies[3,22] where sexual initiation at or before age 14 also has been correlated with lack of contraceptive use as well as higher rates of HIV and STIs.[33,34] Condom use at first sex significantly decreased the odds of a pregnancy among females in both Baltimore and Johannesburg. Given the high rates of HIV and STIs in both Baltimore[22] and Johannesburg[35], integration of HIV/STI and reproductive health services and tailoring these services to meet the needs of adolecents is critical.

Environmental factors have a significant impact on the health and well-being of adolescents.[36,37] In our study, higher levels of observed violence in the environment increased the odds of a pregnancy among females in Johannesburg and males in Baltimore. This is consistent with how neighbourhoods with higher levels of violence, crime and poverty have been shown to increase adolescent sexual risk behaviours.[36,38] Both Johannesburg and Baltimore are characterized by housing instability, densely populated neighbourhoods, abandoned buildings occupied illegally, unclean neighbourhoods, and few green and recreational spaces for adolescents. In the qualitative study[14] the piling up of trash, inadequate and crowded housing, lack of basic services such as water and electricity were major health concerns among adolescents. More research is thus needed to understand the impact of physical environment on adolescent pregnancy.

Limitations

Given the cross-sectional nature of our study, it was not possible to tease out the causality of some of the associations from our study. In addition, the length of the instrument precluded in-depth questioning. Since we used RDS to recruit our study participants relying on peer recruitment, most of the individuals in our sample were unmarried adolescents. This approach may have led to underestimations of the prevalence of sexual activity and pregnancy particularly among adolescents in Ibadan, New Delhi and Shanghai. Given the

low levels of reported sexual experience in Ibadan, New Delhi and Shanghai our study was underpowered to examine the differences in pregnancy outcomes across all the cities.

Implications and Contribution

Prevalence of sexual experience and adolescent pregnancy varies across settings and by gender. While our study found that some individual and environmental level factors were associated with adolescent pregnancy across sites, the influence of other factors was unique to certain settings. Being in school was strongly related to pregnancy in both Baltimore and Johannesburg, whereas alcohol use was significant only in Baltimore. On the other hand, being raised by a single parent, or living in an unstable housing situation were far more important correlates of pregnancy among females in Johannesburg. Among youth living in very impoverished neighbourhoods across the five cities, the adolescents showed varying levels of sexual and reproductive health needs suggesting that prevention approaches need to tailor their approaches to the unique needs of their targeted communities.

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TABLE 1

A. PREVALENCE OF PREGNANCY AND REPRODUCTIVE HISTORY: FEMALES*

	FEMALES				
	BALTIMORE N=193	**JOHANNESBURG N=224**	**IBADAN N=229**	**SHANGHAI N=216**	**NEW DELHI N=250**
	W% (U%, n)	**W% (U%, n)**	**W% (U%, n)**	**W% (U%, n)**	**W% (U%, n)**
EVER SEXUAL INTERCOURSE±	75.3 (67.4, 130/193)	55.5 (58.0, 130/224)	16.0 (13.5, 31/229)	8.4 (8.8, 19/216)	0.3 (1.2, 3/250)
EVER PREGNANT	52.9 (54.8, 53/130)	28.8 (19.2, 25/130)	24.1 (22.6, 7/31)	16.1 (15.8, 3/19)	52.2 (33.3, 1/3)
CURRENTLY PREGNANT	14.4 (17.0, 9/53)	31.6 (16.0, 4/25)	36.0 (42.9, 3/7)	84.0 (66.7, 2/3)	100.0 (100.0, 1/1)
EVER ABORTION	31.9 (43.4, 23/53)	14.6 (28.0, 7/25)	54.5 (57.1, 4/7)	16.0 (33.3, 1/3)	100.0 (100.0, 1/1)
EVER GAVE BIRTH	56.1 (43.4, 23/53)	32.5 (48.0, 12/25)	38.4 (28.6, 2/7)	--	--
# CHILDREN GAVE BIRTH TO					
1	94.0 (82.6 19/23)	99.4 (91.7, 11/12)	52.7 (50.0, 1/2)	--	--
2 or more	6.0 (17.4, 4/23)	0.6 (8.3, 1/12)	47.3 (50.0, 1/2)	--	--

B. PREVALENCE OF PREGNANCY AND REPRODUCTIVE HISTORY: MALES*

	MALES				
	BALTIMORE N=263	**JOHANNESBURG N=272**	**IBADAN N=220**	**SHANGHAI N=222**	**NEW DELHI N=250**
	W% (UW%, n)	**W% (UW%, n)**	**W% (UW%, n)**	**W% (UW%, n)**	**W% (UW%, n)**
EVER SEXUAL INTERCOURSE±	86.4 (84.4, 222/263)	69.2 (79.4, 216/272)	44.0 (39.1, 86/220)	25.5 (35.1, 78/222)	16.7 (15.6, 39/250)
PARTNER EVER PREGNANT	24.9 (28.3, 63/222)	22.2 (26.4, 57/216)	17.6 (12.8, 11/86)	10.7 (19.2, 15/78)	15.4 (15.4, 6/39)
PARTNER EVER ABORTION	65.7 (55.6, 35/63)	45.2 (50.9, 29/57)	62.3 (72.7, 8/11)	51.4 (60.0, 9/15)	9.3 (50.0, 3/6)
PARTNER EVER GAVE BIRTH	46.0 (36.5, 23/63)	32.8 (35.1, 20/57)	72.2 (63.6, 7/11)	--	3.6 (16.7, 1/6)
# OF CHILDREN					
1	77.2 (69.6, 16/23)	91.3 (80.0, 16/20)	5.6 (14.3, 1/7)	--	100.0 (100.0, 1/1)

B. PREVALENCE OF PREGNANCY AND REPRODUCTIVE HISTORY: MALES*

	MALES				
	BALTIMORE N=263	**JOHANNESBURG N=272**	**IBADAN N=220**	**SHANGHAI N=222**	**NEW DELHI N=250**
	W% (UW%, n)	**W% (UW%, n)**	**W% (UW%, n)**	**W% (UW%, n)**	**W% (UW%, n)**
2 or more	22.8 (30.4, 7/23)	8.7 (20.0, 4/20)	94.5 (85.7, 6/7)	--	--

Displaying weighted (W) proportions using cluster and combined RDS and age post-stratification weights, followed by unweighted (U) proportions and observations.

[±] Ever/never had heterosexual (vaginal) intercourse

[*] 99.9% of females were unmarried at time of survey.

[*] All males were unmarried at time of survey.

TABLE 2

A. CHARACTERISTICS OF FEMALES WHO REPORT HAVING HAD SEXUAL INTERCOURSE: IBADAN AND SHANGHAI

	EVER HAD SEX (FEMALES)			
	IBADAN N=229		SHANGHAI N=216	
	W%	UW n	W%	UW n
AGE				
15–16 years	8.5***	12/146	2.8***	4/65
17–19 years	25.0	19/83	11.7	15/151
EDUCATION LEVEL				
Less than 8th grade	9.3	2/36	11.4	3/34
Some high school	17.8	18/127	8.2	10/115
High school degree	16.2	10/53	4.9	4/59
Some college, no degree	20.3	1/13	11.2	2/8
CURRENTLY IN SCHOOL				
No	22.3	10/45	10.3*	13/149
Yes	15.0	21/184	5.2	6/67
RELATIVE WEALTH				
Better than most	14.1	12/114	2.3	1/10
Same as most	17.6	15/91	8.0	12/183
Worse than most	22.9	3/19	13.4	6/22
PERSON(S) RAISED BY[$]				
Two parents	15.6	21/161	8.9	17/181
One parent	31.4	4/19	--	--
Other	9.7	3/37	7.5	2/26
UNSTABLE HOUSING				
No	16.4	23/179	5.2*	13/194
Yes	17.2	8/47	33.4	6/22
EVER DRANK ALCOHOL				
No	13.4*	21/188	3.6	3/71
Yes	30.6	10/41	10.8	16/145
ALCOHOL USE PAST 30 DAYS[£]				
Did not drink last month	16.6***	3/19	4.3	2/50
< 5 drinks in a row last month	44.1	6/16	7.5	6/57
≥ 5 drinks in a row last month	77.0	1/2	25.9	8/37
PERCEIVED SAFETY IN ENVIRONMENT				
Safe	16.6	26/195	7.9	15/179
Unsafe	17.7	15/30	10.9	4/35
	Eversex – W mean (SE)		**Ever sex – W mean (SE)**	
	Yes	***No***	***Yes***	***No***

A. CHARACTERISTICS OF FEMALES WHO REPORT HAVING HAD SEXUAL INTERCOURSE: IBADAN AND SHANGHAI

	EVER HAD SEX (FEMALES)			
	IBADAN N=229		SHANGHAI N=216	
	W%	UW n	W%	UW n
PERCEIVED FEAR (scale)§	4.5 (1.29)	4.9 (0.31)	4.5 (0.04)	2.9 (0.38)
COMMUNITY VIOLENCE (scale)§	3.1 (0.35)	3.2 (0.61)	4.3 (0.39)*	2.6 (0.18)
PHYSICAL ENVIRONMENT (scale)§	13.9 (0.63)	15.1 (0.22)	7.9 (1.07)	9.5 (0.15)

B. CHARACTERISTICS OF MALES WHO REPORT HAVING HAD SEXUAL INTERCOURSE: IBADAN, NEW DELHI, SHANGHAI

	EVER HAD SEX (MALES)			
	IBADAN N=220		SHANGHAI N=222	
	W%	UW n	W%	UW n
AGE				
15–16 years	29.8**	34/121	21.9	13/62
17–19 years	53.2	52/99	28.9	65/160
EDUCATION LEVEL				
Less than 8th grade	72.1	11/17	45.0	28/61
Some high school	40.2	43/118	15.4	28/103
High school degree	38.8	27/72	21.8	19/51
Some college, no degree	36.3	5/13	39.7	3/7
CURRENTLY IN SCHOOL				
No	51.3	18/39	33.0*	68/164
Yes	40.1	67/180	1.6	10/58
RELATIVE WEALTH				
Better than most	48.1**	56/123	19.4	9/22
Same as most	33.7	27/83	23.0	55/172
Worse than most	19.4	1/9	48.5	14/27
PERSON(S) RAISED BY$				
Two parents	34.9**	52/159	20.3**	57/182
One parent	71.5	9/14	33.6	2/4
Other	54.2	20/40	46.8	13/25
UNSTABLE HOUSING				
No	37.6*	63/171	23.4*	56/166
Yes	47.0	23/48	34.6	22/56
EVER DRANK ALCOHOL				
No	33.8***	45/145	7.1**	9/46
Yes	58.7	41/75	31.9	69/179
ALCOHOL USE PAST 30 DAYS£				

B. CHARACTERISTICS OF MALES WHO REPORT HAVING HAD SEXUAL INTERCOURSE: IBADAN, NEW DELHI, SHANGHAI

	EVER HAD SEX (MALES)			
	IBADAN N=220		SHANGHAI N=222	
	W%	**UW n**	**W%**	**UW n**
Did not drink last month	51.6	18/39	19.0	12/39
< 5 drinks in a row last month	34.8	10/20	35.6	23/74
>5 drinks in a row last month	86.4	13/16	37.8	34/64
PERCEIVED SAFETY IN COMMUNITY				
Safe	41.9	74/192	24.5	62/182
Unsafe	45.8	12/27	30.9	16/40
	Ever sex – W mean (SE)		**Ever sex – W mean (SE)**	
	Yes	***No***	***Yes***	***No***
PERCEIVED FEAR (scale)§	4.3 (0.55)	3.9 (0.43)	5.0 (0.83)	4.44 (0.19)
COMMUNITY VIOLENCE (scale)§	4.0 (0.25)	3.4 (0.51)	5.3 (0.50)	3.6 (0.12)
PHYSICAL ENVIRONMENT (scale)§	12.6 (0.48)	13.5 (0.72)	11.4 (1.08)	9.7 (0.50)

Displaying weighted (W) row proportions using cluster and combined RDS and age post-stratification weights, followed by unweighted (U) observations by variable.

*** p<0.001,

** p<0.01,

* p<0.05.

Comparing ever vs. never had sex by characteristics (row percent).

Note: 99.9% of females were unmarried at time of survey.

Displaying weighted (W) row proportions using cluster and combined RDS and age post-stratification weights, followed by unweighted (U) observations by variable. The varaible unstably housed was excluded for Delhi.

Note: all males were unmarried at time of survey.

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TABLE 3

A. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG FEMALES

	EVER HAD SEXUAL INTERCOURSE				EVER PREGNANT			
	BALTIMORE N=193		JOHANNESBURG N=224		BALTIMORE N=130		JOHANNESBURG N=130	
	W%	UW n	W%	UW n	W%	UWn	W%	UW n
AGE								
15–16 years	62.0***	47/91	41.2***	21/53	34.8***	10/47	47.4*	6/21
17–19 years	82.1	83/102	69.7	109/171	62.0	43/83	18.4	19/109
EDUCATION LEVEL								
Less than 8th grade	51.2*	15/26	39.7*	6/15	61.7	9/15	11.6	1/6
Some high school	72.8	76/118	46.3	73/140	39.0	18/76	27.8	9/73
High school degree	82.8	37/46	85.9	29/36	84.6	26/37	40.2	9/29
Some college, no degree	94.6	2/3	70.6	22/33	0	0/0	20.5	6/22
CURRENTLY IN SCHOOL								
No	78.2	28/32	80.9*	9/12	72.3	19/28	35.2	4/9
Yes	71.4	101/160	54.4	121/211	45.7	33/101	28.2	21/121
RELATIVE WEALTH								
Better than most	78.4	35/54	72.9**	34/50	57.2	14/35	30.0	4/34
Same as most	70.4	83/124	51.8	84/154	50.6	34/83	28.5	17/84
Worse than most	64.5	11/13	57.6	12/20	27.1	5/11	28.1	4/12
PERSON(S) RAISED BY								
Two parents	72.0**	60/93	58.8	81/131	47.2	23/60	17.0*	11/81
One parent	84.3	31/45	61.6	13/22	59.8	12/31	51.7	5/13
Other	59.6	29/43	60.3	32/58	56.8	15/29	44.2	8/32
UNSTABLE HOUSING								
No	72.7	125/187	53.9	106/189	51.8***	51/125	20.5*	16/106
Yes	94.1	5/6	65.1	24/35	14.2	2/5	61.9	9/24
EVER USED ALCOHOL								

A. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG FEMALES

	EVER HAD SEXUAL INTERCOURSE				EVER PREGNANT			
	BALTIMORE N=193		JOHANNESBURG N=224		BALTIMORE N=130		JOHANNESBURG N=130	
	W%	UW n	W%	UW n	W%	UWn	W%	UW n
No	58.6***	50/97	37.9***	37/83	42.8*	22/50	12.0**	4/37
Yes	85.5	80/96	66.1	93/141	56.6	31/80	34.3	21/93
ALCOHOL USE PAST 30 DAYS£								
Did not drink	87.6	34/42	59.5	31/54	54.0±	10/32	19.1	4/30
< 5 drinks in a row	77.7	27/32	74.6	32/49	35.9	12/27	31.1	4/29
>5 drinks in a row	91.6	18/20	62.4	30/38	73.7	18/16	26.6	9/30
AGE FIRST SEX								
15 years or older					45.0**	29/77	22.6*	17/114
14 years or younger					61.3	24/53	57.0	8/16
LIFETIME SEXUAL PARTNERS								
1					20.8**	9/30	30.5*	6/59
2–4					42.6	11/47	21.3	10/55
≥ 5					72.4	29/45	60.2	9/16
EVER SAME SEX PARTNER								
No					45.3	32/90	29.4	21/114
Yes					66.4	21/39	22.6	4/16
EVER TRANSACTIONAL SEX								
No					48.3±	46/121	27.4*	20/121
Yes					82.9	7/9	50.2	5/9
UNWANTED SEX PAST YEAR								
No					49.2	43/114	29.0	20/109
Yes					75.5	10/15	28.7	5/21
ANY CONTRACEPTION AT FIRST SEX±								
No					72.4***	16/30	52.8*	7/19
Yes					50.0	37/99	20.9	18/111

A. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG FEMALES

	EVER HAD SEXUAL INTERCOURSE				EVER PREGNANT			
	BALTIMORE N=193		JOHANNESBURG N=224		BALTIMORE N=130		JOHANNESBURG N=130	
	W%	UW n	W%	UW n	W%	UWn	W%	UW n
CONDOM AT FIRST SEX								
No					75.3***	16/29	57.1*	8/23
Yes					48.9	36/95	20.1	16/105
OTHER CONTRACEPTION AT FIRST SEX±±								
No					49.8	37/91	31.5	18/88
Yes					57.9	16/37	23.2	6/35
ALWAYS USE CONDOMS								
No					55.6*	35/81	43.4**	19/57
Yes					27.1	9/28	5.2	3/46
PERCEIVED SAFETY IN ENVIRONMENT								
Safe	67.9**	68/118	57.6	62/113	51.2	25/68	28.8	11/62
Unsafe	82.7	62/75	53.8	68/111	51.5	28/62	28.7	14/68
	Ever had sexual intercourse - W Mean (SE)				**Ever pregnant - W Mean (SE)**			
	Yes	***No***	***Yes***	***No***	***Yes***	***No***	***Yes***	***No***
PERCEIVED FEAR (scale)§	5.5 (0.6)	5.0 (0.4)	6.4 (0.33)	6.6 (0.18)	5.7 (0.73)	5.3 (1.0)	7.9 (0.86)**	6.1 (0.11)
COMMUNITY VIOLENCE (scale)§	6.56 (0.60)	5.4 (0.30)	7.2 (0.21)	6.8 (0.39)	6.5 (0.69)	6.6 (0.66)	8.9 (0.74)***	6.5 (0.28)
PHYSICAL ENVIRONMENT (scale)§	11.3 (0.44)**	15.0 (0.43)	12.6 (0.40)	13.1 (0.51)	10.3 (0.50)**	12.4 (0.76)	8.6 (1.05)**	14.2 (0.42)

B. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG MALES

	EVER HETEROSEXUAL INTERCOURSE				PARTNER EVER PREGNANT			
	BALTIMORE N=263		JOHANNESBURG N=272		BALTIMORE N=222		JOHANNESBURG N=216	
	W%	UW n	W%	UW n	W%	UW n	W%	UW n
AGE								
15–16 years	77.8*	127/161	54.0**	47/70	12.5*	24/127	15.8	8/47
17–19 years	94.3	95/102	82.3	169/202	36.0	39/95	27.0	49/169
EDUCATION LEVEL								
Less than 8th grade	68.2	38/55	26.9*	10/22)	25.9	8/38	18.9	3/10
Some high school	92.0	141/160	74.8	147/177	27.1	39/141	25.8	43/147
High school degree	85.6	36/41	84.9	37/42	27.1	14/36	17.1	7/37
Some college, no degree	100.0	7/7	57.6	22/31	28.9	2/7	15.2	4/22
CURRENTLY IN SCHOOL								
No	96.8	34/35	88.8***	69/76	41.9***	47/188	28.9	32/146
Yes	84.9	188/228	61.2	146/195	23.1	16/34	19.5	25/69
RELATIVE WEALTH								
Better than most	84.9	84/100	54.1	45/60	18.3*	17/84	11.6	7/45
Same as most	89.6	118/138	70.0	150/188	30.7	39/118	23.6	42/150
Worse than most	86.5	13/16	86.0	21/24	47.6	5/13	32.4	8/21
PERSON(S) RAISED BY$								
Two parents	86.8	92/113	68.4	108/139	22.6	23/92	17.8	23/108
One parent	87.0	50/60	63.1	21/26	32.7	14/50	29.5	6/21
Other	88.7	60/66	68.1	77/94	28.4	19/60	24.1	24/77
UNSTABLE HOUSING								
No	88.7	201/234	68.5	168/212	25.3	53/201	20.7	40/168
Yes	94.6	21/24	64.7	48/60	44.3	10/21	27.3	17/48
EVER USED ALCOHOL								
No	84.8	110/136	46.7*	28/56	21.8	23/110	23.2	6/28
Yes	89.2	112/127	75.7	188/216	31.3	40/112	18.7	51/188
ALCOHOL USE PAST 30 DAYS£								

B. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG MALES

	EVER HETEROSEXUAL INTERCOURSE				PARTNER EVER PREGNANT			
	BALTIMORE N=263		JOHANNESBURG N=272		BALTIMORE N=222		JOHANNESBURG N=216	
	W%	UW n	W%	UW n	W%	UW n	W%	UW n
Did not drink	95.4	49/54	48.6*	33/47	20.6*	10/49	13.5**	6/33
< 5 drinks in a row	83.0	30/34	82.6	71/78	37.6	12/30	14.8	14/71
>5 drinks in a row	88.2	30/33	89.7	84/91	48.3	18/30	33.3	31/84
AGE FIRST SEX								
15 years or older					16.9***	9/41	12.1***	23/123
14 years or younger					30.9	56/181	34.7	34/93
LIFETIME SEXUAL PARTNERS								
1					10.2*	3/13	16.4*	2/16
2–4					10.3	5/24	3.6	7/65
≥ 5					29.2	41/147	30.4	38/116
EVER SAME SEX PARTNER								
No					27.3	56/203	21.5	53/202
Yes					37.1	7/13	31.0	4/14
EVER TRANSACTIONAL SEX								
No					27.3	54/196	17.7*	38/169
Yes					28.9	9/23	42.1	19/47
UNWANTED SEX PAST YEAR								
Yes					23.7	11/26	31.4	17/50
No					28.5	52/192	18.9	40/166
ANY CONTRACEPTION AT FIRST SEX±								
No					29.6	16/60	22.7	23/76
Yes					23.8	41/151	22.6	33/136
CONDOM AT FIRST SEX								
No					40.7±	21/63	19.0	26/81
Yes					21.5	36/145	23.8	29/127
OTHER CONTRACEPTION AT FIRST SEX±±								

B. SEXUAL EXPERIENCE AND PREGNANCY BY KEY SOCIODEMOGRAPHIC, NEIGHBORHOOD AND BEHAVIORAL CHARACTERISTICS: BALTIMORE AND JOHANNESBURG MALES

	EVER HETEROSEXUAL INTERCOURSE				PARTNER EVER PREGNANT			
	BALTIMORE N=263		JOHANNESBURG N=272		BALTIMORE N=222		JOHANNESBURG N=216	
	W%	UW n	W%	UW n	W%	UW n	W%	UW n
No					27.5	37/142	19.1	34/147
Yes					30.8	18/47	33.7	18/41
ALWAYS USE CONDOMS								
No					36.7±	49/133	31.9**	35/107
Yes					21.5	12/58	22.8	16/49
PERCEIVED SAFETY IN ENVIRONMENT								
Safe	84.4***	117/146	71.9	105/138	23.4±	31/117	16.7	25/105
Unsafe	90.9	103/113	64.1	110/133	31.8	31/103	27.3	32/110
	Ever had sexual intercourse - W Mean (SE)				**Partner ever pregnant - W Mean (SE)**			
	Yes	***No***	***Yes***	***No***	***Yes***	***No***	***Yes***	***No***
PERCEIVED FEAR (scale)§	3.1 (0.14)*	3.8 (0.25)	4.9 (0.30)	6.2 (0.75)	4.9 (0.22)*	2.4 (0.34)	3.2 (0.05)***	5.4 (0.32)
COMMUNITY VIOLENCE (scale)§	7.3 (0.32)***	5.2 (0.18)	9.1 (0.24)	8.3 (1.13)	9.8 (0.43)**	6.3 (0.39)	9.4 (0.64)	9.0 (0.30)
PHYSICAL ENVIRONMENT (scale)§	11.4 (0.55)*	14.4 (0.99)	10.4 (0.31)	10.6 (1.43)	9.4 (1.26)	12.1(0.53)	7.7 (0.27)***	11.1 (0.30)

Displaying weighted (W) row proportions using cluster and combined RDS and age post-stratification weights, followed by unweighted (U) observations by variable.

*** p<0.001,

** p<0.01,

* p<0.05 ± p<0.1.

Using Pearson's corrected Chi Square test to compare the proportion ever-sex vs. never-sex (columns 1–2) and ever-pregnant vs. never-pregnant (columns 3–4) by characteristics (row percent).

Note: majority of sample unmarried (>98%).

£ Excluding currently pregnant females because the prevalence of drinking could be affected by being pregnant.

££ Age at first sex calculcated through survival analysis; differences determined by log-rank test

$ Before you were 15, who was the primary woman/man who raised you? Biological vs. none or other female/male figure

[§] Neighborhood fear (0–18): higher score = more fear of moving around; Physical environment (0–24): higher score = better physical environment; Neighborhood violence (0–24): higher score = more violence observed

[±] Condom or any other method for pregnancy prevention (Did you use something other than a condom to prevent pregnancy that last time, like birth control pills or something else (i.e. morning-after-pill, emergency contraceptives, patches, withdrawal, rhythm, injection, creams/suppository/jelly)?

[±±] Any other method than condom for pregnancy prevention

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TABLE 4

ADJUSTED PREVALENCE ODDS RATIO OF PREGNANCY FOR SELECTED FACTORS: BY GENDER AND SITE

	BALTIMORE FEMALES N=71		JOHANNESBURG FEMALES N=96		BALTIMORE MALES N=96		JOHANNESBURG MALES N=137	
	aOR±	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
AGE (cont.)	1.2	0.87, 1.62	1.1	0.59, 1.73	1.2	0.77, 1.77	**1.5****	1.25, 1.77
CURRENTLY IN SCHOOL	**0.1***	0.01, 0.59	**0.1***	0.01, 0.79	0.8	0.22, 2.92	**0.4*****	0.37, 0.44
Ref: not in school								
RAISED BY ONE PARENT			**18.1*****	10.37, 31.53				
RAISED BY OTHER ADULTS			**5.7***	1.36, 23.67				
Ref: raised by two parents								
UNSTABLE HOUSING			**4.7****	2.47, 8.92				
Ref: Stable housing								
< 5 DRINKS IN A ROW PAST 30 DAYS	0.2	0.03, 1.00			2.7**	1.68, 4.26	0.8	0.49, 1.16
≥ 5 DRINKS IN A ROW PAST 30 DAYS	**4.4*****	3.52, 5.46			**4.6****	2.38, 9.09	1.0	0.77, 1.18
Ref: no drink past 30 days								
EARLY SEXUAL DEBUT (<15)	1.3	0.46, 3.51	**7.4****	3.39, 15.93	**1.4****	1,12, 1.65	**5.4*****	4.34, 6.69
Ref: first sex age 15 or above								
EVER TRANSACTIONAL SEX							**1.7***	1.08, 2.74
Ref: never transactional sex								
CONDOM AT FIRST SEX	**0.2***	0.05, 0.98	**0.2****	0.08, 0.44	0.7	0.11 4.27		
Ref: No condom at first sex								
ALWAYS USE CONDOMS			0.6	0.15, 2.09			1.3	0.90, 1.88
Ref: do not always use condoms								
PERCEIVED FEAR (*scale*)§			1.1	0.99, 1.14	1.1	0.97, 1.2	**0.9*****	0.83, 0.89
COMMUNITY VIOLENCE (*scale*)§			**1.2****	1.12, 1.26	**1.1***	1.02, 1.12		
PHYSICAL ENVIRONMENT (*scale*)§	1.0	0.86, 1.06	**0.9***	0.78, 0.95			**0.9*****	0.88, 0.94

*** p<0.001,

** p<0.01,

* p<0.05.

Note: ever pregnant does not include females currently pregnant. aOR=adjusted Odds Ratio.

§ Neighborhood fear: higher score = more fear of moving around Neighborhood violence (0–24): higher score = more violence observed; Physical environment (0–24): higher score = better physical environment;

± aOR=Adjusted Odds Ratio