Prevalence of sexually transmitted diseases in juvenile prostitutes and street youth

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AC ROUGET, JK MAH, RA LANG, JR JOFFRES. Prevalence of sexually transmitted diseases in juvenile prostitutes and street youth. Can J Infect Dis 1994;5(1):21-27. Four groups of adolescents – 35 juvenile prostitutes, 36 street youth, 31 monogamous sexually active adolescents and 35 non-sexually active adolescents – were studied between January 1, 1988 and December 31, 1988 for the presence of sexually transmitted diseases and other genital pathogens. The high prevalence of sexually transmitted diseases found in the juvenile prostitutes (*Neisseria gonorrhoeae*, 49%; *Chlamydia trachomatis*, 83%) is in contrast to other studies, which document much lower rates of infection. This could be due to the fact that there are few studies done on juvenile prostitutes as a well defined group. Despite high risk sexual behaviour, the consistent use of contraception was low. No contraceptives were used by 57% of the juvenile prostitutes and 85% of the street youth. None of the adolescents sought medical attention although 48% of the juvenile prostitutes and 53% of the street youth had genital symptoms. It appears that the present public health education and health care delivery do not reach this high risk population.

Key Words: Adolescents, Juvenile prostitutes, Sexually transmitted diseases, Street youth

Prévalence des maladies transmissibles sexuellement chez les jeunes prostitué(e)s et itinérant(e)s.

RÉSUMÉ: Quatre groupes d'adolescent(e)s, trente-cinq jeunes prostitué(e)s, trente-six jeunes de la rue, trente-et-un jeunes actifs sexuellement et monogames, et trente-cinq adolescent(e)s non actifs sexuellement ont été étudié(e)s entre le 1^{er} janvier 1988 et le 31 décembre 1988 pour ce qui est des maladies transmissibles sexuellement et autres pathogènes génitaux. La prévalence élevée des maladies transmissibles sexuellement observée parmi les prostitué(e)s juvéniles (*Neisseria gonorrhoeae*, 49%; *Chlamydia trachomatis*, 83%) contraste avec d'autres études qui font état d'un taux beaucoup moindre d'infection. Cela pourrait être attribuable au fait qu'il y a peu d'études sur les prostitué(e)s juvéniles en tant que groupe bien défini. Malgré le comportement sexuel à risque élevé, l'emploi constant de mesures contraceptives s'est révélé peu répandu. Aucun contraceptif n'a été utilisé par 57% des prostitué(e)s juvéniles et 85% des jeunes itinérant(e)s. Aucun de ces adolescents n'a consulté un médecin, bien que 48% des prostitué(e)s juvéniles et 53% des jeunes de la rue aient présenté des symptômes génitaux. Il semble que les programmes d'éducation en matière de santé publique et que les programmes sanitaires n'atteignent pas cette population à risque élevé.

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SEXUALLY TRANSMITTED DISEASES HAVE BECOME AN IN-creasing concern to health care professionals working with adolescents. In 1986 over 900,000 cases of gonorrhoea infections were reported in the United States (1) and about 40,000 in Canada (2). In Canada sexually transmitted diseases represented 55.4% of all notifiable diseases for 1986. The second highest incidence of reported sexually transmitted diseases was in female adolescents aged 14 to 19 years (2). Gonococcal infections accounted for 94% of all notified sexually transmitted diseases in 1986. Chlamydial infection reports in Canada have increased fivefold since 1980. Cases in youths 15 to 19 years of age increased by 26%. Females aged 15 to 25 years accounted for 44% of all reports (2). The total rate of gonococcal infections for the United States in 1991 was 249.5 per 100,000 population (3,4). In Canada, the rate for gonococcal infections for females aged 15 to 19 years in 1989 has dropped by a small extent to 337.6 per 100,000 population (3,4). Factors considered to predict the risk of sexually transmitted diseases include age, race, number of sexual partners, frequency of sexual intercourse, previous history of sexually transmitted diseases and methods of contraception (6,7). There is scant information regarding prevalence of sexually transmitted diseases and other genital pathogens in juvenile prostitutes in Canada. It was felt it was important to study this population as a homogeneous group rather than looking at the incidence of sexually transmitted diseases in a given age group representing a cross section of population. Another purpose of the study was to gather information regarding contraception use, as well as drug and alcohol use and the use of health care facilities.

STUDY POPULATION

This study was undertaken over a 12-month period, from January 1, 1988 to December 31, 1988 to determine the prevalence of sexually transmitted diseases in four female adolescent groups. Female adolescents involuntarily admitted for the first time to the Yellowhead Youth Centre (Edmonton, Regional Services for Northern Alberta, Department of Social Services) agreed to participate in the study. These participants included 35 juvenile prostitutes and 36 street youth. The adolescents were admitted because of prostitution, antisocial behaviour, family dysfunction and/or severe emotional disturbance. Thirty-one sexually active female adolescents and 35 non-sexually active female adolescents seen at the University of Alberta Hospitals Adolescent Clinic also participated. To assess the impact of multiple sexual partners on the incidence of sexually transmitted diseases, participants were divided into four groups according to predefined criteria.

Group 1, 35 adolescent prostitutes, acknowledged accepting payment for sexual services. Before admission they resided outside of the family home. These

participants reported more than 10 sexual partners per week during the month before admission to the Yellowhead Youth Centre. Group 2, 36 street youths, were adolescents residing outside the family home with no fixed address and no adult supervision. They denied providing sexual services for payment and reported five or fewer partners per week in the month before admission. Group 3, 31 sexually active adolescents, sought check-up and birth control measures at the University of Alberta Adolescent Clinic. They were all attending school and living at home. The adolescents were in a monogamous relationship with a male peer and had only one sexual partner the previous month. Group 4, 35 non-sexually active adolescents, were seen at the clinic for a routine check-up with no specific genital complaints and were not interested in contraception measures. Adolescents on antibiotics within two months before the study were excluded from participation in the study.

Six patients were excluded from group 1 since they had received treatment for sexually transmitted disease just before admission. Five patients were excluded from group 2 for the same reason. Eight patients were excluded from group 3, and 10 patients were excluded from group 4. All patients excluded from groups 3 and 4 were taking antibiotics for acne therapy.

METHODS

The medical history and the physical examination were performed by one of the investigators for all the participants in the study. Personal information was obtained using a structured interview. The physical examination included a general medical examination and pelvic examination; sexual development was measured using the Tanner score. Pelvic examination included speculum examination of the vagina and cervix and a bimanual examination of the uterus and adnexa. Routine cultures for sexually transmitted diseases were taken for all adolescents at the time of admission to the Yellowhead Youth Centre and transported in the appropriate media to the University of Alberta Hospitals Laboratories at the end of each clinic. Cultures reached the laboratory within approximately 2 h of obtaining the specimens. The Yellowhead Youth Centre is 15 km from the University of Alberta Hospitals. Cultures for the control groups were obtained at the University of Alberta Adolescent Clinic at the time of examination. All cultures were performed by the University of Alberta Hospitals Laboratory Medicine, Department of Microbiology, and all Papanicolaou smears were interpreted by the University of Alberta Hospitals Cytology Laboratory. All specimens were processed by code, so the technician was not aware of the source of the specimen. The laboratory procedures for detection of sexually transmitted diseases were done according to a standard protocol. Vaginal specimens were taken for beta hemolytic streptococcus, *Gardnerella vaginalis*, *Can-*

TABLE 1
Study population information obtained from interviews and physical examination

Variables	Group 1 (n=35)	Group 2 (n=36)	Group 3 (n=31)	Group 4 (n=35)
Mean age (years)	14.7	14.2	14.8	14.6
Number of sexual partners	> 10/week	2 - 5/week	1/month	None
Timing of first intercourse	> 2 years	> 2 years	< 1 year	None
Ethnicity (number)				
Native	13	13	6	1
Caucasia	22	23	25	32
Other	0	0	0	2
Vaginal discharge duration > 1 month (%)	17	69	3	0
Illicit drug use (%)	100	100	0	0
Sexually abused (%)	43	25	0	0
Alcohol use (%)	100	100	40	40
Birth control (%)				
None	57	75	42	0
Condoms	17	17	16	0
Oral contraceptives	26	08	42	0
Other	0	0	0	0
Tanner score	4	4	4	4
School attendance before admission (%)	0	0	100	100
Level of education (%)				
Grade 6	100	100	100	100
Grade 8	0	0	90	74
Grade 9	0	0	10	26
Parents with postsecondary education (%)	0	0	93.5	97

Group 1 Juvenile prostitutes; Group 2 Street youth; Group 3 Monogamous sexually active adolescents; Group 4 Non-sexually active adolescents

didia albicans, *Trichomonas vaginalis*, *Mycoplasma hominis*, and *Ureaplasma urealyticum*. Endocervical specimens were taken for *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. A smear and Gram's stain of vaginal secretions were done in all patients. An aliquot of blood was obtained for routine serological testing for syphilis. Cultures were taken for herpes simplex vaginalis virus only when clinically indicated by the presence of lesion(s). Papanicolaou smears were obtained by scraping the endocervix with a wooden spatula, spreading the cells on a glass slide, spraying with aerosol cytofixative, and then transporting them to the University of Alberta Hospitals Cytology Laboratory for standard staining.

The χ^2 test statistic or Fisher's exact test were used for comparisons between groups. A P value of 0.05 was used for all comparisons. Analysis of variance was used to compare means across groups.

RESULTS

One hundred and thirty-seven adolescent females were included in the analysis summarized in Table 1. The mean age was 14.5 years (SD=1.3, range 12 to 17 years). Although the mean age was 14.5 years in groups 1 and 2 (juvenile prostitutes and street youth) all of the patients had been sexually active for more than two years. These findings were in contrast to patients in group 3 (sexually active monogamous), adolescents who had all been sexually active for less than one year. Seventy-four per cent (102 of 137) of the participants

were caucasian while 24% (33 of 137) were native and 1% (two of 137) were of other ethnic origins. There was no significant difference among the groups with respect to age or sexual maturation as measured using the Tanner score. There was a significantly greater proportion of street youth and prostitutes of native origin than in the other groups ($P<0.001$). All the prostitutes and street youths in our study gave a history of illicit drug use; predominant drugs used were marijuana, hashish, cocaine and intravenous use of pentazocine and methylphenidate. These drugs were used daily. Illicit drug use was defined as the consistent use of any of the listed drugs. None of the patients living at home (group 3) or in the control group (group 4) gave a history of illicit drug use. Alcohol use was reported by all of the juvenile prostitutes and street youth; all reported alcohol consumption more than three times per week and were intoxicated three to five times in the month before admission. Alcohol was used by 40% of the adolescents in groups 3 and 4 in the month before the interview, but none reported intoxication.

Sexual and contraception histories: In group 1, all prostitutes reported having more than 10 sexual partners per week (range 12 to 48 partners). No contraceptive methods were used by 57% (20 of 35), 17% (six of 35) used condoms with their clients, and 26% (nine of 35) used oral contraceptives as a means of birth control, as indicated in Table 1. Group 2, street youths, reported having two to five sexual partners per week. Of those, 75% (27 of 36) used no contraception, 17% (six of 36)

TABLE 2

Sexually transmitted diseases in adolescents: Relationships between pathogens and sexual activity

Organism isolated	Group 1 (n=35)		Group 2 (n=36)		Group 3 (n=31)		Group 4 (n=35)		P1	P2
	Number	%	Number	%	Number	%	Number	%		
Beta hemolytic streptococcus	5	14	3	8	3	10	2	6	NS	NS
<i>Gardnerella vaginalis</i>	5	14	11	31	3	10	0	0	0.002	NS
Herpes simplex vaginalis	2	6	1	3	0	0	0	0	NS	NS
<i>Candida albicans</i>	0	0	2	6	0	0	0	0	NS	NS
<i>Trichomonas vaginalis</i>	10	29	3	8	0	0	0	0	<0.001	0.03
<i>Ureaplasma urealyticum</i>	33	94	30	83	20	65	11	31	<0.001	NS
<i>Mycoplasma hominis</i>	31	89	20	56	12	39	1	3	<0.001	0.003
<i>Neisseria gonorrhoeae</i>	17	49	2	6	0	0	0	0	<0.001	<0.001
<i>Chlamydia trachomatis</i>	29	83	3	8	1	3	0	0	<0.001	<0.001

Group 1 Juvenile prostitutes; Group 2 Street youth; Groups 3 Monogamous sexually active adolescents; Group 4 Non-sexually active adolescents; P1 P values comparing groups 1, 2, 3 and 4; P2 P values comparing groups 1 and 2; NS Not significant

used condoms, and 8% (three of 36) used oral contraceptives. It is of interest that the use of condoms in these two groups was never consistent. For group 3, sexually active adolescents with no more than one sexual partner for the month before participation in the study, no contraception was reported by 42% (13 of 31), 16% (five of 31) always used condoms and 42% (13 of 31) used oral contraceptives. In group 4, all participants denied a history of sexual activity and did not use any form of birth control measures. All participants in groups 1, 2 and 3 reported that sexual activity was heterosexual and denied homosexual activities.

Genitourinary symptoms: Vaginal discharge of at least one month's duration before admission was reported by 17% of prostitutes (six of 35), 69% of street youths (25 of 36), and 3% of sexually active adolescents in group 3 (one of 31) and none in group 4 (Table 1). Prostitutes and street youth had a significantly higher prevalence of vaginal discharge symptoms ($P < 0.001$) than the other sexually active monogamous and non-sexually active groups. The perception by the patients of having an unusual vaginal discharge was accurate for patients who complained of those symptoms (groups 1, 2 and 3) and was validated during pelvic examination. Genital pathogens were isolated in 34% of the prostitutes (12 of 35) who had no genital complaints, in 6% of the street youth (two of 36), and in none of the asymptomatic sexually active monogamous group.

Secondary amenorrhea: Pregnancy was diagnosed in two of the juvenile prostitutes. Both patients, despite having had secondary amenorrhea for 14 and 15 weeks, respectively, did not seek medical attention. Both of these patients had *N gonorrhoeae* and *C trachomatis* isolated. One of the patients also reported previous history of herpes genitalis.

Previous history of sexual abuse: A history of previous sexual abuse was reported by 43% of prostitutes (15 of 35) and 25% of street youths (nine of 36). Sexual abuse was not acknowledged in any of the adolescents in groups 3 and 4.

Educational attainment: All of the juvenile prostitutes and street youth (100%) had left school by the time of admission to Yellowhead Youth Centre. None of the participants of groups 1 and 2 attended school within one month of admission. All of them were at least two years behind in their education. Patients in groups 3 and 4 were not only attending school but their grade levels were appropriate for their chronological age (Table 1).

Parental education: The patients in groups 1 and 2 were significantly different from groups 3 and 4 in not knowing their parents' precise educational level, although they reported that none of their parents completed high school. These findings were in sharp contrast to patients in groups 3 and 4, in which 93.5% of parents of group 3 (29 of 31) and 97% of the parents in group 4 (34 of 35) completed postsecondary education.

Prevalence of sexually transmitted diseases (Table 2): *N gonorrhoeae* was found in 49% of juvenile prostitutes (group 1) (17 of 35) and in 6% of street youth (group 2) (two of 36). Patients in the monogamous sexual relationships (group 3) and in the non-sexually active group (group 4) had no *N gonorrhoeae* isolated. *C trachomatis* was found in 83% of juvenile prostitutes (group 1) (29 of 35) and in 8% of street youth (group 2) (three of 36). *C trachomatis* was found in only 3% of the monogamous sexually active group (one of 31). It was not isolated in any of the patients in group 4. Genital herpes simplex viral infection was reported in 6% of the juvenile prostitutes (two of 35) who had two to three previous episodes before admission to Yellowhead Youth Centre. The street youth group reported 3% (one of 36) having a previous episode of herpes genitalis. Viral cultures from these patients were negative for herpes genitalis at the time of physical examination. None of the adolescents in groups 3 and 4 reported having had herpes genitalis infections. Among the prostitutes, 49% (17 of 35) were positive for both *N gonorrhoeae* and *C trachomatis*. Serology for syphilis (by Venereal Disease Research Laboratory test) was negative for all groups of patients.

Other pathogens: Group B streptococci were isolated in patients in all four groups although higher percentages were found in the prostitutes (14% [five of 35]). In the street youth, it was present in 8% (three of 36) and in the monogamous sexually active adolescents in 10% (three of 31) and in 6% of the control group (two of 35). *G vaginalis* was also isolated in adolescents in groups 1, 2 and 3, but none in the control group. *G vaginalis* was cultured in 14% of the prostitutes (five of 35), in 31% of the street youth (11 of 36) and in 10% of the monogamous sexually active group (three of 31). The presence of clue cells in the vaginal smear was associated with a positive culture of *G vaginalis*. *C albicans* was found only among the street youth (6% [two of 36]).

T vaginalis was cultured in 29% of the prostitutes (10 of 35) and 8% (3) of the street youth (three of 36). It was not isolated in the monogamous sexually active and in the non-sexually active group. *U urealyticum* was found in all four groups. It was present in 94% of the prostitutes (33 of 35), 83% of the street youth (30 of 36), in 65% of the monogamous sexually active adolescents (20 of 31), and in 31% of the control group (11 of 35). *M hominis* was also isolated in the four groups. It was found in 89% of the prostitutes (31 of 35), 56% of the street youth (20 of 36), 39% of the monogamous sexually active adolescents (12 of 31), and in 3% of the non-sexually active patients (one of 35).

DISCUSSION

The present study supports previous research indicating that early onset of sexual activity increases the likelihood of high risk behaviour resulting in pregnancy and sexually transmitted diseases, and of drug use among juvenile prostitutes and street youth (6,7). Clearly, groups 1 and 2 were sexually active at a younger than average age (8). The proportion of natives found in groups 1 and 2 is also higher than that in the general population. A high percentage of lack of contraceptive use was found in the juvenile prostitutes (57%) and an even higher percentage among the street youth (75%). Of concern is that in the monogamous sexually active group, 42% did not use any kind of contraception despite being sexually active for more than six months. These findings are consistent with those of other researchers (9).

Consistent with the literature was the finding of a higher than average percentage of sexual abuse in juvenile prostitutes (10,11). It is of interest that there was no acknowledgement of sexual abuse among the monogamous sexually active adolescents. According to Canadian and North American literature it would be expected to be at a 15 to 25% prevalence (12,13). This difference might be explained by the small population sample studied. The educational attainment of patients in groups 1 and 2 is in keeping with the literature (6,7). The education of parents of high risk adolescents has been reported with similar findings to ours (6,7).

The role of *U urealyticum* and *M hominis* in causing pathological vaginal discharge or as a marker for sexual activity is controversial (14-16). Although *U urealyticum* and *M hominis* were found in 65% (20 of 31) and 39% (12 of 31), respectively, of the monogamous sexually active group, only 10% (3 of 31) had copious vaginal discharge and no evidence of mucopurulent cervicitis upon pelvic examination. Other researchers have found *U urealyticum* in 11 to 27% of prepuberal girls and *M hominis* in 6 to 11% (14,17,18). In our study, *U urealyticum* was found in 31% (11 of 35) and *M hominis* in 3% (one of 35) of the non-sexually active group. When these results were obtained these patients were seen again in order to further validate their history of virginity. All patients confirmed lack of sexual activity and/or sexual abuse experiences that they could recall.

There is limited information in Canada regarding sexually transmitted diseases in juvenile delinquents. The percentages of *N gonorrhoeae* and *C trachomatis* found in adolescent prostitutes in our study were very high compared with those found by Bell et al (19) or Hughes et al (20). The high prevalence of sexually transmitted diseases may be a reflection of an increased number of sexual partners and limited and inconsistent use of condoms used by clients of juvenile prostitutes. There is a significant statistical difference in the prevalence of sexually transmitted diseases isolated in the street youth, prostitutes and in the monogamous sexually active group. Our findings differ from the prevalence of *M trachomatis* and *N gonorrhoeae* found by other investigators (19-21,23,24). The prevalence of *C trachomatis* and *N gonorrhoeae* in adolescent females has been reported to range from 10 to 25% and from 3 to 12%, respectively (21). However, these researchers did not specify the number of sexual partners in their patients. Recent Canadian studies of street youth indicated a prevalence of sexually transmitted diseases of up to 40 to 50% (22). Bell et al (19) reported a similar prevalence of genital infections in juvenile prostitutes and a nonprostitute group. This finding is not in keeping with our study. Hughes et al (20) found one of the highest prevalences of *C trachomatis* in Canada in their 1986 study, yet the prevalence found in the present study is still higher. It is important to stress that the province of Alberta has the highest prevalence of *C trachomatis* and *N gonorrhoeae* compared with other provinces (25,26).

Regarding the risk and the perception of having a sexually transmitted disease, our findings are in keeping with a recent Canadian study (27) in which college students clearly demonstrated knowledge of sexually transmitted disease symptoms including acquired immunodeficiency syndrome (AIDS), but they did not necessarily translate this knowledge into safe sexual practice. Other researchers have found some encouraging behavioural changes associated with better knowledge and awareness, particularly about AIDS (28). The

long term consequences of sexually transmitted disease are significant to adolescents since they are just entering their reproductive years. Complications include pelvic inflammatory disease, ectopic pregnancy, spontaneous abortion, cervical intraepithelial neoplasm and neonatal mortality. One million American women suffer from an episode of pelvic inflammatory disease each year; 16 to 20% of the cases occur in teenagers (6,29).

Another surprising finding was that, in contrast to other studies (29), all participants had a normal Pap-nicolaou smear. In light of studies showing an association between early age of coitus and sexually transmitted diseases, and the susceptibility of cervical epithelial neoplasia, normal findings in our population are surprising. This may be a reflection of a relatively small sample size and/or of the young age of the population.

As to the association of symptoms such as unusual vaginal discharge and the isolation of pathogens, our findings are similar to other studies, although the percentages of asymptomatic patients was lower in our population (19). In group 1 only 51% were asymptomatic. Although 19% in groups 1 (17 of 35) and 2 (17 of 36) had symptoms, none of them sought medical attention. Our concerns are that despite universal health

care access in Canada, a high risk population is not using the present system of health care delivery. A proposal to send health care professionals into the street to recruit high risk youth for a complete medical examination and sexually transmitted disease screening should be contemplated. The cost for this type of health care delivery will be minimal in comparison with the human suffering and cost of the complications associated with sexually transmitted diseases (30,31).

This study may be limited by the relatively small number of participants. The reliability of participants' answers may also be questioned. The considerable psychosocial problems of adolescent prostitutes and street youth result in angry young women who may give inaccurate information to test the interviewer and the involuntary setting in which they find themselves. Similarly, the control group may omit information in the interview because of embarrassment when answering questions related to sexuality. It would appear that there is much to be learned by approaching this high risk group of adolescents. Since it is difficult to access a large number of juvenile prostitutes in a single setting, a multicentre study throughout the country would be desirable.

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