ORIGINAL ARTICLE

Urine based screening for asymptomatic/undiagnosed genital chlamydial infection in young people visiting the accident and emergency department is feasible, acceptable, and can be epidemiologically helpful

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Objective: To assess the acceptability and the feasibility of urine based *Chlamydia trachomatis* screening in asymptomatic young people aged 16–35 years attending an inner city accident and emergency (A&E) department.
Design: Cross sectional study.
Setting: A&E department in a teaching hospital, in south London, UK.
Method: From July to November 2001 a urine based chlamydia screening test was offered to 719 consecutive A&E attendees aged 16–35 years and their companions. Participants were given an information sheet and were asked to complete a demographic and sexual health questionnaire. Following informed consent, eligible participants provided first pass urine specimens. Specimens were tested for *C trachomatis* using nucleic acid amplification.
Results: Of the A&E attendees asked, 76.5% (550/719) agreed to participate. Prevalence of genital chlamydial infection was 4.2% (18/432; 95% confidence interval (CI) 2.5 to 6.6). 12 of the positive participants (66.7%; 95% CI 40.99 to 86.65) were women, of whom seven were Afro-Caribbean. Nine of the chlamydia positive participants (50%; 95% CI 26.0 to 73.9) were aged 25 years. Three of the positive urine specimens were from companions, of whom a total of 143 were screened. All the positive participants were contactable, and were offered treatment.
Conclusion: Urine based screening for undiagnosed genital chlamydial infection in the A&E department was acceptable and feasible. The department provides a unique site for screening young patients and companions, men and women.

In the United Kingdom, the prevalence of genital chlamydial infection varies from 1% to 29%.[1] However, the exact prevalence of genital chlamydial infection is largely unknown. The majority of the infected individuals are asymptomatic, hence undiagnosed and untreated.[2] The complications of the infection in women—namely, pelvic inflammatory disease, infertility, and ectopic pregnancy are the most costly outcomes of any sexually transmitted infection except HIV.[3] In the United Kingdom, they cost at least £50 million annually.[2] Genital chlamydial infection is also a recognised risk factor for transmission of HIV infection,[3] and a new study reported that genital chlamydial infection could be a risk factor for cervical cancer.[4]

The economic and social implications of genital chlamydial infection can justify the need for a preventive intervention that can identify asymptomatic individuals. A large randomised trial has shown that screening significantly reduces the prevalence of genital chlamydial infection in women.[5] Economic analyses have shown that screening women only is the most cost effective approach if the male sexual contacts are identified and treated through notification.[6] However, screening is not always acceptable in young women.[7] Tracing a "casual" sexual partner is not always possible, and asymptomatic young people may not be aware of their infection, hence they do not seek sexual health services or visit their general practitioners (GPs). There is a need to trace the asymptomatic/undiagnosed genital chlamydial infection in young men and women in other venues. The accident and emergency (A&E) department is a busy walk-in site for young people to attend. Opportunistic chlamydia screening can identify asymptomatic infected individuals in this busy venue. However, the acceptability of screening is an important factor for a successful programme. Our study evaluated the acceptability and feasibility of screening in this setting.

METHODS

We performed a cross sectional study in the A&E department at St George's Hospital, London. We obtained approval from the local ethics committee. Chlamydia information and posters were provided in the A&E department. From July to November 2001, consecutive men and women (patients and companions) aged 16–35 years visiting the A&E department were invited to participate when the investigator was in attendance. All the A&E patients are assessed by a triage nurse. Non-urgent cases waited between 1 and 19 hours to be seen. We approached patients and their companions to participate before or after they had seen the triage nurse. Those who agreed to take part were offered a chlamydia study information sheet, and were asked to complete a demographic and sexual history questionnaire. A volume of 20–30 ml of first void urine specimen was collected from each eligible participant. The urine specimens were stored at 4°C and processed within 5 days of collection by the Becton-Dickinson ProbeTecET (BD ProbeTec) assay.

The exclusion criteria were men and women with urgent medical/surgical conditions, those with no previous sexual experience, and those who had been on antibiotic treatment during the past month. The latter might suppress chlamydial infection and produce a false negative result. Participants with symptoms indicating a possible sexually transmitted infection (STI) were also excluded, as the objective of the screening is to

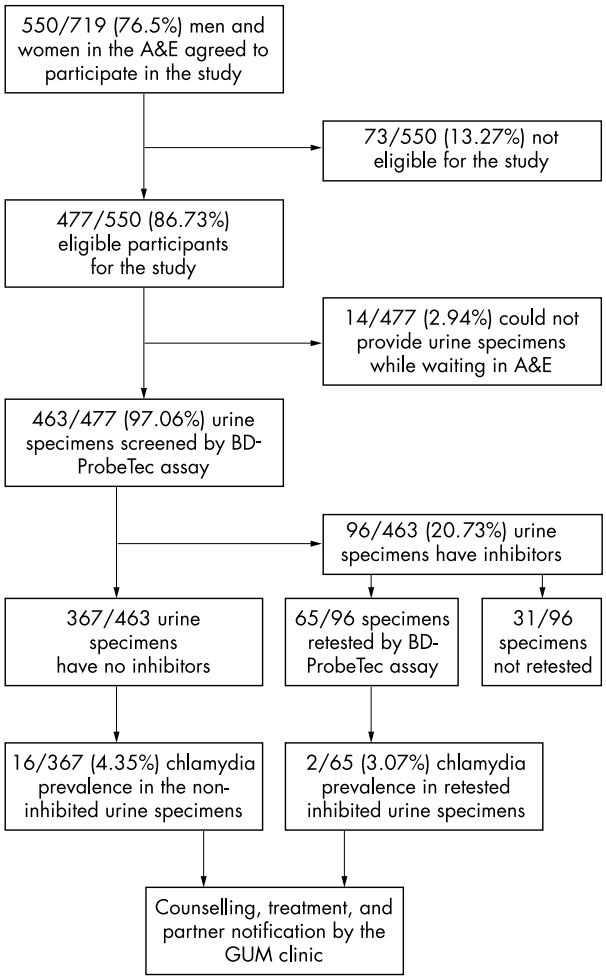

Figure 1 Flow chart of the chlamydia screening study in the A&E department.

identify the asymptomatic infected individuals. Symptomatic individuals usually seek medical care. No incentives were offered for participation in the study. SPSS 10 was used for data analysis. The relation between genital chlamydial infection and the risk factors was measured by χ^2 test.

Confidentiality was addressed in the patient information sheet. Each participant was asked to telephone for the results 2 weeks after the screening. Chlamydia positive participants were offered a full STI screen, chlamydia treatment, and partner notification in the genitourinary medicine (GUM) clinic of the same hospital. A standard letter was sent to the chlamydia positive participants who did not telephone for their results, and reminder letters were sent after 7, 14, and 21 days.

RESULTS

Of the A&E attendees asked, 76.5% (550/719) agreed to participate in the study (304 men and 246 women); 23.5% (169/719) refused to participate (90 men and 79 women), 13% (73/550) were not eligible, and 2.9% (14/477) could not provide urine while waiting in the A&E department (fig 1). The acceptability and the refusal rates for men and women were 77.2%, 22.8% and 75.7%, 24.3%, respectively. Chlamydia prevalence was 4.2% (18/432; 95% CI 2.5 to 6.6), and 20.7% (96/463); 95% CI 17.13 to 24.71 of urine specimens had inhibitors.

The demographic characteristics, sexual behaviour, and the sexual history of the eligible and the screened participants are shown in table 1. Non-eligible participants and people who declined participation in the study had similar demographic characteristics to the screened participants. Half of the chlamydia positive participants were aged ⩽ 25 years. Of the chlamydia positive participants, 66.7% (12/18) were women, of whom 39% (7/18) were Afro-Caribbean. Thirteen of the female participants were pregnant and one of them was chlamydia positive. Eight of the participants were homosexual men, of whom one was chlamydia positive. One of the homosexual participants has HIV infection, but could not provide a urine sample. Three of the positive participants were companions, of whom a total of 143 were screened.

The majority of the chlamydia positive participants (13/18) had visited the A&E department complaining of minor trauma. One of the chlamydia positive participants presented with cardiac arrhythmia and one was admitted with asthma. Of eligible participants, 54.7% had not heard about chlamydia, and 76.3% of those who had heard were not aware of its complications, including 14 of the chlamydia positive participants. Sixteen per cent (76/477) of the eligible participants gave a previous history of STDs (table 1). All the positive participants were contactable.

DISCUSSION

In the United Kingdom, genital chlamydial infection is the commonest bacterial STD.[2 8] In spite of the widespread national sexual health service, the prevalence of the infection is still on the increase.[8] The asymptomatic nature of the infection impairs its control. Chlamydia screening can identify the undiagnosed/asymptomatic individuals. However, the majority of screening studies focused mainly on screening women.[6 7 9] Male screening is also important as the detection rates for asymptomatic individuals might differ in discordant couples.[10] No studies described the effectiveness of screening or early treatment for men in reducing transmission to women or in prevention of acute infections or complications in men. More studies are needed to evaluate the cost effectiveness of chlamydia screening men and women.[9]

The sexual health strategy in the United Kingdom is the first national strategy to control STD/HIV. It proposes a closer collaboration between primary care and specialist services.[11] However, the strategy may miss undiagnosed chlamydia infected young people who may not be registered with a GP, or may be reluctant to attend a GUM clinic. Data from GUM clinics can underestimate the burden of STIs in the general population. Less than 10% of genital chlamydial infections are thought to be diagnosed in GUM clinics.[8] In our study, 77% of the screened participants had never attended a GUM clinic, including 72% (13/18) of the chlamydia positive participants (table 1).

The A&E department is one of the busiest walk-in healthcare settings. It provides an alternative site for chlamydia screening. The screening in a busy urban A&E department can not only identify the undiagnosed cases in the community, but also can monitor trends in the prevalence of the infection outside the GUM setting, as a sentinel site. To our knowledge, this is the first urine based chlamydia screening study in the United Kingdom, performed in an A&E department. Similar screening studies in the A&E department were performed in the United States on adolescents[12] and adults.[13] They reported higher prevalence rates of the infection. This is probably because of the difference in the populations, and/or difference in the screening test they used (ligase chain reaction).

St George's Hospital is one of the largest hospitals in the United Kingdom, with 1170 beds. The hospital serves a multiethnic community in south London. Its A&E department provides a free walk-in service, and it was visited by around 90 000 patients in 2001. The actual numbers attending are much higher than this figure as the majority of the patients are accompanied by their sexual partners, relatives, or friends.

The feasibility of screening young people in the A&E department relies on the collaboration between the GUM and

Table 1 Demographic characteristics, sexual behaviour, and sexual history of eligible participants, screened participants, and chlamydia positive participants

Demographic, sexual behaviour and sexual history correlates	Eligible participates (n=477)	% of 477	Screened participants (n=432)	% of 432	Chlamydia positive participants (n=18)
Age (years)					
16–17	13	2.73	13	3.009	0
18–20	54	11.32	49	11.343	6
21–25	140	29.35	125	28.935	3
26–30	181	37.95	160	37.037	4
31–35	89	18.66	85	19.676	5
Sex					
Female	213	44.65	196	45.370	12
Male	264	55.35	236	54.630	6
Patient/companion					
Patient	334	70.02	301	69.676	15
Companion	143	29.98	131	30.324	3
Ethnicity					
Bangladeshi	1	0.21	1	0.231	0
Black Caribbean	30	6.29	27	6.250	3
Black African	29	6.08	26	6.019	3
Black other	14	2.94	13	3.009	0
Chinese	3	0.63	3	0.694	0
Indian	11	2.31	9	2.083	0
Pakistani	10	2.10	9	2.083	0
White	350	73.38	315	72.917	11
Other	29	6.08	29	6.713	1
Alcohol intake unit/week					
>21/week	36	7.55	33	7.639	1
<21/week	441	92.45	399	92.361	17
Meeting place					
Pub	54	11.32	48	11.111	5
Club	46	9.64	40	9.259	2
Other	377	79.04	344	79.630	11
Number of sexual partner(s) in the past year					
0	17	3.56	15	3.472	0
1	316	66.25	290	67.130	6
2	74	15.51	65	15.046	5
>2	70	14.68	62	14.352	7
Condom use					
Never	158	33.12	147	34.028	4
Sometimes	229	48.01	205	47.454	10
Always	90	18.87	80	18.519	4
History of STIs					
Chlamydia	29	6.08	26	6.019	2
Gonorrhoea	8	1.68	6	1.389	1
Genital herpes	8	1.68	8	1.852	0
Genital warts	21	4.40	19	4.398	1
Syphilis	0	0.00	0	0.000	0
Non-specific	9	1.89	9	2.083	0
HIV	1	0.21	0	0.000	0
GUM visit					
Yes	112	23.48	98	22.685	5
No	365	76.52	334	77.315	13
Chlamydia knowledge					
Yes	216	45.28	211	48.843	4
No	261	54.72	221	51.157	14
Sexual orientation					
Heterosexual	469	98.32	425	98.380	17
Homo/bisexual	8	1.68	7	1.620	1

the A&E departments. Screening can be incorporated into the triage process relatively simply. Triage nurses usually see all the A&E attendees and they can be trained to offer the urine test to young people and their companions. Providing chlamydia information sheet and posters in the A&E department can enhance the awareness of young people about the infection and their participation in the screening.

Our study was not designed to evaluate the prevalence of the infection. Nevertheless, we found a prevalence of genital chlamydial infection of 4.2%. Previous studies of chlamydia screening showed that offering screening to young women <25 years appears to be effective even in a setting with low to moderate chlamydia prevalence rate (3% to 6%).[9] The prevalence of genital chlamydial infection varies considerably between published studies, as did the criteria for case selection, sample size, age of the study population, and laboratory tests used. In our study, there was high rate of inhibitors (20.73%) in the urine specimens, which could underestimate the prevalence of the infection (fig 1). This problem can also cause distress to the participants who are requesting their results. In addition, extra costs are incurred by retesting inhibited specimens.

The cause of the inhibited urine specimens is unknown. A previous study reported a lower percentage of inhibitors by using BD ProbeTec ET assay.[14] To overcome the inhibitors problem we diluted 65 of the inhibited urine suspension by 1 in 4. The dilution revealed a further two chlamydia positive urine specimens. Although the high rate of inhibitors and the

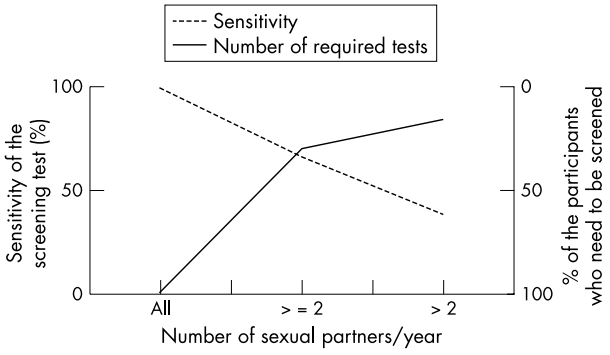

Figure 2 The relation between the number of sexual partners in the past year and the sensitivity of the screening test.

dilution of the inhibited specimens were a matter of concern, the prevalence of the infection remains the same (fig 1) after excluding the inhibited specimens from the study sample ($p = 0.88$). Another factor which could underestimate the prevalence of the infection is the low participation of adolescents (table 1), owing to a delay in obtaining ethical approval for recruiting young people <18 years. The local ethics committee was concerned about compromising the confidentiality of the teenagers.

The recruitment of the participants was non-selective and the prevalence of the infection in female participants was higher (6.12%) than in male participants (2.54%). This is probably because the nature of the infection is more symptomatic in men than in women,[2] hence more men seek medical treatment. However, regression analysis of the potential risk factors showed no significant correlation between chlamydia and sex, race, age, and condom use (table 2). The number of sexual partners in the past year was the only independent risk factor for genital chlamydial infection. The prevalence of the infection was higher, 8% and 11% in participants who had two and more than two sexual partners during the past year, respectively (table 2). Thus, if the screening was offered only to those who had two sexual partners/year, the sensitivity of the screening would be 67% and only 30% of the original sample size needed to be screened (fig 2). However, measuring the true cost of the screening can determine the cut-off point for an effective screening.

In summary, the urine based chlamydia screening of young people in the A&E department was acceptable and feasible. Previous screening studies had focused mainly on women. The A&E department provides an alternative site for screening men and women, and has advantages of testing the patient's companion. The A&E department can also be used to disseminate sexual health information to enhance young people's health awareness about the infection. Further studies are needed to estimate the cost effectiveness of opportunistic screening of genital chlamydial cases out side the GUM stetting.

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CONTRIBUTORS

TA conducted the study, wrote the paper, and helped in study design and analysis of the data; AH analysed the study data; PH designed the study and helped in writing the paper.

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Table 2 Relations between genital chlamydial infection and potential risk factors

Demographic and sexual behaviour correlate of the screened participants	Number of chlamydia positive participants/ total number in the same group	Prevalence of chlamydia positive participants/ total number of screened participants in the same group	95% CI	Crude odds ratio	95% CI	p Value	Adjusted odds ratio	95% CI	p Value
Age (years)									
<21	6/62	9.67%	3.6 to 19.9	1			1		
≥21	12/370	3.24%	1.8 to 5.8	0.31	0.11 to 0.87	0.045	0.456	0.148 to 1.40	0.17
Sex									
Male	6/236	2.54%	1.0 to 5.7	1			1		
Female	12/196	6.12%	3.2 to 10.5	2.5	0.93 to 6.86	0.064	2.55	0.85 to 7.63	0.094
Number of sexual partner (s) in the past year									
<2	6/305	1.96%	0.8 to 4.4	1			1		
2	5/65	7.69%	2.5 to 17.0	4.1	1.2 to 14.1	0.038	3.82	1.00 to 14.61	0.05
>2	7/62	11.29%	4.6 to 4.8	6.3	2.1 to 19.6	0.001	7.96	2.24 to 28.19	0.001
Ethnicity									
White	11/315	3.49%	1.8 to 6.3	1			1		
Black	6/66	9.09%	3.4 to 18.7	2.76	0.98 to 7.8	0.093	1.7	0.52 to 5.60	0.376
Others	1/51	1.96%	0.1 to 11.7	0.55	0.1 to 4.38	0.88	0.81	0.09 to 6.96	0.849
Condom use									
Never	4/147	2.72%	0.8 to 7.3	1			1		
Sometimes	10/205	4.87%	2.4 to 9.0	1.8	0.56 to 5.96	0.31	0.97	0.26 to 3.63	0.967
Always	4/80	5.00%	1.3 to 12.3	1.88	0.46 to 7.73	0.61	0.928	0.19 to 4.50	0.926
Alcohol intake/week									
Normal*	17/399	4.26%	2.6 to 6.9	1			1		
High†	1/33	3.03%	0.2 to 17.5	0.56	0.07 to 4.3	0.91	0.448	0.52 to 3.82	0.463

*Normal = ≤14 units/week for women and ≤21 units/week for men.
†High = >14 units/week for women and >21 units/week for men.

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