Sexually transmitted infections in adolescent girls

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SUMMARY Two hundred and ten adolescent girls in residential care with an age range of 12 to 16 years were screened for sexually transmitted infections. The incidences of infection with *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Trichomonas vaginalis* were 13.7%, 16.2%, and 16.0% respectively. Pelvic inflammatory disease was identified in 16.4% of those with *C trachomatis* or gonococcal infection. The high morbidity from sexually transmitted disease in these adolescent girls reinforces the need for screening similar at risk teenagers.

Introduction

Sexually transmitted diseases (STDs) occur commonly in sexually active young women. The incidence of individual STDs in adolescent girls attending an STD clinic in London was described by Forster *et al.*¹ They showed that in girls aged 15–19 the incidence of syphilis, gonorrhoea, infection with *Trichomonas vaginalis*, herpes simplex virus, and genital warts remained almost unchanged in the period 1972–82. Similar studies from the United States of America have shown that in this age group there is a high incidence of infection with *Chlamydia trachomatis* as well.^{2,3}

Since 1966 Leeds City Council has provided an observation and assessment centre for young teenage girls. The centre provides 20 places for girls aged up to 16 from the Yorkshire region who have committed offences and are awaiting legal proceedings at a court of law. It is particularly concerned with girls with identified behavioural problems who have been engaged in prostitution or who have been sexually abused. Girls are also admitted when made subject to an interim care order relating to irregular attendance at school. Screening for sexually transmitted infection is undertaken where appropriate as part of a general assessment.

We here report the prevalence of sexually transmitted infection in young girls in residential care in Leeds in 1978–85.

Patients and methods

We screened 210 adolescent girls for STD between January 1978 and December 1985. Their mean age

was 14.1 (range 12 to 16) years. Of the 210 girls, 187 (89%) were white, eight (4%) were black (West Indian), three (1%) were Asian, and 12 (6%) were of mixed ethnic origin. The girls were self referred after being counselled by the residential staff of the assessment centre. Each girl was interviewed and examined by a visiting genitourinary physician. A previous admission into residential care with screening for STD did not preclude further investigation. A new presentation of each patient who attended more than once was reported as a separate diagnosis. A detailed genitourinary and sexual history was obtained.

Each patient underwent a full pelvic examination, during which clinical findings were recorded. Routine investigations comprised microscopy of urethral, cervical, and vaginal specimens, cultures for *Neisseria gonorrhoeae* from the urethra and cervix, and culture for *T vaginalis* from the vagina. Standard methods of specimen collection, culture techniques, and diagnostic criteria have been described.⁴ This analysis is of 210 girls; in the second half of the study period (from 1981) specimens for culture for *C trachomatis* were also collected from 134 girls. A cotton wool swab was rotated in the cervical canal and broken off into a bijou bottle containing 0.2 mol/l sucrose phosphate transport medium. This was kept at 4°C until inoculated on to chlorheximide treated McCoy cells. Cell monolayers were stained with Giemsa, and were examined for typical inclusions after being incubated for 48 hours. In patients with genital ulceration, exudate from the base of the ulcers was collected on a cotton wool swab and placed in virus transport medium until inoculated on to confluent monolayers of human embryo fibroblasts, which were incubated at 37°C for up to 14 days and observed daily for the characteristic cytopathic effect of herpes simplex virus. Serological testing for syphilis was performed in all cases.

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TABLE I Sexual histories of 210 adolescent girls in residential care screened for sexually transmitted diseases

Sexual history	No (%) of girls
Had engaged in prostitution	47 (22.4)
Sexually abused	7 (3.3)
Regular (more than 4 weeks' duration) sexual partner	74 (35.2)
Two or more sexual partners within preceding four weeks	66 (31.4)
Denied having had sexual intercourse	16 (7.6)

Results

There were 307 new presentations of 210 girls screened for STD, many of the girls having repeated admissions for separate offences. Of the 210 girls, 47 openly admitted to having engaged in prostitution. Seven had been sexually abused (three had been raped and four had been exposed to incest from the ages of 5 to 8 years). These sexual histories are summarised in table I.

TABLE II Pattern of sexually transmitted disease (STD) in 210 adolescent girls in residential care

No of episodes of STD	No of girls
0	132
1	35
2	25
3	11
4 or more	7

Table II shows that 132 of the 210 girls screened had no evidence of STD. The remaining 78 girls presented 175 times, with seven girls having four or more infections, 11 having three infections, and 25 having two infections with sexually transmitted pathogens. The prevalence of *N gonorrhoeae*, *T vaginalis*, *C trachomatis*, herpes simplex viral infection, and genital warts is shown in table III. In 307 new presentations of 210 girls screened between January 1979 and December 1985, 42 infections with *N gonorrhoeae* (13.7%) and 49 infections with *T vaginalis* (16%) were diagnosed. *C trachomatis* was isolated from cervical cultures in 32 of 198

TABLE III Prevalence of sexually transmitted disease (STD) in adolescent girls

Infective organism	No of presentations	No (%) of episodes
<i>Neisseria gonorrhoeae</i>	307	42 (13.7)
<i>Trichomonas vaginalis</i>	307	49 (16)
<i>Chlamydia trachomatis</i>	198	32 (16.2)
Genital wart virus	307	12 (3.9)
Herpes simplex virus	307	4 (1.3)

presentations (16.2%) screened during the later period January 1981 to December 1985. *N gonorrhoeae* and *C trachomatis* were isolated together in seven of these cases. We arbitrarily divided our results into three periods, 1978–80, 1981–3, and 1984–5 for further analysis (table IV). Though we recognised that significant changes in incidence cannot be concluded from this data, the trend suggests that *C trachomatis* and *T vaginalis* are increasingly important pathogens in sexually active adolescents in residential care.

Herpes genitalis and genital warts were diagnosed on four and 12 occasions respectively. It is noteworthy that cervical cytology in two girls with genital warts showed dysplasia when the girls were seen at Leeds General Infirmary two years later. The other 10 girls were lost to follow up after discharge from the assessment centre.

Two girls had pediculosis pubis and four had scabies. The prevalence of these infestations is undoubtedly an underestimate. Because of the risk of spreading parasitic infections in an institution, all symptomatic girls are disinfested on admission to the centre, before a definitive diagnosis can be made by the visiting doctor.

Pelvic inflammatory disease was diagnosed clinically on the basis of pyrexia, abdominal pain, vaginal discharge, pain on cervical excitation, and adnexal tenderness on bimanual examination in 16 girls, of whom five yielded *C trachomatis* on cervical culture and six yielded *N gonorrhoeae* from the urethra and cervix. One girl aged 13 years had a gonococcal Bartholin's abscess that required surgical intervention.

Syphilis serology test results were negative in all cases.

TABLE IV Prevalence of sexually transmitted disease (STD) in adolescent girls during three periods

Infective organism	No infected (% presented) in:		
	1978–80 (109 presented)	1981–3 (115 presented)	1984–5 (83 presented)
<i>Neisseria gonorrhoeae</i>	19 (17.4)	16 (13.9)	7 (8.4)
<i>Chlamydia trachomatis</i>	ND	11 (9.6)	21 (25.3)
<i>Trichomonas vaginalis</i>	11 (10.1)	17 (14.8)	19 (22.9)

ND = Not done.

Discussion

Adolescents are engaging in sexual intercourse at an earlier age, and often with multiple partners. This emerges from a background of increased urbanisation, changing sexual mores, and an earlier age of menarche.^{5,6} Screening adolescents for sexually transmitted infections is now routine in many health care settings in the United States of America. The results of this study confirm that *C trachomatis*, *N gonorrhoeae*, and *T vaginalis* can often be identified in sexually active girls aged under 16 in residential care in the United Kingdom.

Our study population clearly showed several risk factors for STD: early age at first intercourse, low socioeconomic background, history of sexual abuse, and a 23.3% (47/210) prevalence of prostitution in girls aged 12 to 16. In contrast to North American study groups, which contained mainly black girls, 89% of our girls were white.

In a study of delinquent girls in Scotland during the 1960s, *N gonorrhoeae* was isolated in 1.8% and *T vaginalis* in 23.6% of 110 girls screened.⁷ In the study published here *N gonorrhoeae* was isolated on 42 occasions (13.7% of presentations). A prevalence rate as high as this has only been seen otherwise in an STD clinic. The overall prevalence rate for *C trachomatis* was comparable with those found in women attending STD clinics⁸ and in adolescents attending obstetric clinics.⁹ In the later period, 1984–5, the incidence of infection with *C trachomatis* (25.3% of presentations) and *T vaginalis* (22.9%) indicated that infections with these pathogens may be increasingly important in adolescent girls in care. The implications are clearly shown. It is interesting that a core group of 78 girls contributed all the positive results.

Recent trends for pelvic inflammatory disease in the United Kingdom have shown age specific rates increasing in the 15 to 19 and 20 to 24 year old age groups.¹⁰ The risk of acquiring salpingitis of a sexually active 15 year old girl in Sweden has been calculated to be 1:8 and of girls aged 16 years 1:10.¹¹ These workers showed an appreciable decrease in the incidence of pelvic inflammatory disease with increasing age in sexually active women. They also estimated that one out of four women with pelvic inflammatory disease would suffer from one or more episodes of chronic abdominal pain, infertility, or ectopic pregnancy. Of the 210 girls in our study, 16 had a clinically diagnosed pelvic inflammatory disease at presentation. More importantly, 16.4% of girls infected on presentation with *N gonorrhoeae* or *C trachomatis*, or both, had pelvic inflammatory disease. This high morbidity from sexually transmitted infections in such a young age group is a matter of considerable concern.

Cervical intraepithelial neoplasia has been strongly linked with papillomavirus infection.¹² One study

estimated that the prevalence rate for early neoplastic changes on cervical cytology was 35/1000 in sexually active adolescent girls aged 12 to 16 who were in a youth detention centre in New York City.¹³ In Leeds 12 of 210 girls had papillomavirus infection, and we know that two of them had cervical dysplasia two years later. This indicates that routine cytological screening of sexually active adolescents in care in the United Kingdom should also be instituted.

We have identified young girls in residential care in Leeds as being a major risk group for sexually transmitted infections. Probably none of the girls screened would have sought specific care or advice for STD outside an institutional setting. In view of the high morbidity from sexually transmitted infections, in particular pelvic inflammatory disease, it is important to investigate and treat similar teenagers at risk throughout the United Kingdom.

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